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Radiative recombination and photoionization cross sections for heavy element impurities in plasmas

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Abstract

We have performed fully relativistic Dirac–Fock calculations of total cross sections for radiative recombination of heavy element impurities with electrons and subshell photoionization cross sections for 31 ions of Fe, Ni, Cu, Mo, and W, which are important elements in plasma studies. The electron kinetic energy range is 4 eV to 50 keV. To obtain the total radiative recombination cross section, subshell cross sections were calculated for ground and all excited electron states up to states with principal quantum number $n = 20$. The total radiative recombination cross sections are presented in tabular and graphical forms. The subshell photoionization cross sections for excited states with $n \leqslant 12$ and orbital momenta $\ell \leqslant 6$ were fitted by a simple analytical expression with five fit parameters. The fit parameters are tabulated.

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1. Introduction

Radiative recombination (RR) is an important mechanism in the ionization equilibrium and thermal balance in laboratory plasmas and gaseous nebulas. Therefore, cross section data for RR of an electron with ions, as well as cross sections for the inverse process of photoionization, are needed in solving many problems in laboratory plasma physics and astrophysics. In particular, data for impurity atoms and ions in fusion plasmas play an important role for modelling and diagnostics. In the RR process, an electron is captured in ground and excited states of the impurity ion and a photon is simultaneously emitted. The radiation carries information about plasma regimes which can be used to measure plasma parameters (e.g., electron temperature).

Radiative recombination cross sections (RRCSs) are obtained from photoionization cross sections (PCSs) using the principle of detailed balance. A number of PCS calculations are available, however, almost all are for the ground state of atoms and ions. For example, configuration-averaged PCSs were calculated in Refs. [1,2] for all subshells of ground state atoms with atomic numbers $Z \leqslant 100$ within the relativistic Dirac–Slater (DS) method for several values of photon [1] and photoelectron [2] energies. The PCSs for all shells of ground states of atoms and ions from He to Zn were calculated by the same method in Refs. [3,4] for photon energies $E_{\rm th} + 4\ {\rm eV} \leqslant k \lesssim 100E_{\rm th}$, where $E_{\rm th}$ is the ionization threshold. The PCSs were fitted by simple analytical expressions involving five fit parameters. The average error of the fits was less than 2%, the maximum error being between 4% and 14%. However, the DS method may give significant errors near the threshold for the outer shells of neutral and low states of ionization of atoms. This may lead to large errors in the low-temperature RR rate coefficient for these species.

As for excited states of atoms and ions, there exist only a few calculations of PCSs and RRCSs, in particular we note the following:

(i) Clark et al. [5] performed relativistic Hartree–Fock calculations of the configuration-averaged PCSs for the ground and excited electron states with quantum numbers $1{\rm s} \leqslant n\ell \leqslant 5{\rm g}$ in the He-like through Al-like isoelectronic sequences of atoms ionized four or more times with $6 \leqslant Z \leqslant 100$. The PCSs were fitted by analytical expressions involving 15 fit parameters in the photon energy range between $E_{\rm th}$ and $10E_{\rm th}$, with the average fitting error being less than 10% (the maximum error between 10% and 50%).

(ii) The Opacity Project, led by Seaton [6], entails extensive nonrelativistic Hartree–Fock and close-coupling calculations of PCSs for the ground and low excited states of atoms and ions. During the project, PCSs for a large number of atoms and ions were computed, primarily for astrophysical applications (see, e.g., [7], TOPbase, version 0.7).

(iii) The unified scheme incorporating both the RR and dielectronic recombination in the framework of the R-matrix method was used for the study of electron–ion recombination by Nahar and Pradhan [8–10] with allowance made for relativistic effects in the Breit–Pauli approximation. The calculations are very sophisticated and to date, PCSs and the RR rate coefficients have been obtained for ~50 ions, primarily for elements of astrophysical interest.

(iv) Exact relativistic benchmark calculations of PCSs were performed by Ichihara and Eichler [11] for the K, L, and M shells of hydrogen-like ions and, consequently, RRCSs for RR of an electron with bare nuclei with charge numbers $1 \leqslant Z \leqslant 112$. The results of the calculations for a few representative cases were compared with those derived from the widely used nonrelativistic dipole (ND) approximation in order to assess the accuracy of the latter. They summarized the results as follows. (a) For $Z \lesssim 30$ and electron kinetic energy $E_k \leqslant 10$ keV, the discrepancies between ND and exact relativistic cross sections are less than 10%. (b) For $Z \lesssim 50$ and $E_k \leqslant 10$ keV, the ND approximation uncertainties are about 10%. (c) For $Z = 92$, the discrepancy amounts to more than 10% even at the lowest electron energy ($E_k = 1$ eV).

(v) Exact relativistic calculations of total and differential cross sections for RR of electrons with the H-, He-, and Li-like uranium ions were carried out in our paper [12] in the framework of the Dirac–Fock (DF) method, with regard to the contribution of the Breit electron interaction and the main quantum electrodynamic corrections. The effect of finite nuclear size and all multipole orders of the photon field were taken into account. The subshell cross sections were calculated with an accuracy of 0.1%. The calculation's accuracy was verified by comparing our results for RR of the electron with bare nuclei with benchmark calculations by Ichihara and Eichler [11].

The PCSs obtained by Clark et al. [5] were used, for example, by Arnaud and Raymond [13] for the calculation of the RR rate coefficients for the iron ions and by Verner and Ferland [14] for ions of all elements from H through Zn. Verner and Ferland noted that the analytical expression for PCSs presented by Clark et al. [5] did not ensure a correct asymptotic behavior (cross sections decrease too slowly with increasing energy) because the expression fits the numerical values of PCS up to $10E_{th}$ only. This leads to unnaturally high rate coefficients, for example, for Na-like species at temperature $T \sim 10$ keV. To avoid this situation, Verner and Ferland [14] substituted expressions for the high energy tails proportional to E^{-3} in the range from $10E_{th}$ to $100E_{th}$ and by the ND asymptote above $100E_{th}$. TOPbase [7] also gives inaccurate high-energy tails.

Our goal is to produce a new, unified database for the RR and photoionization cross sections as functions of the electron energy for a number of heavy element impurity ions occurring in plasmas. Preliminary results are given in Ref. [15]. In the present paper, the total RRCSs and the subshell PCSs are given for 31 ions of Fe, Ni, Cu, Mo, and W which are most important in fusion studies [16]. The calculations were performed as in Ref. [12], using the fully relativistic DF method where, as distinct from the DS method used in our previous papers [1–4], the electron exchange interaction was taken into account exactly, both for the bound electrons and between bound and free electrons. Therefore, we have the correct relativistic, asymptotic behavior of PCSs and RRCSs as opposed to the ND approximation.

The subshell RRCSs and PCSs were computed for ground and all excited states up to those with principal quantum number $n = 20$. The total RRCSs were calculated with regard to the contributions of all these subshells. The total RRCSs are presented in Graph 1 and Table 1 for 41 values of the electron kinetic energy E_k from the range $4\text{ eV} \leqslant E_k \leqslant 50$ keV. Energy points are spaced logarithmically over the range.

The subshell PCSs for ground and excited states with $n \leqslant 12$ and orbital quantum number $\ell \leqslant 6$ obtained in the calculations were fitted by the analytical expression with five fit parameters. The fit parameters for ~3300 electron states are given in Table 2.

2. Method of calculation

Radiative recombination of the electron with the N-electron ion results in the $(N+1)$-electron ion. The subshell RRCS for the recombining ion when the electron is captured to the ith subshell can be expressed in terms of the corresponding PCS per one electron $\sigma_{ph}^{(i)}$ for the recombined $(N+1)$-electron ion, [17]

$$\sigma_{rr}^{(i)} = \frac{k^2 q_v}{2E_k}\sigma_{ph}^{(i)}. \tag{1}$$

The transfer coefficient can be derived from the principle of detailed balance. In Eq. (1), k is the photon energy and q_v is the number of vacancies in the ith subshell prior to recombination. (Relativistic units ($\hbar = m_0 = c = 1$) are used in Eqs. (1)–(4).) The subshell PCS can be written in the form

$$\sigma_{ph}^{(i)} = \frac{4\pi^2\alpha}{k(2j_i+1)}\sum_L\sum_\kappa[(2L+1)Q_{LL}^2(\kappa) + LQ_{L+1L}^2(\kappa) + (L+1)Q_{L-1L}^2(\kappa) - 2\sqrt{L(L+1)}Q_{L-1L}(\kappa)Q_{L+1L}(\kappa)]. \tag{2}$$

Here L is the multipolarity of the radiation field, $\kappa = (\ell - j)(2j+1)$ is the relativistic quantum number, j is the total angular momentum of the electron, and α is the fine structure constant. The reduced matrix element $Q_{\Lambda L}(\kappa)$ is determined by the expression

$$Q_{\Lambda L}(\kappa) = ([\bar{\ell}][\ell_i]/[\Lambda])^{1/2}C^{\Lambda 0}_{\bar{\ell}0\ell_i 0}\mathcal{A}\begin{pmatrix}\bar{\ell} & 1/2 & j\\ \ell_i & 1/2 & j_i\\ \Lambda & 1 & L\end{pmatrix}R_{1\Lambda} + ([\ell][\bar{\ell}_i]/[\Lambda])^{1/2}C^{\Lambda 0}_{\ell 0\bar{\ell}_i 0}\mathcal{A}\begin{pmatrix}\ell & 1/2 & j\\ \bar{\ell}_i & 1/2 & j_i\\ \Lambda & 1 & L\end{pmatrix}R_{2\Lambda}, \tag{3}$$

where $\bar{\ell} = 2j - \ell$, $C^{\Lambda 0}_{\ell_1 0\ell_2 0}$ is the Clebsch–Gordan coefficient, $\mathcal{A}(\cdot)$ is the recoupling coefficient for the four angular momenta, $[a]$ denotes the expression $(2a+1)$, and $R_{1\Lambda}$ and $R_{2\Lambda}$ are the radial integrals in the form

$$R_{1\Lambda} = \int_0^\infty G_i(r)F(r)j_\Lambda(kr)\,\mathrm{d}r,$$
$$R_{2\Lambda} = \int_0^\infty G(r)F_i(r)j_\Lambda(kr)\,\mathrm{d}r. \quad (4)$$

In Eq. (4), $j_\Lambda(kr)$ is the spherical Bessel function of the Λth order, $G(r)$ and $F(r)$ are the large and small components of the Dirac electron wavefunction multiplied by r. In Eqs. (2)–(4), the subscript i is related to the bound electron while designations with no subscript are related to the continuum spectrum electron. Electron wavefunctions are calculated in the framework of the DF method; that is, the bound and continuum wavefunctions represent the solutions of the DF equations with exact consideration of the exchange interaction [18,19]. Both bound and continuum wavefunctions are calculated in the self-consistent field of the corresponding ions with $N+1$ and N electrons, respectively.

Further summing of subshell RRCSs $\sigma_{rr}^{(n\kappa)} \equiv \sigma_{rr}^{(i)}$ over all bound states produces the total RRCS which can be written as

$$\sigma_{rr}^{\mathrm{tot}} = \sum_{n=n_{\min}}^{\infty} \sum_{\kappa=\mp1,\mp2,\ldots,-n} \sigma_{rr}^{(n\kappa)}, \quad (5)$$

where $n_{\min}$ combined with the appropriate value of κ refers to the ground state of the recombined ion.

It should be emphasized that the PCS calculations performed by the DF method and by the DS method where the exchange is taken into consideration approximately, may significantly differ, especially for outer shells of low-charged ions. PCSs, $\sigma_{\mathrm{ph}}^{(i)}$, calculated within the DF method (solid lines) and DS method (dashed lines) for the $5d_{3/2}$, $5f_{5/2}$, $6s_{1/2}$, and $6p_{1/2}$ shells of the ion W^{5+} are shown in Fig. 1. These shells (along with appropriate fine-structure components) make a major contribution to the total RRCS for the corresponding recombining ion W^{6+}. As seen, there are significant differences between the two calculations. Exact values of the difference

$$\Delta_{\mathrm{mod}} = \left[\frac{\sigma_{\mathrm{ph}}(\mathrm{DS}) - \sigma_{\mathrm{ph}}(\mathrm{DF})}{\sigma_{\mathrm{ph}}(\mathrm{DF})}\right] \times 100\% \quad (6)$$

are given in Table A for four energies in the range under consideration. As is seen, at the low photoelectron energy, the difference Δ_{mod} is considerable. Even at the highest energy, 50.327 keV, differences between the DS and DF results are 17% for the $5d_{3/2}$ shell, 79% for $5f_{5/2}$, 18% for $6s_{1/2}$, and 28% for the $6p_{1/2}$ shell.

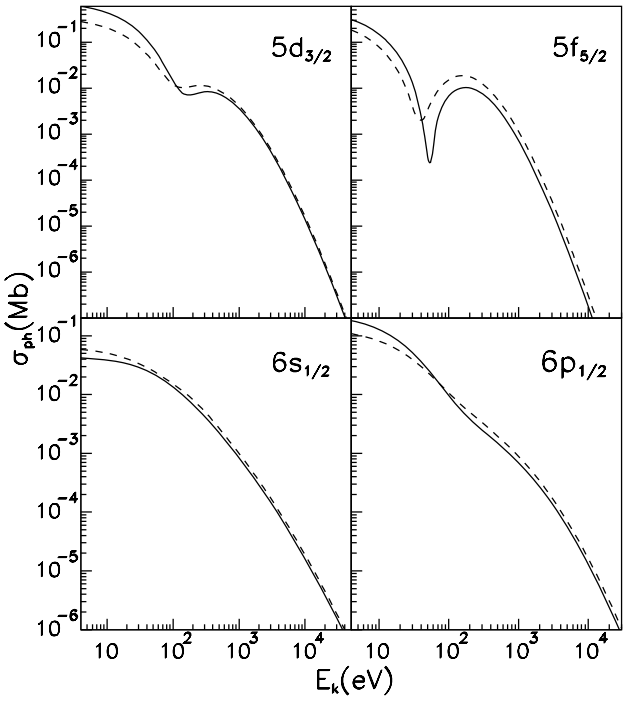

Fig. 1. PCS, $\sigma_{\mathrm{ph}}^{(i)}$, (in Mb) versus the photoelectron energy E_{k} for various shells of the ion W^{5+}. Solid, DF calculation; dashed, DS calculation.

Table A
Difference Δ_{mod} (in %) in PCSs calculated by the use of the DS and DF models for subshells of W^{5+}

E_{k}, eV	Subshell			
	$5d_{3/2}$	$4f_{5/2}$	$6s_{1/2}$	$6p_{1/2}$
10.3	−53	−48	31	−36
109	−6	112	14	13
1153	13	61	19	28
50327	17	79	18	28

Due to these differences in the PCS and thus in RRCS values, the more accurate DF model should be preferred. For the lowest states of highly-charged ions at reasonably high energies, the difference Δ_{mod} is small. For example, our DF calculation of RRCSs for the 2s, $2p_{1/2}$, and $2p_{3/2}$ shells of the He-like nickel agree with the DS calculations [17] within $\lesssim 3\%$ in the energy range 4 keV $\leqslant E_{\mathrm{k}} \leqslant$ 50 keV.

Note that at very low photoelectron energy, both of the one-electron approximations may not be quite accurate due to the possible influence of electron correlations. However, the correlation effect is not expected to be substantial for photoionization of ions with the only electron above a closed core or the He-like ions considered here. In Fig. 2, we compare our DF values of $\sigma_{\mathrm{ph}}(E_{\mathrm{k}})$ with relevant background nonresonant PSCs obtained by Nahar et al. [9,10] using the Breit-Pauli R-matrix method where the electron correlations are taken into account. The comparison is given for available ions having one electron above a closed core, namely for the Li-like ions. PCSs are presented for the 2s shell of the Ne^{7+} ion (Fig. 2(a)) and for the highly-charged Fe^{23+} ion (Fig. 2(b)). As is clearly seen, our results are in good agreement with R-matrix calculations in the electron energy range under consideration. The average deviations of the DF values from PCSs obtained using the R-matrix method are 3.7% for Ne^{7+} and 1.6% for Fe^{23+}.

The present DF calculations were performed by the use of our computer code package RAINE [19,20]. The numerical methods used in the codes, as well as the problems associated with the accuracy of calculations, were discussed

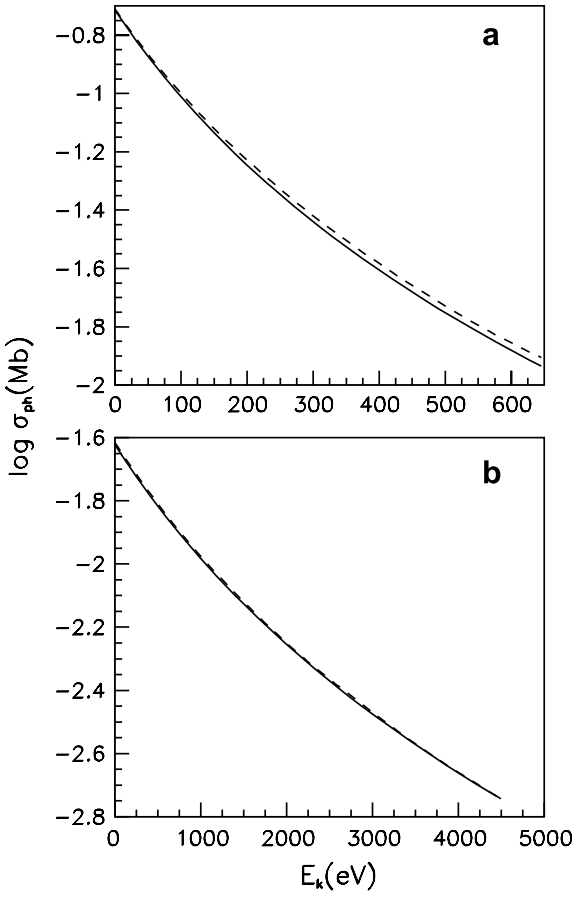

Fig. 2. A comparison between $\sigma_{ph}(E_k)$ calculated within the DF method (solid) and the R-matrix method [9,10] (dashed) for the 2s shell of the Li-like ions Ne^{7+} (a) and Fe^{23+} (b).

at length in Refs. [12,19]. It should be noted that the PCS is calculated with a numerical precision of about 0.1%.

3. Total radiative recombination cross sections

The ionic states of the heavy element impurities which are of the most importance in fusion study, are [16] (i) the fully stripped and H-like ions, (ii) the most stable He-, Ne-, Ar-, and Kr-like ions with closed shells, and (iii) the Ni-like ion for molybdenum and tungsten as well as the Pd- and Er-like ions for tungsten. As for point (iii), our DF calculations show that the Ni-like ions Mo^{14+} and W^{46+} with the configuration $[Ar]3d^4_{3/2}3d^4_{5/2}4s^2$ as well as the Er-like ion W^{6+} with configuration $[Xe]4f^6_{5/2}4f^6_{7/2}6s^2$ are metastable. Ground states of the ions Mo^{14+} and W^{46+} have the closed 3d shell $(3d^4_{3/2}3d^6_{5/2})$. These states are lower by 436 eV for Mo^{14+} and by 3162 eV for W^{46+} than the Ni-like configuration. The ground state of W^{6+} has the closed 4f-shell $(4f^6_{5/2}4f^8_{7/2})$ which lies 118 eV lower than the Er-like configuration. Because of that, we consider the 31 ions listed in Table B.

For these ions, we computed total RRCSs (see Eq. (5)) for the capture of the electron into all shells beginning from the first open shell up to shells with $n = 20$. For a specific

Table B
Ion stages considered in the present work

Configuration	Ion charge				
	Fe	Ni	Cu	Mo	W
Bare nucleus	26	28	29	42	74
H-like	25	27	28	41	73
He-like	24	26	27	40	72
Ne-like	16	18	19	32	64
Ar-like	8	10	11	24	56
$[Ar]3d^4_{3/2}3d^6_{5/2}$				14	46
Kr-like				6	38
Pd-like					28
$[Xe]4f^6_{5/2}4f^8_{7/2}$					6

value of n, all possible $2n - 1$ values of the quantum number κ were taken into consideration, provided the corresponding $\sigma_{rr}^{(n\kappa)}$ contribution to σ_{rr}^{tot} is larger than 0.01%.

The terms of the sum over κ in Eq. (5) decrease rather rapidly as κ increases. The higher the energy E_k, the more rapidly it decreases. Contributions of the terms corresponding to various orbital quantum numbers ℓ with respect to the total RRCS are plotted in Fig. 3 for three ions and four values of $E_k = 4$, 109, 1153, and 9646 eV; that is, we present the magnitude Δ_ℓ which can be written as

$$\Delta_\ell = [\sigma_{rr}^{(\ell)}/\sigma_{rr}^{tot}] \times 100\%, \quad (7)$$

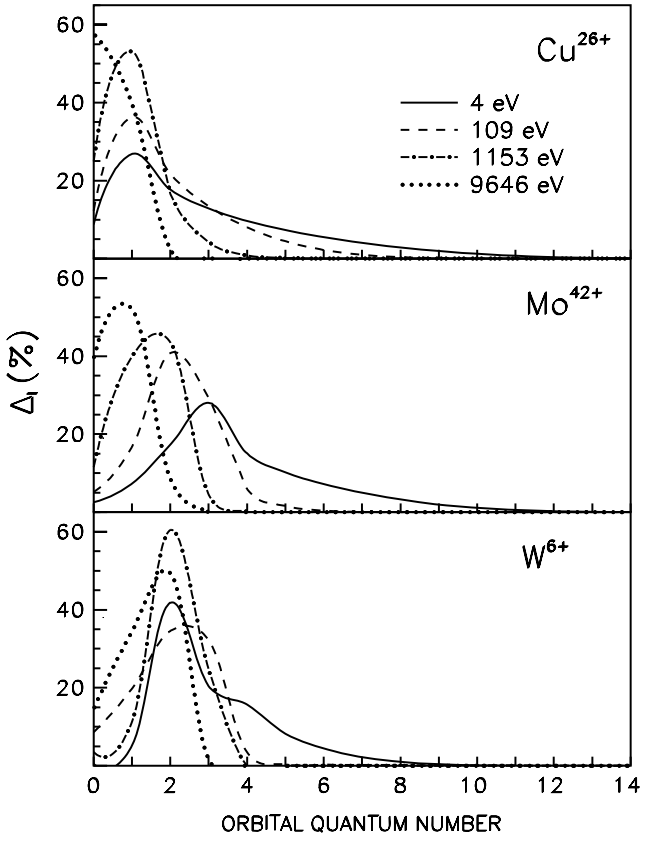

Fig. 3. Contribution Δ_ℓ (in %) of terms $\sigma_{rr}^{(\ell)}$ to the total RRCS (Eqs. (7) and (8)) for four values of the electron kinetic energy E_k.

where

$$\sigma_{rr}^{(\ell)} = \sum_{n=n_{\min}}^{20} \left(\sigma_{rr}^{(n\kappa=\ell)} + \sigma_{rr}^{(n\kappa=-\ell-1)}\right). \quad (8)$$

As is evident, in all cases $\sigma_{rr}^{(\ell)}$ with large value of $\ell \gtrsim 8$ do not contribute significantly to $\sigma_{rr}^{\rm tot}$. With regard to the rapid convergence of the sum over κ and a finite number of terms, we made allowance only for those values of κ which make a contribution to $\sigma_{rr}^{\rm tot}$ larger than 0.01%. Note that fit parameters for subshell PCSs are given for shells with $\ell \leqslant 6$.

A different situation exists in summation of the infinite series over n in Eq. (5). Relative contributions of the states with various n to the total RRCS

$$\Delta_n = [\sigma_{rr}^{(n)}/\sigma_{rr}^{\rm tot}] \times 100\%, \quad (9)$$

where

$$\sigma_{rr}^{(n)} = \sum_{\kappa=\mp1,\mp2\ldots-n} \sigma_{rr}^{(n\kappa)} \quad (10)$$

are given in Fig. 4 for the Ne-like ions Cu^{19+}, Mo^{32+}, and W^{64+} and for the same four energies E_k. We see that Δ_n decreases rapidly at $n \lesssim 8$ but there is no rapid convergence at higher n. Although the contributions Δ_n for the largest value $n = 20$ do not exceed several percent, the tails of all curves in Fig. 4 decrease very slowly—the lower E_k, the slower the decrease. So in the general case, the remainder of the infinite series in Eq. (5) should be taken into consideration.

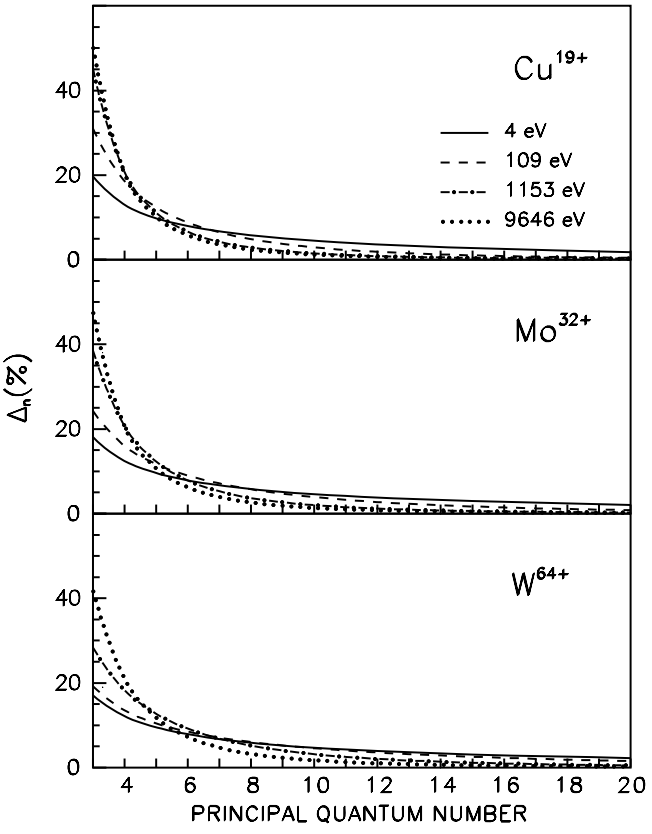

Fig. 4. Convergence of the infinite series over n (Eq. (5)) in the form of contributions Δ_n (in %) of terms $\sigma_{rr}^{(n)}$ to the total RRCS (Eqs. (9) and (10)) for four values of the electron kinetic energy E_k.

In a real plasma, however, there is a cutoff of bound levels from density effects, above which recombination is not meaningful. For fusion plasmas with electron density in the range of $10^{14}/\text{cm}^3$, the upper limit is $n \lesssim 20$. Therefore the correction associated with the remainder of the infinite series in Eq. (5) is not needed in fusion plasmas. Nevertheless, the correction should be taken into account for ideal plasmas (for example, low-density astrophysical plasmas). If necessary, this can be done in a number of ways [21,22].

In Ref. [21], the method for quantitative calculation of total RRCSs based on the quantum defect theory and the DS model was proposed. This method does not require separate direct calculation of subshell RRCSs for a large number of excited electron states. The results for several ions of Fe, Mo, and W were reported in Ref. [21] for five values of the electron energy in the high energy range 1 keV $\leqslant E_k \leqslant$ 100 keV.

The simplest way to calculate the correction to $\sigma_{rr}^{\rm tot}$ up to that value of n which is required in a specific case, is to use the semiclassical formula by Kramers which can be written as follows [22]

$$\sigma_{\rm kr}^{(n)}(\text{Mb}) = 0.21 \times 10^{-3} \frac{Z_{\rm eff}^4 E_0^2}{nE_k(Z_{\rm eff}^2 E_0 + n^2 E_k)}. \quad (11)$$

In Eq. (11), the electron energy E_k is given in eV, $E_0 = 13.605$ eV, and $Z_{\rm eff}$ is the appropriate effective charge of the ion [21,22]. It should be emphasized that we present total RRCSs without regard for the correction.

The electron energy dependence of the total RRCS is plotted in Graph 1 for recombining ions under consideration. One can see that the energy dependence $\sigma_{rr}^{\rm tot}(E_k)$ exhibits minimum and maximum for the lowest-charged ions Mo^{6+} and W^{6+} because of a behavior of RRCSs for the lowest shells making a major contribution into $\sigma_{rr}^{\rm tot}$ (see Fig. 1 for PCS). For higher-charged ions, the E_k-dependence presents smooth monotone curves. The values of the total RRCSs are presented in Table 1.

4. Analytical fits of photoionization cross sections

A large number of subshell RRCS and PCS values produced may be used in modern computer codes treating various problems of plasma physics and astrophysics. For this purpose, the PCSs are conveniently described by a simple analytical expression with a small number of fit parameters. The parameters permit the subshell RRCS to also be easily obtained using Eq. (1).

We applied here the procedure developed in Refs. [3,4]. The method is based on the approximate similarity of PCSs for atomic shells with the same n and κ but for different atoms and ions revealed by Kamrukov et al. [23]. The relation can be written as

$$\sigma_{\rm ph}^{(n\kappa)}(k) = \sigma_0 F(y), \quad y = k/k_0. \tag{12}$$

Here σ_0 and k_0 are fit parameters depending on quantum numbers n and κ of a shell as well as on Z and N, while $F(y)$ is a so-called "nearly universal" function depending strongly on n and κ and depending weakly on Z and N. Each k-dependent curve of the PCS in logarithmic variables, $\log\sigma_{\rm ph}^{(n\kappa)}(\log k)$, may be shifted to a "nearly universal" curve $\log F(y)$. The shift along the energy axis is determined by the fit parameter k_0, while the shift along the PCS axis by the fit parameter σ_0 [3,4,23]. A form of the function $F(y)$ furnishing the desired result was proposed in Ref. [4] as follows

$$F(y) = [(y-1)^2 + y_w^2]y^{-Q}(1+\sqrt{y/y_a})^{-p}, \tag{13}$$

where y_w, y_a and p are three additional fit parameters, and $Q = 5.5 + \ell - 0.5p$. Each of the parameters is responsible for the PCS behavior in a specific range of the photon energy [4].

With Eqs. (12) and (13), the fit parameters were obtained by minimizing the mean-square deviation from calculated values $\sigma_{\rm ph}^{(n\kappa)}$. We used the method of the simplex search developed by Nelder and Mead (see Ref. [24], chap. 4).

For each recombined ion, the fit parameters were calculated for all electron states with quantum numbers $n_{\rm min} \leqslant n \leqslant 12$ and $\kappa = \mp 1, \mp 2, \ldots, \mp 6, -7$. The fitting was produced in the photon energy range from $k_{\rm min} = E_{\rm th} + 4$ eV to $k_{\rm max}$ where $\sigma_{\rm ph}^{(n\kappa)}(k_{\rm max})$ falls by five orders of magnitude as compared with its maximum value, the energy $E_{\rm k} = k_{\rm max} - E_{\rm th}$ being less than 50 keV. Usually, $k_{\rm max}$ is of the order of $100E_{\rm th}$ for the s, p, d, and f shells and $k_{\rm max}$ is of the order of $10E_{\rm th}$ for the g, h, and i shells. For the very inner shells of the highest-charged ions, $k_{\rm max}$ may be of the order of several $E_{\rm th}$ in view of the large magnitude of $E_{\rm th}$. The values of ionization threshold energies $E_{\rm th}$ obtained in the DF calculations as well as the maximum energy $k_{\rm max}$ together with five fit parameters are given in Table 2. With these fit parameters and Eqs. (12) and (13), one can obtain the value of the PCS, $\sigma_{\rm ph}^{(n\kappa)}(k)$, per one electron.

For each shell, we found the relative root-mean-square error

$$\delta_{\rm av} = \sqrt{\frac{1}{M}\sum_{i=1}^{M}\left[\frac{\sigma_{\rm calc}^{(n\kappa)}(k_i) - \sigma_{\rm fit}^{(n\kappa)}(k_i)}{\sigma_{\rm calc}^{(n\kappa)}(k_i)}\right]^2} \times 100\%, \tag{14}$$

where $M \leqslant 41$ is the number of points involved in the fitting, $\sigma_{\rm calc}^{(n\kappa)}(k_i)$ and $\sigma_{\rm fit}^{(n\kappa)}(k_i)$ are values of the PCS calculated

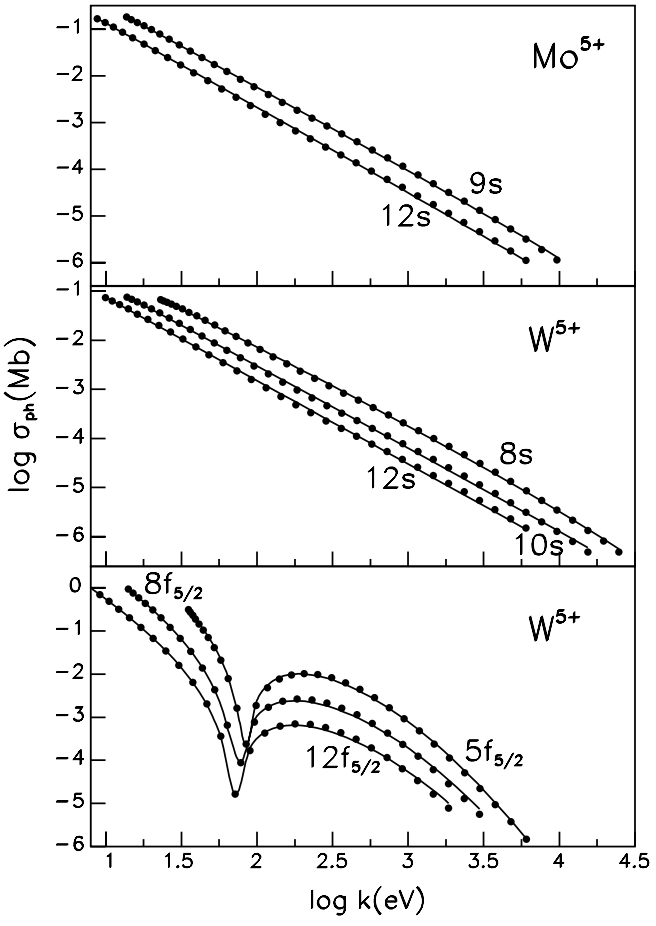

Fig. 5. Worst-fitting cases. Fitted (solid lines) and calculated (circles) PCSs versus the photon energy k.

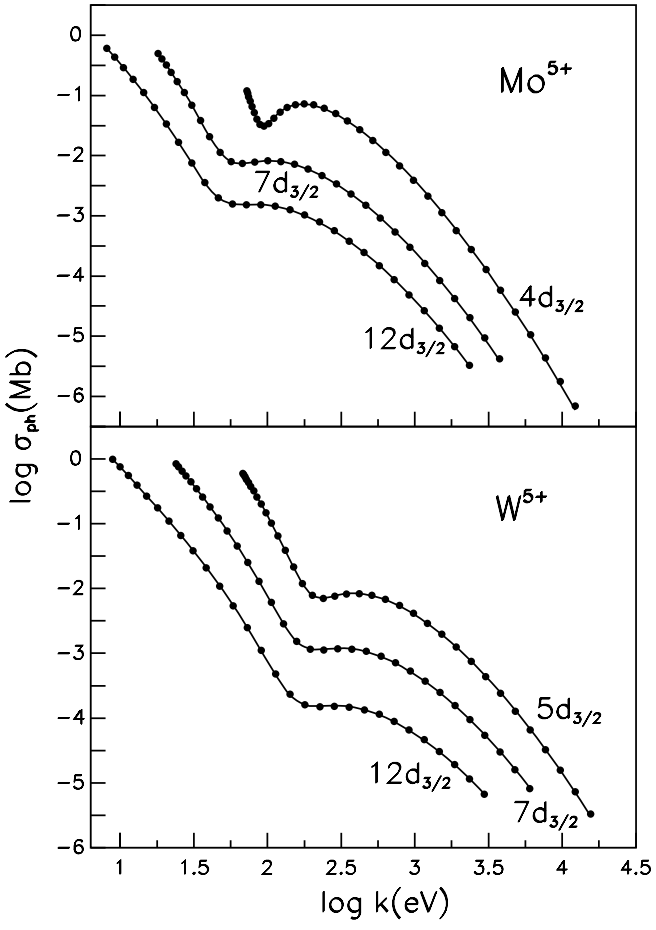

Fig. 6. Fitted (solid lines) and calculated (circles) PCSs for the $nd_{3/2}$ shells of Mo^{5+} and W^{5+} versus the photon energy k.

and obtained in the fitting, respectively. The error δ_{av} for each shell is also presented in Table 2.

As a rule, the fitting was carried out with good accuracy and $\delta_{av} \lesssim 2\%$. However, there are several cases where the error may be greater. The worst-fitting cases in our calculations are related to the nf shells of the lowest-charged ion W^{5+} revealing a very deep Cooper minimum and to the *ns* shells of W^{5+} and Mo^{5+}. A comparison between PCSs calculated and obtained by fitting is presented in Fig. 5 for the $ns_{1/2}$ shells of Mo^{5+} and W^{5+} as well as for the $nf_{5/2}$ shells of W^{5+}. Solid lines refer to the fitted $\sigma_{ph}^{(n\kappa)}$ and circles denote PCSs obtained in the DF calculations. The fitting errors δ_{av} are the largest in these three cases. The errors reach ~11% for the 7f and 8f shells, ~8% for the $10s_{1/2}$ shell of W^{5+}, and ~7% for the $12s_{1/2}$ shell of Mo^{5+}. Nevertheless, the fitting error is small for all other shells of Mo^{5+} and W^{5+} including the nd shells (see Fig. 6) where the Cooper minimum exists as well, but is not as deep as for the nf shells in W^{5+}. The maximum errors for the nd shells of Mo^{5+} and W^{5+} are $\lesssim 4\%$ and $\lesssim 2\%$, respectively. For shells with the larger orbital quantum number ($\ell > 3$) of the lowest-charged ions as well as for all shells of the higher-charged ions, the fitting accuracy is commonly $\lesssim$1–2%.

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References

[1] I.M. Band, Yu.I. Kharitonov, M.B. Trzhaskovskaya, At. Data Nucl. Data Tables 23 (1979) 443.
[2] M.B. Trzhaskovskaya, V.I. Nefedov, V.G. Yarzhemsky, At. Data Nucl. Data Tables 77 (2001) 97;
At. Data Nucl. Data Tables 82 (2002) 257.
[3] I.M. Band, M.B. Trzhaskovskaya, D.A. Verner, D.G. Yakovlev, Astron. Astrophys. 237 (1990) 267.
[4] D.A. Verner, D.G. Yakovlev, I.M. Band, M.B. Trzhaskovskaya, At. Data Nucl. Data Tables 55 (1993) 233.
[5] R.E.H. Clark, R.D. Cowan, F.W. Bobrowicz, At. Data Nucl. Data Tables 34 (1986) 415.
[6] M.J. Seaton, J. Phys. B 20 (1987) 6363.
[7] W. Cunto, C. Mendoza, F. Ochsenbein, C.J. Zeipen, Astron. Astrophys. 275 (1993) L5.
[8] S.N. Nahar, A.K. Pradhan, Radiat. Phys. Chem. 70 (2004) 323.
[9] S.N. Nahar, A.K. Pradhan, Astrophys. J. Suppl. Ser. 162 (2006) 417.
[10] S.N. Nahar, A.K. Pradhan, H.L. Zhang, Astrophys. J. Suppl. Ser. 133 (2001) 255.
[11] A. Ichihara, J. Eichler, At. Data Nucl. Data Tables 74 (2000) 1.
[12] M.B. Trzhaskovskaya, V.K. Nikulin, Opt. Spectrosc. 95 (2003) 537.
[13] M. Arnaud, J. Raymond, Astrophys. J. 398 (1992) 394.
[14] D.A. Verner, G.J. Ferland, Astrophys. J. Suppl. Ser. 103 (1996) 467.
[15] M.B. Trzhaskovskaya, V.K. Nikulin, R.E.H. Clark, Radiative recombination and photoionization cross sections for heavy element impurities in plasmas: I–IV. PNPI Reports PNPI-2678, PNPI-2679, PNPI-2699, PNPI-2700, 2006.
[16] M. O'Mullane, N.R. Badnell, H.P. Summers, A.D. Whiteford, M. Witthoeft, Atomic data and modelling for analysis of heavy impurity behavior in fusion plasmas. First IAEA Research Co-ordination Meeting "Atomic Data for Heavy Element Impurities in Fusion Reactors," November 2005, IAEA, Vienna, Austria. Available from: <www-amdis.iaea.org/CRP/Heavy_elements/Presentations/>.
[17] J.H. Scofield, Phys. Rev. A 40 (1989) 3054.
[18] I.P. Grant, Adv. Phys. 19 (1970) 747.
[19] I.M. Band, M.B. Trzhaskovskaya, C.W. Nestor Jr., P.O. Tikkanen, S. Raman, At. Data Nucl. Data Tables 81 (2002) 1.
[20] I.M. Band, M.A. Listengarten, M.B. Trzhaskovskaya, V.I. Fomichev, Computer program complex RAINE, I–VI, LNPI Reports LNPI-289, 1976; LNPI-298, LNPI-299, LNPI-300, 1977; LNPI-498, 1979; LNPI-1479, 1989.
[21] Y.S. Kim, R.H. Pratt, Phys. Rev. A 27 (1983) 2913.
[22] L.H. Andersen, J. Bolko, Phys. Rev. A 42 (1990) 1184.
[23] A.S. Kamrukov, N.P. Kozlov, Yu.S. Protasov, S.N. Chuvashev, Opt. Spectrosc. 55 (1983) 17.
[24] D.M. Himmelblau, Applied Nonlinear Programming, McGraw-Hill, 1972.

Explanation of Tables

Table 1. Total radiative recombination cross sections

E_k	Electron kinetic energy in eV
$\sigma_{rr}^{\mathrm{tot}}$	Total RRCS (see Eq. (5)) in Mb ($=10^{-18}$ cm^2)

Table 2. Fit parameters for photoionization cross sections

E_{th}	Ionization threshold energy in eV
k_{max}	Maximum photon energy in eV to which the fitting was performed
k_0, σ_0	Fit parameters used with Eq. (12) in eV and Mb, respectively
p, y_a, y_w	Fit parameters used with Eq. (13)

Presented for a value to its right is the decimal order.

Explanation of Graph

Graph 1. Total radiative recombination cross sections in Mb

E_k	Electron kinetic energy in eV
8+, 16+, etc.	Ion charge

Table 1
Total radiative recombination cross sections. See Page 79 for Explanation of Tables

Fe	σ_{rr}^{tot}, Mb				
E_k, eV	Fe^{8+}	Fe^{16+}	Fe^{24+}	Fe^{25+}	Fe^{26+}
4.00	9.819−02	3.583−01	9.744−01	1.243+00	1.523+00
5.07	7.542−02	2.777−01	7.628−01	9.746−01	1.196+00
6.41	5.782−02	2.146−01	5.960−01	7.632−01	9.379−01
8.12	4.426−02	1.652−01	4.647−01	5.966−01	7.345−01
10.28	3.380−02	1.265−01	3.611−01	4.649−01	5.735−01
13.02	2.581−02	9.665−02	2.801−01	3.618−01	4.474−01
16.48	1.971−02	7.348−02	2.165−01	2.810−01	3.484−01
20.87	1.503−02	5.563−02	1.668−01	2.175−01	2.706−01
26.43	1.146−02	4.192−02	1.281−01	1.679−01	2.097−01
33.46	8.734−03	3.146−02	9.794−02	1.292−01	1.620−01
42.36	6.643−03	2.349−02	7.460−02	9.916−02	1.249−01
53.64	5.039−03	1.747−02	5.659−02	7.583−02	9.600−02
67.92	3.806−03	1.294−02	4.276−02	5.781−02	7.361−02
86.00	2.858−03	9.537−03	3.215−02	4.392−02	5.626−02
108.89	2.131−03	6.999−03	2.408−02	3.326−02	4.290−02
137.87	1.571−03	5.115−03	1.795−02	2.511−02	3.262−02
174.56	1.146−03	3.720−03	1.332−02	1.889−02	2.474−02
221.03	8.258−04	2.693−03	9.835−03	1.416−02	1.872−02
279.86	5.861−04	1.941−03	7.225−03	1.059−02	1.412−02
354.35	4.106−04	1.393−03	5.279−03	7.883−03	1.062−02
448.67	2.834−04	9.950−04	3.835−03	5.851−03	7.972−03
568.10	1.930−04	7.048−04	2.770−03	4.326−03	5.964−03
719.31	1.298−04	4.967−04	1.988−03	3.186−03	4.449−03
910.77	8.638−05	3.478−04	1.419−03	2.339−03	3.308−03
1153.20	5.702−05	2.418−04	1.003−03	1.708−03	2.452−03
1460.15	3.742−05	1.671−04	7.036−04	1.242−03	1.810−03
1848.80	2.446−05	1.146−04	4.892−04	8.983−04	1.330−03
2340.91	1.596−05	7.800−05	3.373−04	6.464−04	9.728−04
2964.00	1.040−05	5.267−05	2.304−04	4.624−04	7.076−04
3752.94	6.762−06	3.529−05	1.561−04	3.289−04	5.116−04
4751.87	4.389−06	2.345−05	1.048−04	2.324−04	3.674−04
6016.70	2.841−06	1.546−05	6.982−05	1.630−04	2.618−04
7618.19	1.833−06	1.010−05	4.611−05	1.135−04	1.848−04
9645.96	1.178−06	6.551−06	3.022−05	7.823−05	1.291−04
12213.47	7.534−07	4.218−06	1.965−05	5.340−05	8.921−05
15464.38	4.797−07	2.698−06	1.268−05	3.607−05	6.088−05
19580.60	3.039−07	1.714−06	8.126−06	2.409−05	4.102−05
24792.45	1.915−07	1.082−06	5.167−06	1.590−05	2.727−05
31391.56	1.200−07	6.786−07	3.261−06	1.037−05	1.790−05
39747.19	7.478−08	4.231−07	2.043−06	6.685−06	1.160−05
50326.87	4.632−08	2.622−07	1.272−06	4.263−06	7.427−06

Ni	σ_{rr}^{tot}, Mb				
E_k, eV	Ni^{10+}	Ni^{18+}	Ni^{26+}	Ni^{27+}	Ni^{28+}
4.00	1.577−01	4.595−01	1.149+00	1.455+00	1.773+00
5.07	1.216−01	3.573−01	9.009−01	1.142+00	1.393+00
6.41	9.342−02	2.769−01	7.048−01	8.950−01	1.093+00
8.12	7.161−02	2.139−01	5.504−01	7.005−01	8.569−01
10.28	5.471−02	1.645−01	4.285−01	5.466−01	6.698−01
13.02	4.175−02	1.261−01	3.329−01	4.261−01	5.232−01
16.48	3.181−02	9.632−02	2.579−01	3.313−01	4.080−01
20.87	2.418−02	7.321−02	1.992−01	2.570−01	3.174−01
26.43	1.836−02	5.541−02	1.533−01	1.988−01	2.463−01
33.46	1.391−02	4.173−02	1.176−01	1.533−01	1.907−01
42.36	1.052−02	3.130−02	8.979−02	1.179−01	1.472−01
53.64	7.939−03	2.336−02	6.830−02	9.033−02	1.134−01
67.92	5.970−03	1.736−02	5.174−02	6.900−02	8.704−02
86.00	4.469−03	1.284−02	3.904−02	5.254−02	6.665−02
108.89	3.326−03	9.455−03	2.932−02	3.987−02	5.091−02
137.87	2.458−03	6.929−03	2.192−02	3.016−02	3.878−02
174.56	1.801−03	5.055−03	1.632−02	2.274−02	2.946−02

(continued on next page)

Table 1 (*continued*)

Ni	σ_{rr}^{tot}, Mb				
E_k, eV	Ni^{10+}	Ni^{18+}	Ni^{26+}	Ni^{27+}	Ni^{28+}
221.03	1.306−03	3.668−03	1.209−02	1.709−02	2.232−02
279.86	9.360−04	2.650−03	8.912−03	1.280−02	1.687−02
354.35	6.617−04	1.904−03	6.536−03	9.554−03	1.272−02
448.67	4.621−04	1.362−03	4.767−03	7.106−03	9.557−03
568.10	3.183−04	9.696−04	3.457−03	5.267−03	7.165−03
719.31	2.164−04	6.843−04	2.491−03	3.889−03	5.355−03
910.77	1.453−04	4.799−04	1.785−03	2.861−03	3.989−03
1153.20	9.658−05	3.345−04	1.270−03	2.097−03	2.964−03
1460.15	6.364−05	2.316−04	8.950−04	1.528−03	2.193−03
1848.80	4.166−05	1.592−04	6.260−04	1.109−03	1.616−03
2340.91	2.716−05	1.086−04	4.341−04	8.007−04	1.186−03
2964.00	1.766−05	7.354−05	2.983−04	5.748−04	8.657−04
3752.94	1.146−05	4.944−05	2.033−04	4.104−04	6.285−04
4751.87	7.428−06	3.297−05	1.372−04	2.912−04	4.534−04
6016.70	4.803−06	2.181−05	9.190−05	2.052−04	3.247−04
7618.19	3.097−06	1.432−05	6.102−05	1.435−04	2.306−04
9645.96	1.990−06	9.323−06	4.019−05	9.956−05	1.622−04
12213.47	1.274−06	6.026−06	2.626−05	6.841−05	1.129−04
15464.38	8.121−07	3.868−06	1.703−05	4.652−05	7.768−05
19580.60	5.152−07	2.467−06	1.096−05	3.129−05	5.278−05
24792.45	3.253−07	1.563−06	7.004−06	2.081−05	3.540−05
31391.56	2.044−07	9.844−07	4.442−06	1.368−05	2.344−05
39747.19	1.277−07	6.162−07	2.798−06	8.888−06	1.531−05
50326.87	7.940−08	3.835−07	1.750−06	5.711−06	9.889−06

Cu	σ_{rr}^{tot}, Mb				
E_k, eV	Cu^{11+}	Cu^{19+}	Cu^{27+}	Cu^{28+}	Cu^{29+}
4.00	1.921−01	5.146−01	1.242+00	1.567+00	1.904+00
5.07	1.482−01	4.006−01	9.742−01	1.230+00	1.497+00
6.41	1.141−01	3.109−01	7.627−01	9.648−01	1.175+00
8.12	8.758−02	2.406−01	5.959−01	7.555−01	9.217−01
10.28	6.698−02	1.853−01	4.643−01	5.899−01	7.207−01
13.02	5.115−02	1.423−01	3.610−01	4.601−01	5.634−01
16.48	3.897−02	1.089−01	2.800−01	3.581−01	4.395−01
20.87	2.963−02	8.292−02	2.165−01	2.780−01	3.421−01
26.43	2.247−02	6.287−02	1.668−01	2.152−01	2.657−01
33.46	1.702−02	4.745−02	1.281−01	1.662−01	2.059−01
42.36	1.285−02	3.565−02	9.792−02	1.278−01	1.590−01
53.64	9.684−03	2.666−02	7.459−02	9.807−02	1.226−01
67.92	7.272−03	1.985−02	5.658−02	7.499−02	9.420−02
86.00	5.439−03	1.470−02	4.275−02	5.716−02	7.221−02
108.89	4.047−03	1.084−02	3.215−02	4.342−02	5.519−02
137.87	2.992−03	7.958−03	2.408−02	3.288−02	4.207−02
174.56	2.196−03	5.814−03	1.795−02	2.481−02	3.199−02
221.03	1.596−03	4.226−03	1.332−02	1.867−02	2.426−02
279.86	1.147−03	3.056−03	9.832−03	1.399−02	1.835−02
354.35	8.146−04	2.199−03	7.223−03	1.046−02	1.384−02
448.67	5.716−04	1.574−03	5.277−03	7.786−03	1.041−02
568.10	3.953−04	1.122−03	3.834−03	5.778−03	7.812−03
719.31	2.702−04	7.929−04	2.768−03	4.270−03	5.844−03
910.77	1.823−04	5.573−04	1.987−03	3.145−03	4.358−03
1153.20	1.216−04	3.887−04	1.417−03	2.307−03	3.241−03
1460.15	8.034−05	2.693−04	1.002−03	1.685−03	2.401−03
1848.80	5.269−05	1.853−04	7.027−04	1.225−03	1.772−03
2340.91	3.437−05	1.266−04	4.884−04	8.854−04	1.302−03
2964.00	2.234−05	8.587−05	3.366−04	6.368−04	9.518−04
3752.94	1.450−05	5.779−05	2.300−04	4.554−04	6.922−04
4751.87	9.388−06	3.861−05	1.557−04	3.237−04	5.003−04
6016.70	6.068−06	2.559−05	1.045−04	2.286−04	3.592−04
7618.19	3.913−06	1.683−05	6.959−05	1.603−04	2.558−04
9645.96	2.515−06	1.098−05	4.594−05	1.115−04	1.805−04
12213.47	1.610−06	7.109−06	3.010−05	7.681−05	1.260−04
15464.38	1.027−06	4.572−06	1.956−05	5.240−05	8.704−05

Table 1 (*continued*)

Cu	σ_{rr}^{tot}, Mb				
E_k, eV	Cu^{11+}	Cu^{19+}	Cu^{27+}	Cu^{28+}	Cu^{29+}
19580.60	6.523−07	2.921−06	1.262−05	3.537−05	5.937−05
24792.45	4.123−07	1.854−06	8.081−06	2.361−05	3.998−05
31391.56	2.594−07	1.170−06	5.138−06	1.557−05	2.657−05
39747.19	1.623−07	7.336−07	3.243−06	1.015−05	1.744−05
50326.87	1.011−07	4.575−07	2.033−06	6.550−06	1.131−05

Mo	σ_{rr}^{tot}, Mb						
E_k, eV	Mo^{6+}	Mo^{14+}	Mo^{24+}	Mo^{32+}	Mo^{40+}	Mo^{41+}	Mo^{42+}
4.00	2.829−02	2.181−01	8.952−01	1.497+00	2.779+00	3.403+00	4.045+00
5.07	2.086−02	1.680−01	7.006−01	1.175+00	2.188+00	2.681+00	3.188+00
6.41	1.528−02	1.290−01	5.472−01	9.208−01	1.721+00	2.110+00	2.511+00
8.12	1.112−02	9.864−02	4.264−01	7.206−01	1.352+00	1.659+00	1.976+00
10.28	8.035−03	7.506−02	3.312−01	5.622−01	1.059+00	1.302+00	1.551+00
13.02	5.780−03	5.697−02	2.567−01	4.380−01	8.299−01	1.021+00	1.218+00
16.48	4.141−03	4.307−02	1.983−01	3.403−01	6.491−01	8.001−01	9.556−01
20.87	2.967−03	3.247−02	1.527−01	2.635−01	5.065−01	6.257−01	7.483−01
26.43	2.139−03	2.442−02	1.171−01	2.034−01	3.942−01	4.883−01	5.851−01
33.46	1.567−03	1.834−02	8.951−02	1.563−01	3.061−01	3.803−01	4.566−01
42.36	1.181−03	1.376−02	6.814−02	1.197−01	2.369−01	2.954−01	3.556−01
53.64	9.266−04	1.033−02	5.166−02	9.123−02	1.828−01	2.288−01	2.763−01
67.92	7.610−04	7.762−03	3.902−02	6.921−02	1.405−01	1.768−01	2.142−01
86.00	6.504−04	5.843−03	2.934−02	5.226−02	1.076−01	1.362−01	1.655−01
108.89	5.713−04	4.410−03	2.197−02	3.926−02	8.209−02	1.045−01	1.276−01
137.87	5.075−04	3.336−03	1.638−02	2.936−02	6.237−02	7.999−02	9.813−02
174.56	4.474−04	2.528−03	1.215−02	2.183−02	4.719−02	6.102−02	7.527−02
221.03	3.872−04	1.919−03	8.963−03	1.616−02	3.555−02	4.639−02	5.756−02
279.86	3.261−04	1.456−03	6.575−03	1.189−02	2.667−02	3.516−02	4.391−02
354.35	2.661−04	1.104−03	4.790−03	8.703−03	1.992−02	2.656−02	3.340−02
448.67	2.103−04	8.331−04	3.464−03	6.335−03	1.481−02	2.000−02	2.535−02
568.10	1.612−04	6.241−04	2.484−03	4.584−03	1.096−02	1.501−02	1.918−02
719.31	1.201−04	4.646−04	1.765−03	3.297−03	8.066−03	1.122−02	1.448−02
910.77	8.721−05	3.429−04	1.243−03	2.356−03	5.907−03	8.365−03	1.090−02
1153.20	6.191−05	2.504−04	8.647−04	1.673−03	4.302−03	6.213−03	8.185−03
1460.15	4.305−05	1.808−04	5.943−04	1.182−03	3.115−03	4.598−03	6.128−03
1848.80	2.937−05	1.289−04	4.035−04	8.283−04	2.241−03	3.389−03	4.575−03
2340.91	1.970−05	9.074−05	2.709−04	5.755−04	1.602−03	2.489−03	3.404−03
2964.00	1.303−05	6.305−05	1.798−04	3.970−04	1.136−03	1.820−03	2.525−03
3752.94	8.518−06	4.331−05	1.183−04	2.720−04	7.994−04	1.324−03	1.865−03
4751.87	5.528−06	2.943−05	7.720−05	1.849−04	5.578−04	9.585−04	1.372−03
6016.70	3.572−06	1.982−05	5.008−05	1.249−04	3.859−04	6.902−04	1.005−03
7618.19	2.304−06	1.324−05	3.233−05	8.374−05	2.646−04	4.944−04	7.320−04
9645.96	1.486−06	8.786−06	2.082−05	5.576−05	1.799−04	3.520−04	5.301−04
12213.47	9.578−07	5.793−06	1.337−05	3.688−05	1.212−04	2.490−04	3.814−04
15464.38	6.174−07	3.796−06	8.575−06	2.422−05	8.097−05	1.749−04	2.723−04
19580.60	3.976−07	2.473−06	5.486−06	1.580−05	5.364−05	1.219−04	1.926−04
24792.45	2.555−07	1.602−06	3.501−06	1.023−05	3.526−05	8.422−05	1.350−04
31391.56	1.637−07	1.031−06	2.227−06	6.590−06	2.300−05	5.763−05	9.357−05
39747.19	1.046−07	6.602−07	1.413−06	4.219−06	1.490−05	3.904−05	6.412−05
50326.87	6.657−08	4.205−07	8.930−07	2.686−06	9.583−06	2.618−05	4.343−05

W	σ_{rr}^{tot}, Mb								
E_k, eV	W^{6+}	W^{28+}	W^{38+}	W^{46+}	W^{56+}	W^{64+}	W^{72+}	W^{73+}	W^{74+}
4.00	2.908−02	1.139+00	2.061+00	2.808+00	4.565+00	6.033+00	9.274+00	1.245+01	1.274+01
5.07	2.124−02	8.936−01	1.622+00	2.214+00	3.600+00	4.760+00	7.332+00	9.839+00	1.007+01
6.41	1.536−02	7.000−01	1.275+00	1.743+00	2.836+00	3.753+00	5.786+00	7.771+00	7.950+00
8.12	1.097−02	5.473−01	1.001+00	1.371+00	2.233+00	2.958+00	4.564+00	6.135+00	6.274+00
10.28	7.723−03	4.266−01	7.834−01	1.075+00	1.754+00	2.327+00	3.595+00	4.832+00	4.942+00
13.02	5.357−03	3.321−01	6.127−01	8.426−01	1.379+00	1.830+00	2.832+00	3.810+00	3.896+00
16.48	3.646−03	2.579−01	4.781−01	6.592−01	1.082+00	1.438+00	2.229+00	3.002+00	3.071+00
20.87	2.428−03	1.997−01	3.722−01	5.145−01	8.474−01	1.129+00	1.753+00	2.363+00	2.418+00
26.43	1.577−03	1.542−01	2.890−01	4.006−01	6.627−01	8.846−01	1.377+00	1.859+00	1.902+00

(*continued on next page*)

Table 1 (*continued*)

W	σ_{rr}^{tot}, Mb								
E_k, eV	W^{6+}	W^{28+}	W^{38+}	W^{46+}	W^{56+}	W^{64+}	W^{72+}	W^{73+}	W^{74+}
33.46	9.969−04	1.187−01	2.237−01	3.110−01	5.171−01	6.920−01	1.081+00	1.461+00	1.495+00
42.36	6.142−04	9.109−02	1.725−01	2.406−01	4.025−01	5.401−01	8.469−01	1.148+00	1.174+00
53.64	3.751−04	6.970−02	1.326−01	1.855−01	3.124−01	4.205−01	6.624−01	8.998−01	9.209−01
67.92	2.375−04	5.318−02	1.015−01	1.425−01	2.417−01	3.265−01	5.171−01	7.044−01	7.211−01
86.00	1.676−04	4.047−02	7.743−02	1.089−01	1.863−01	2.527−01	4.027−01	5.506−01	5.637−01
108.89	1.429−04	3.072−02	5.882−02	8.293−02	1.430−01	1.949−01	3.127−01	4.295−01	4.398−01
137.87	1.458−04	2.325−02	4.450−02	6.284−02	1.093−01	1.496−01	2.422−01	3.343−01	3.424−01
174.56	1.610−04	1.754−02	3.353−02	4.740−02	8.316−02	1.144−01	1.870−01	2.597−01	2.660−01
221.03	1.779−04	1.319−02	2.515−02	3.557−02	6.297−02	8.713−02	1.438−01	2.012−01	2.061−01
279.86	1.888−04	9.883−03	1.879−02	2.658−02	4.744−02	6.600−02	1.102−01	1.555−01	1.593−01
354.35	1.897−04	7.368−03	1.397−02	1.976−02	3.556−02	4.977−02	8.419−02	1.198−01	1.228−01
448.67	1.802−04	5.462−03	1.034−02	1.463−02	2.651−02	3.732−02	6.404−02	9.213−02	9.443−02
568.10	1.626−04	4.022−03	7.610−03	1.077−02	1.965−02	2.785−02	4.853−02	7.066−02	7.243−02
719.31	1.405−04	2.939−03	5.569−03	7.898−03	1.448−02	2.067−02	3.662−02	5.404−02	5.540−02
910.77	1.169−04	2.129−03	4.049−03	5.761−03	1.060−02	1.525−02	2.753−02	4.122−02	4.227−02
1153.20	9.426−05	1.528−03	2.922−03	4.182−03	7.711−03	1.119−02	2.060−02	3.138−02	3.217−02
1460.15	7.378−05	1.087−03	2.092−03	3.018−03	5.567−03	8.167−03	1.536−02	2.382−02	2.442−02
1848.80	5.618−05	7.651−04	1.484−03	2.167−03	3.988−03	5.923−03	1.139−02	1.804−02	1.850−02
2340.91	4.166−05	5.339−04	1.044−03	1.547−03	2.832−03	4.269−03	8.416−03	1.364−02	1.398−02
2964.00	3.012−05	3.693−04	7.260−04	1.097−03	1.993−03	3.057−03	6.187−03	1.028−02	1.053−02
3752.94	2.128−05	2.536−04	4.997−04	7.736−04	1.389−03	2.175−03	4.525−03	7.728−03	7.918−03
4751.87	1.472−05	1.731−04	3.403−04	5.417−04	9.581−04	1.537−03	3.292−03	5.796−03	5.937−03
6016.70	1.000−05	1.175−04	2.293−04	3.767−04	6.542−04	1.079−03	2.382−03	4.335−03	4.439−03
7618.19	6.698−06	7.951−05	1.530−04	2.601−04	4.422−04	7.517−04	1.712−03	3.233−03	3.310−03
9645.96	4.434−06	5.361−05	1.012−04	1.783−04	2.960−04	5.202−04	1.223−03	2.404−03	2.460−03
12213.47	2.909−06	3.603−05	6.644−05	1.214−04	1.964−04	3.575−04	8.671−04	1.781−03	1.822−03
15464.38	1.896−06	2.413−05	4.334−05	8.204−05	1.293−04	2.441−04	6.103−04	1.314−03	1.344−03
19580.60	1.231−06	1.609−05	2.812−05	5.507−05	8.464−05	1.656−04	4.262−04	9.660−04	9.871−04
24792.45	7.970−07	1.068−05	1.818−05	3.674−05	5.513−05	1.116−04	2.953−04	7.067−04	7.217−04
31391.56	5.157−07	7.067−06	1.173−05	2.439−05	3.580−05	7.483−05	2.029−04	5.142−04	5.250−04
39747.19	3.338−07	4.656−06	7.566−06	1.611−05	2.319−05	4.988−05	1.384−04	3.721−04	3.796−04
50326.87	2.164−07	3.058−06	4.877−06	1.060−05	1.501−05	3.308−05	9.367−05	2.675−04	2.728−04

Table 2
Fit parameters for photoionization cross sections. See Page 79 for Explanation of Tables

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
Fe^{7+}								
$4s_{1/2}$	9.770+01	3.149+04	7.606−03	5.983+04	4.377+00	9.000+05	1.932+01	0.9
$5s_{1/2}$	5.420+01	1.963+04	1.678−02	8.314+04	3.867+00	9.000+05	1.938+01	2.9
$6s_{1/2}$	3.460+01	1.225+04	3.306−02	4.215+04	3.606+00	9.000+05	1.925+01	3.6
$7s_{1/2}$	2.402+01	9.670+03	6.006−02	1.578+04	3.450+00	9.000+05	1.897+01	4.1
$8s_{1/2}$	1.765+01	7.636+03	1.170−01	4.401+03	3.339+00	9.000+05	1.222+01	4.3
$9s_{1/2}$	1.352+01	7.632+03	1.732−01	1.762+03	3.277+00	9.000+05	1.341+01	4.8
$10s_{1/2}$	1.069+01	6.027+03	3.554−01	3.873+02	3.213+00	9.000+05	8.113+00	4.4
$11s_{1/2}$	8.661+00	4.761+03	4.790−01	1.756+02	3.183+00	9.000+05	6.966+00	4.0
$12s_{1/2}$	7.161+00	4.759+03	4.676−01	1.448+02	3.171+00	9.000+05	7.199+00	4.4
$4p_{1/2}$	8.652+01	1.230+04	2.086+01	3.622+00	7.482+00	7.963+01	9.713−01	0.7
$5p_{1/2}$	4.938+01	9.695+03	1.296−02	2.317+02	7.582+00	1.315+05	7.620+02	0.7
$6p_{1/2}$	3.208+01	7.650+03	1.693−02	5.160+02	7.165+00	1.315+05	8.433+02	1.5
$7p_{1/2}$	2.254+01	6.039+03	2.196−02	8.228+02	6.837+00	1.316+05	5.933+02	2.4
$8p_{1/2}$	1.671+01	6.033+03	1.072+00	1.361+01	6.546+00	3.476+03	1.127+01	3.6
$9p_{1/2}$	1.289+01	4.765+03	1.389+00	9.790+00	6.318+00	3.479+03	7.697+00	4.2
$10p_{1/2}$	1.024+01	3.763+03	1.810+00	6.576+00	6.121+00	3.480+03	5.311+00	4.5
$11p_{1/2}$	8.332+00	3.761+03	1.463−01	1.745+02	6.115+00	4.608+04	5.443+01	5.2
$12p_{1/2}$	6.913+00	3.760+03	1.703−01	1.355+02	6.022+00	4.609+04	4.276+01	6.0
$4p_{3/2}$	8.608+01	1.230+04	1.772+01	4.050+00	7.575+00	8.590+01	9.882−01	0.6
$5p_{3/2}$	4.920+01	9.695+03	5.008−01	1.959+01	7.558+00	3.286+03	2.399+01	0.6
$6p_{3/2}$	3.198+01	7.650+03	6.771−01	2.142+01	7.096+00	3.284+03	2.130+01	1.7
$7p_{3/2}$	2.248+01	6.039+03	8.950−01	1.870+01	6.751+00	3.282+03	1.464+01	2.7
$8p_{3/2}$	1.667+01	4.769+03	3.250−02	9.203+02	6.574+00	1.083+05	3.440+02	3.1
$9p_{3/2}$	1.286+01	4.765+03	4.060−02	9.356+02	6.374+00	1.083+05	2.380+02	4.1
$10p_{3/2}$	1.022+01	3.763+03	5.213−02	8.278+02	6.201+00	1.081+05	1.612+02	4.5
$11p_{3/2}$	8.319+00	3.761+03	6.123−02	6.881+02	6.091+00	1.081+05	1.238+02	5.2
$12p_{3/2}$	6.903+00	2.971+03	8.019−02	5.098+02	5.960+00	1.081+05	8.402+01	5.5
$3d_{3/2}$	1.513+02	4.903+03	4.835+01	8.213+01	5.861+00	7.096+01	4.591−01	0.4
$4d_{3/2}$	6.886+01	3.822+03	1.608+01	4.732+01	8.360+00	6.309+01	3.928−06	0.6
$5d_{3/2}$	4.165+01	3.006+03	7.269+00	3.510+01	8.860+00	1.222+02	2.240−04	0.5
$6d_{3/2}$	2.798+01	2.992+03	2.957+00	3.621+01	9.050+00	2.898+02	4.559−05	0.6
$7d_{3/2}$	2.010+01	2.361+03	3.408+00	2.295+01	8.811+00	2.914+02	1.868+00	1.1
$8d_{3/2}$	1.514+01	2.356+03	3.974+00	1.528+01	8.566+00	2.910+02	1.812+00	1.6
$9d_{3/2}$	1.182+01	1.861+03	9.343−03	3.561+03	8.941+00	1.043+05	4.181+02	1.1
$10d_{3/2}$	9.478+00	1.858+03	9.992−03	3.377+03	8.844+00	1.043+05	4.182+02	1.0
$11d_{3/2}$	7.771+00	1.857+03	1.090−02	3.362+03	8.733+00	1.042+05	3.712+02	1.2
$12d_{3/2}$	6.487+00	1.467+03	1.253−02	3.472+03	8.591+00	1.043+05	2.987+02	1.1
$3d_{5/2}$	1.510+02	4.903+03	4.652+01	8.918+01	5.959+00	6.661+01	4.376−01	0.4
$4d_{5/2}$	6.880+01	3.822+03	1.581+01	4.836+01	8.396+00	6.237+01	3.691−04	0.6
$5d_{5/2}$	4.163+01	3.006+03	7.469+00	3.477+01	8.851+00	1.182+02	4.137−01	0.5
$6d_{5/2}$	2.797+01	2.992+03	2.846+00	3.739+01	9.064+00	2.965+02	2.413−04	0.6
$7d_{5/2}$	2.010+01	2.361+03	3.288+00	2.371+01	8.826+00	2.970+02	1.936+00	1.1
$8d_{5/2}$	1.514+01	2.356+03	1.791−02	1.796+03	9.062+00	4.970+04	1.757+02	0.9
$9d_{5/2}$	1.181+01	1.861+03	2.023−02	1.902+03	8.889+00	4.970+04	1.758+02	1.4
$10d_{5/2}$	9.475+00	1.858+03	2.186−02	1.772+03	8.781+00	4.970+04	1.757+02	1.8
$11d_{5/2}$	7.769+00	1.857+03	2.305−02	1.528+03	8.715+00	4.970+04	1.758+02	1.0
$12d_{5/2}$	6.486+00	1.467+03	2.532−02	1.434+03	8.610+00	4.972+04	1.530+02	1.3
$4f_{5/2}$	5.605+01	1.209+03	1.120+00	1.236+04	8.852+00	5.793+02	2.493+01	2.1
$5f_{5/2}$	3.593+01	1.189+03	1.575+00	4.572+03	8.622+00	5.462+02	2.437−01	2.5
$6f_{5/2}$	2.489+01	9.357+02	1.178+00	2.295+03	9.249+00	5.456+02	6.382−04	1.6
$7f_{5/2}$	1.824+01	9.290+02	1.121+00	1.238+03	9.429+00	5.457+02	2.678−02	1.7
$8f_{5/2}$	1.393+01	7.332+02	1.238+00	7.030+02	9.357+00	5.454+02	1.670−01	1.0
$9f_{5/2}$	1.098+01	7.303+02	1.273+00	4.486+02	9.364+00	5.457+02	1.520+00	0.8
$10f_{5/2}$	8.878+00	5.770+02	1.256+00	3.156+02	9.408+00	5.471+02	1.929+00	0.9
$11f_{5/2}$	7.325+00	5.754+02	1.276+00	2.265+02	9.407+00	5.473+02	2.111+00	0.8
$12f_{5/2}$	6.147+00	5.742+02	1.323+00	1.665+02	9.372+00	5.475+02	2.079+00	0.6
$4f_{7/2}$	5.605+01	1.209+03	1.122+00	1.245+04	8.847+00	5.772+02	2.476+01	2.1
$5f_{7/2}$	3.593+01	1.189+03	1.567+00	4.616+03	8.626+00	5.458+02	7.748−02	2.5
$6f_{7/2}$	2.489+01	9.357+02	1.169+00	2.319+03	9.255+00	5.462+02	1.579−03	1.6
$7f_{7/2}$	1.824+01	9.290+02	1.116+00	1.247+03	9.430+00	5.463+02	2.000−03	1.6
$8f_{7/2}$	1.393+01	7.332+02	1.234+00	7.078+02	9.357+00	5.458+02	9.904−03	1.0
$9f_{7/2}$	1.098+01	7.303+02	1.413+00	4.252+02	9.214+00	5.441+02	5.672−03	0.8

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$10f_{7/2}$	8.877+00	5.770+02	1.263+00	3.132+02	9.406+00	5.430+02	1.930+00	0.8
$11f_{7/2}$	7.325+00	5.754+02	1.358+00	2.163+02	9.331+00	5.428+02	1.855+00	0.5
$12f_{7/2}$	6.147+00	5.742+02	1.341+00	1.638+02	9.363+00	5.425+02	2.058+00	0.6
$5g_{7/2}$	3.487+01	4.836+02	8.097+00	4.423+02	6.348+00	5.561+02	7.605−01	2.3
$6g_{7/2}$	2.423+01	4.729+02	1.282+01	4.848+01	6.355+00	5.560+02	5.882−01	0.9
$7g_{7/2}$	1.780+01	3.722+02	1.232+01	3.291+01	6.639+00	5.524+02	5.382−01	1.0
$8g_{7/2}$	1.363+01	3.680+02	8.844+00	5.841+01	7.988+00	1.479+02	6.123−01	1.1
$9g_{7/2}$	1.077+01	3.651+02	7.751+00	5.426+01	8.316+00	1.476+02	6.149−01	1.5
$10g_{7/2}$	8.722+00	2.886+02	4.684+00	1.228+02	9.911+00	8.371+01	8.177−01	1.4
$11g_{7/2}$	7.208+00	2.871+02	4.424+00	9.872+01	1.008+01	8.369+01	8.504−01	1.4
$12g_{7/2}$	6.056+00	2.859+02	3.499+00	1.104+02	1.060+01	8.361+01	9.805−01	1.6
$5g_{9/2}$	3.487+01	4.836+02	8.094+00	4.434+02	6.347+00	5.567+02	7.567−01	2.3
$6g_{9/2}$	2.423+01	4.729+02	1.284+01	4.831+01	6.353+00	5.564+02	5.881−01	0.9
$7g_{9/2}$	1.780+01	3.722+02	1.234+01	3.281+01	6.634+00	5.562+02	5.378−01	1.0
$8g_{9/2}$	1.363+01	3.680+02	8.974+00	5.630+01	7.963+00	1.479+02	6.106−01	1.1
$9g_{9/2}$	1.077+01	3.651+02	7.752+00	5.425+01	8.315+00	1.476+02	6.148−01	1.5
$10g_{9/2}$	8.722+00	2.886+02	4.549+00	1.312+02	1.007+01	7.805+01	8.529−01	1.5
$11g_{9/2}$	7.208+00	2.871+02	4.259+00	1.066+02	1.022+01	8.006+01	8.815−01	1.5
$12g_{9/2}$	6.056+00	2.859+02	3.448+00	1.139+02	1.069+01	8.013+01	1.005+00	1.8
$6h_{9/2}$	2.419+01	2.452+02	4.747+01	1.178−01	1.613+01	4.489+00	6.379+00	0.1
$7h_{9/2}$	1.777+01	2.388+02	2.044+01	7.505−01	1.822+01	6.531+00	1.380+01	0.2
$8h_{9/2}$	1.361+01	2.346+02	8.031+00	2.287+02	1.055+01	2.333+01	6.652−01	0.8
$9h_{9/2}$	1.075+01	1.853+02	4.347+00	9.808+02	1.337+01	1.878+01	9.681−01	0.6
$10h_{9/2}$	8.709+00	1.833+02	4.553+00	6.100+02	1.340+01	1.872+01	9.350−01	0.5
$11h_{9/2}$	7.197+00	1.818+02	2.865+00	8.210+02	1.468+01	2.283+01	1.302+00	0.6
$12h_{9/2}$	6.048+00	1.806+02	2.924+00	5.882+02	1.470+01	2.278+01	1.268+00	0.6
$6h_{11/2}$	2.419+01	2.452+02	5.069+01	7.412−02	1.591+01	4.605+00	6.319+00	0.1
$7h_{11/2}$	1.777+01	2.388+02	3.402+01	8.239−01	1.810+01	4.143+00	8.312+00	0.2
$8h_{11/2}$	1.361+01	2.346+02	1.179+01	2.885+01	7.460+00	1.481+02	4.537−01	3.1
$9h_{11/2}$	1.075+01	1.853+02	9.917+00	3.458+01	8.058+00	1.483+02	4.530−01	4.4
$10h_{11/2}$	8.709+00	1.833+02	3.484+00	9.454+02	1.415+01	2.041+01	1.129+00	0.6
$11h_{11/2}$	7.197+00	1.818+02	3.553+00	6.561+02	1.423+01	2.022+01	1.113+00	0.6
$12h_{11/2}$	6.048+00	1.806+02	2.260+00	7.035+02	1.511+01	2.716+01	1.541+00	0.6
$7i_{11/2}$	1.777+01	1.556+02	5.441+01	5.197−02	1.796+01	2.718+00	6.568+00	0.1
$8i_{11/2}$	1.361+01	1.515+02	2.759+01	1.041+00	2.017+01	3.483+00	1.067+01	0.2
$9i_{11/2}$	1.075+01	1.486+02	3.486+01	2.179+00	2.100+01	2.550+00	8.363+00	0.2
$10i_{11/2}$	8.708+00	1.466+02	3.786+01	2.267+00	2.136+01	2.331+00	8.021+00	0.2
$11i_{11/2}$	7.197+00	1.161+02	3.589+01	2.169+00	2.158+01	2.456+00	8.016+00	0.2
$12i_{11/2}$	6.047+00	1.149+02	3.686+01	1.253+00	2.159+01	2.486+00	8.731+00	0.2
$7i_{13/2}$	1.777+01	1.556+02	4.665+01	1.185−01	1.823+01	2.887+00	6.554+00	0.2
$8i_{13/2}$	1.361+01	1.515+02	3.897+01	3.738−01	1.976+01	2.794+00	9.988+00	0.5
$9i_{13/2}$	1.075+01	1.486+02	2.935+01	2.294+00	2.107+01	2.957+00	9.462+00	0.3
$10i_{13/2}$	8.708+00	1.466+02	3.048+01	1.950+00	2.141+01	2.843+00	9.920+00	0.2
$11i_{13/2}$	7.197+00	1.161+02	2.921+01	1.712+00	2.161+01	2.983+00	9.994+00	0.2
$12i_{13/2}$	6.047+00	1.149+02	3.386+01	7.976−01	2.156+01	2.724+00	1.106+01	0.1
Fe^{15+}								
$3s_{1/2}$	4.889+02	5.082+04	7.756−02	1.212+04	4.465+00	8.000+04	1.949+01	0.8
$4s_{1/2}$	2.576+02	5.058+04	1.477−01	2.038+04	3.841+00	8.000+04	1.845+01	1.9
$5s_{1/2}$	1.590+02	3.155+04	2.180−01	1.324+04	3.582+00	8.009+04	1.089+02	2.0
$6s_{1/2}$	1.079+02	2.490+04	3.216−01	7.114+03	3.389+00	7.996+04	4.948+01	2.2
$7s_{1/2}$	7.800+01	1.966+04	4.616−01	3.398+03	3.256+00	7.994+04	2.585+01	2.3
$8s_{1/2}$	5.901+01	1.552+04	6.674−01	1.483+03	3.155+00	7.994+04	1.468+01	2.3
$9s_{1/2}$	4.620+01	1.226+04	9.974−01	5.840+02	3.071+00	7.994+04	9.028+00	2.1
$10s_{1/2}$	3.715+01	9.683+03	1.558+00	2.065+02	2.999+00	7.994+04	5.905+00	1.9
$11s_{1/2}$	3.052+01	9.676+03	1.844+00	1.200+02	2.963+00	7.994+04	5.076+00	2.1
$12s_{1/2}$	2.552+01	7.644+03	2.048+00	7.921+01	2.938+00	7.994+04	4.557+00	2.0
$3p_{1/2}$	4.545+02	2.525+04	3.446+01	2.542+01	6.542+00	7.802+01	2.297−02	0.4
$4p_{1/2}$	2.439+02	1.982+04	9.910+00	4.342+01	6.418+00	3.218+02	4.744−02	0.3
$5p_{1/2}$	1.523+02	1.562+04	1.277+01	2.113+01	6.078+00	3.223+02	2.980+00	0.7
$6p_{1/2}$	1.041+02	1.232+04	1.721+01	1.044+01	5.730+00	3.211+02	2.279+00	1.2
$7p_{1/2}$	7.565+01	9.722+03	7.564−01	6.603+02	5.882+00	6.901+03	2.477+01	1.0
$8p_{1/2}$	5.745+01	7.676+03	2.064−01	4.673+03	5.762+00	2.897+04	7.751+01	1.1
$9p_{1/2}$	4.512+01	7.663+03	2.409−01	3.601+03	5.635+00	2.895+04	5.590+01	1.5
$10p_{1/2}$	3.637+01	6.053+03	2.832−01	2.652+03	5.525+00	2.895+04	4.053+01	1.7

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$11p_{1/2}$	2.993+01	4.782+03	3.454−01	1.835+03	5.415+00	2.896+04	2.786+01	1.6
$12p_{1/2}$	2.507+01	4.777+03	3.725−01	1.407+03	5.363+00	2.896+04	2.360+01	2.1
$3p_{3/2}$	4.518+02	2.524+04	3.047+01	2.915+01	6.653+00	7.837+01	1.926−01	0.2
$4p_{3/2}$	2.429+02	1.982+04	6.608+00	6.676+01	6.518+00	4.310+02	1.373+00	0.5
$5p_{3/2}$	1.518+02	1.562+04	8.513+00	3.496+01	6.171+00	4.312+02	4.059+00	0.8
$6p_{3/2}$	1.038+02	1.232+04	1.111+01	1.871+01	5.852+00	4.315+02	3.103+00	1.2
$7p_{3/2}$	7.547+01	9.721+03	1.465+01	9.887+00	5.560+00	4.306+02	2.243+00	1.5
$8p_{3/2}$	5.734+01	7.676+03	2.013−01	5.353+03	5.739+00	2.897+04	7.748+01	1.2
$9p_{3/2}$	4.503+01	6.062+03	2.406−01	4.029+03	5.603+00	2.896+04	5.401+01	1.3
$10p_{3/2}$	3.631+01	6.053+03	2.714−01	3.033+03	5.513+00	2.897+04	4.207+01	1.7
$11p_{3/2}$	2.989+01	4.782+03	3.257−01	2.134+03	5.409+00	2.898+04	2.956+01	1.7
$12p_{3/2}$	2.504+01	4.777+03	3.754−01	1.518+03	5.334+00	2.898+04	2.276+01	1.8
$3d_{3/2}$	4.049+02	1.005+04	5.095+01	1.103+02	6.111+00	6.435+01	2.314+00	0.5
$4d_{3/2}$	2.256+02	7.844+03	4.366+01	4.266+01	6.675+00	6.687+01	1.147+00	0.5
$5d_{3/2}$	1.434+02	6.160+03	2.261+01	4.772+01	7.341+00	1.004+02	1.322+00	0.2
$6d_{3/2}$	9.915+01	4.851+03	2.491+01	2.235+01	7.264+00	1.002+02	1.375+00	0.2
$7d_{3/2}$	7.260+01	3.826+03	6.630+00	7.433+01	7.850+00	2.910+02	2.824+00	0.1
$8d_{3/2}$	5.544+01	3.808+03	7.370+00	4.580+01	7.717+00	2.906+02	2.569+00	0.3
$9d_{3/2}$	4.372+01	3.008+03	8.579+00	2.865+01	7.520+00	2.904+02	2.117+00	0.6
$10d_{3/2}$	3.535+01	2.999+03	9.256+00	2.006+01	7.408+00	2.897+02	1.861+00	1.1
$11d_{3/2}$	2.918+01	2.370+03	3.602−01	1.771+03	7.792+00	6.208+03	2.569+01	0.7
$12d_{3/2}$	2.449+01	2.365+03	3.863−01	1.421+03	7.715+00	6.210+03	2.183+01	1.0
$3d_{5/2}$	4.045+02	1.005+04	4.106+01	1.704+02	6.288+00	7.041+01	2.744+00	0.5
$4d_{5/2}$	2.255+02	7.844+03	3.742+01	5.545+01	6.826+00	7.035+01	1.151+00	0.5
$5d_{5/2}$	1.434+02	6.160+03	3.739+01	2.342+01	6.991+00	7.053+01	1.202+00	0.4
$6d_{5/2}$	9.910+01	4.851+03	1.287+01	5.207+01	7.687+00	1.539+02	1.872+00	0.1
$7d_{5/2}$	7.257+01	3.826+03	1.475+01	2.764+01	7.518+00	1.535+02	1.743+00	0.2
$8d_{5/2}$	5.542+01	3.808+03	1.485+00	3.670+02	8.018+00	1.208+03	8.979+00	0.1
$9d_{5/2}$	4.370+01	3.008+03	1.610+00	2.598+02	7.917+00	1.208+03	7.967+00	0.3
$10d_{5/2}$	3.534+01	2.999+03	1.764+00	1.883+02	7.812+00	1.201+03	6.758+00	0.6
$11d_{5/2}$	2.917+01	2.370+03	1.974+00	1.380+02	7.686+00	1.201+03	5.476+00	0.9
$12d_{5/2}$	2.448+01	2.365+03	2.192+00	1.020+02	7.574+00	1.199+03	4.537+00	1.1
$4f_{5/2}$	2.182+02	3.971+03	3.499+00	1.259+05	7.053+00	6.051+02	3.576−02	1.7
$5f_{5/2}$	1.397+02	3.104+03	1.197+00	1.920+04	9.581+00	6.038+02	1.551−02	2.4
$6f_{5/2}$	9.702+01	2.438+03	9.497−01	3.618+03	1.044+01	6.036+02	2.786−02	1.9
$7f_{5/2}$	7.126+01	1.920+03	9.604−01	1.590+03	1.058+01	6.035+02	4.596−01	1.1
$8f_{5/2}$	5.455+01	1.903+03	1.075+00	1.002+03	1.044+01	6.031+02	6.268−01	0.8
$9f_{5/2}$	4.309+01	1.892+03	1.028+00	5.528+02	1.061+01	6.045+02	1.029+01	0.8
$10f_{5/2}$	3.490+01	1.495+03	1.059+00	3.881+02	1.058+01	6.046+02	1.029+01	0.4
$11f_{5/2}$	2.884+01	1.489+03	1.123+00	2.983+02	1.048+01	6.059+02	9.171+00	0.4
$12f_{5/2}$	2.423+01	1.177+03	1.199+00	2.374+02	1.037+01	6.071+02	7.987+00	0.6
$4f_{7/2}$	2.182+02	3.182+03	3.220+00	1.412+05	7.177+00	5.878+02	1.665−02	1.4
$5f_{7/2}$	1.397+02	3.104+03	1.228+00	1.820+04	9.593+00	5.833+02	3.392−02	2.4
$6f_{7/2}$	9.700+01	2.438+03	9.826−01	3.443+03	1.045+01	5.796+02	1.599−01	1.9
$7f_{7/2}$	7.125+01	1.920+03	9.951−01	1.523+03	1.058+01	5.799+02	5.810−01	1.1
$8f_{7/2}$	5.454+01	1.903+03	1.116+00	9.612+02	1.044+01	5.798+02	5.870−01	0.8
$9f_{7/2}$	4.309+01	1.503+03	1.041+00	5.039+02	1.068+01	5.750+02	1.087+01	0.5
$10f_{7/2}$	3.490+01	1.495+03	1.085+00	3.563+02	1.063+01	5.746+02	1.057+01	0.4
$11f_{7/2}$	2.884+01	1.489+03	1.178+00	2.803+02	1.049+01	5.743+02	8.869+00	0.4
$12f_{7/2}$	2.423+01	1.177+03	1.265+00	2.237+02	1.037+01	5.751+02	7.606+00	0.6
$5g_{7/2}$	1.394+02	1.600+03	7.154−01	9.562+05	1.064+01	5.550+02	4.557+00	0.9
$6g_{7/2}$	9.679+01	1.557+03	4.383−01	1.819+04	1.306+01	5.547+02	2.980+00	1.1
$7g_{7/2}$	7.111+01	1.224+03	4.128−01	2.822+03	1.377+01	5.533+02	4.410+00	0.4
$8g_{7/2}$	5.444+01	1.208+03	3.971−01	7.951+02	1.419+01	5.604+02	2.966+01	0.4
$9g_{7/2}$	4.302+01	9.538+02	4.187−01	4.677+02	1.418+01	5.602+02	2.968+01	0.2
$10g_{7/2}$	3.484+01	9.456+02	4.334−01	3.029+02	1.418+01	5.602+02	2.963+01	0.3
$11g_{7/2}$	2.880+01	9.396+02	4.635−01	2.449+02	1.406+01	5.555+02	2.638+01	0.4
$12g_{7/2}$	2.420+01	7.435+02	5.160−01	2.378+02	1.381+01	5.492+02	2.122+01	0.6
$5g_{9/2}$	1.394+02	1.600+03	7.121−01	9.561+05	1.065+01	5.550+02	4.629+00	0.9
$6g_{9/2}$	9.678+01	1.557+03	4.344−01	1.791+04	1.308+01	5.565+02	6.859+00	1.1
$7g_{9/2}$	7.110+01	1.224+03	4.088−01	2.753+03	1.379+01	5.551+02	7.895+00	0.4
$8g_{9/2}$	5.444+01	1.208+03	4.477−01	1.409+03	1.377+01	5.549+02	8.048+00	0.4
$9g_{9/2}$	4.301+01	9.538+02	3.911−01	3.759+02	1.435+01	5.724+02	3.510+01	0.1
$10g_{9/2}$	3.484+01	9.456+02	4.006−01	2.354+02	1.438+01	5.723+02	3.508+01	0.2
$11g_{9/2}$	2.879+01	9.396+02	4.578−01	2.496+02	1.405+01	5.632+02	2.651+01	0.4

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$12g_{9/2}$	2.419+01	7.435+02	5.086−01	2.450+02	1.380+01	5.594+02	2.127+01	0.7
$6h_{9/2}$	9.677+01	1.008+03	2.358+02	2.574−02	1.644+01	3.189+00	6.689+00	0.7
$7h_{9/2}$	7.110+01	7.904+02	4.684+02	1.307−01	1.775+01	1.432+00	2.691+00	0.4
$8h_{9/2}$	5.443+01	7.737+02	5.399+02	2.521−01	1.835+01	1.219+00	2.061+00	0.5
$9h_{9/2}$	4.301+01	7.623+02	4.763+02	3.236−01	1.880+01	1.270+00	2.484+00	0.5
$10h_{9/2}$	3.484+01	6.029+02	4.277+02	2.823−01	1.893+01	1.427+00	2.594+00	0.3
$11h_{9/2}$	2.879+01	5.969+02	4.696+02	9.763−02	1.892+01	1.332+00	3.574+00	0.2
$12h_{9/2}$	2.419+01	5.923+02	6.148+02	1.683−02	1.889+01	1.039+00	6.373+00	0.5
$6h_{11/2}$	9.676+01	1.008+03	2.542+02	1.558−02	1.625+01	3.184+00	6.778+00	0.4
$7h_{11/2}$	7.109+01	7.904+02	3.556+01	3.920−02	1.811+01	1.558+01	5.149+01	0.3
$8h_{11/2}$	5.443+01	7.737+02	3.666+01	3.025−02	1.882+01	1.405+01	5.121+01	0.3
$9h_{11/2}$	4.301+01	7.623+02	3.814+01	1.996−02	1.907+01	1.361+01	5.123+01	0.2
$10h_{11/2}$	3.484+01	6.029+02	4.004+01	1.238−02	1.911+01	1.353+01	5.137+01	0.1
$11h_{11/2}$	2.879+01	5.969+02	4.184+01	7.711−03	1.907+01	1.368+01	5.141+01	0.4
$12h_{11/2}$	2.419+01	5.923+02	1.742+02	1.276−03	1.891+01	3.605+00	4.682+01	0.5
$7i_{11/2}$	7.109+01	6.392+02	2.123+02	1.990−02	1.817+01	2.610+00	6.446+00	0.2
$8i_{11/2}$	5.443+01	5.031+02	1.163+03	6.484−03	1.974+01	3.822−01	7.007+00	0.9
$9i_{11/2}$	4.301+01	4.917+02	2.074+03	2.030−02	2.072+01	1.871−01	7.287+00	1.0
$10i_{11/2}$	3.484+01	4.835+02	4.533+03	2.781−02	2.117+01	8.254−02	6.416+00	1.0
$11i_{11/2}$	2.879+01	4.775+02	1.312+06	1.380−04	2.137+01	2.861−04	1.016+01	0.8
$12i_{11/2}$	2.419+01	3.785+02	1.820+02	3.535−03	2.143+01	2.110+00	6.626+01	0.3
$7i_{13/2}$	7.109+01	6.392+02	2.118+02	1.284−02	1.792+01	2.839+00	6.588+00	0.6
$8i_{13/2}$	5.443+01	5.031+02	1.173+03	6.337−03	1.973+01	3.791−01	7.031+00	0.9
$9i_{13/2}$	4.300+01	4.917+02	8.154+02	6.667−02	2.071+01	4.786−01	6.719+00	1.0
$10i_{13/2}$	3.483+01	4.835+02	1.090+03	8.818−02	2.116+01	3.444−01	6.861+00	1.0
$11i_{13/2}$	2.879+01	4.775+02	1.161+03	8.865−02	2.135+01	3.259−01	6.810+00	0.8
$12i_{13/2}$	2.419+01	3.785+02	8.567+02	9.527−02	2.140+01	4.532−01	6.630+00	0.3
Fe^{23+}								
$2s_{1/2}$	2.047+03	5.237+04	3.246−02	5.741+03	5.329+00	9.650+04	2.140+01	0.3
$3s_{1/2}$	8.968+02	5.122+04	7.815−02	1.100+05	4.090+00	9.650+04	2.116+01	0.1
$4s_{1/2}$	5.009+02	5.083+04	1.277−01	1.329+05	3.629+00	9.650+04	2.154+01	0.7
$5s_{1/2}$	3.192+02	5.065+04	1.793−01	9.383+04	3.386+00	9.650+04	2.146+01	1.2
$6s_{1/2}$	2.210+02	3.161+04	2.524−01	5.264+04	3.214+00	9.650+04	2.140+01	1.4
$7s_{1/2}$	1.620+02	2.495+04	3.345−01	2.811+04	3.100+00	9.650+04	2.136+01	1.5
$8s_{1/2}$	1.239+02	2.492+04	3.204−01	2.075+04	3.101+00	9.649+04	7.829+01	1.3
$9s_{1/2}$	9.774+01	1.968+04	4.097−01	1.149+04	3.022+00	9.646+04	4.797+01	1.4
$10s_{1/2}$	7.909+01	1.554+04	5.291−01	6.082+03	2.956+00	9.645+04	3.015+01	1.4
$11s_{1/2}$	6.531+01	1.228+04	7.052−01	2.985+03	2.897+00	9.643+04	1.895+01	1.3
$12s_{1/2}$	5.485+01	1.227+04	8.199−01	1.847+03	2.864+00	9.644+04	1.488+01	1.5
$2p_{1/2}$	1.998+03	5.232+04	5.184+02	4.431+00	2.553+00	1.540+02	1.036+00	0.2
$3p_{1/2}$	8.833+02	4.063+04	2.365+01	1.153+02	6.042+00	1.543+02	8.870−02	1.3
$4p_{1/2}$	4.953+02	3.189+04	3.041+01	3.544+01	5.781+00	1.543+02	3.597−01	0.5
$5p_{1/2}$	3.164+02	1.990+04	3.060+01	1.659+01	5.807+00	1.552+02	2.903+00	0.2
$6p_{1/2}$	2.194+02	1.568+04	3.994+01	7.654+00	5.481+00	1.543+02	2.137+00	0.6
$7p_{1/2}$	1.610+02	1.563+04	1.758+01	1.687+01	5.562+00	3.510+02	3.336+00	0.8
$8p_{1/2}$	1.232+02	1.234+04	2.197+01	9.463+00	5.330+00	3.499+02	2.437+00	1.1
$9p_{1/2}$	9.727+01	9.743+03	7.070−01	1.936+03	5.526+00	9.907+03	4.013+01	1.0
$10p_{1/2}$	7.875+01	9.725+03	7.875−01	1.457+03	5.432+00	9.913+03	3.068+01	1.3
$11p_{1/2}$	6.506+01	7.683+03	9.251−01	1.041+03	5.322+00	9.910+03	2.175+01	1.4
$12p_{1/2}$	5.465+01	7.673+03	3.313−01	6.009+03	5.273+00	2.992+04	5.096+01	1.6
$2p_{3/2}$	1.981+03	5.231+04	6.400+02	2.588+00	2.315+00	1.541+02	9.656−01	0.3
$3p_{3/2}$	8.784+02	4.063+04	1.745+02	8.629+00	4.806+00	3.904+01	1.089+00	0.3
$4p_{3/2}$	4.933+02	2.529+04	5.788+01	1.419+01	5.815+00	7.053+01	2.093+00	0.2
$5p_{3/2}$	3.153+02	1.990+04	2.266+00	4.529+02	6.215+00	1.555+03	2.874+01	0.1
$6p_{3/2}$	2.188+02	1.568+04	2.701+00	2.977+02	5.996+00	1.547+03	2.096+01	0.4
$7p_{3/2}$	1.606+02	1.563+04	3.165+00	2.015+02	5.810+00	1.542+03	1.500+01	0.7
$8p_{3/2}$	1.229+02	1.234+04	3.767+00	1.357+02	5.629+00	1.540+03	1.044+01	1.0
$9p_{3/2}$	9.709+01	9.743+03	6.892−01	2.026+03	5.537+00	9.504+03	4.199+01	1.1
$10p_{3/2}$	7.862+01	9.725+03	7.740−01	1.523+03	5.438+00	9.490+03	3.163+01	1.4
$11p_{3/2}$	6.496+01	7.683+03	9.089−01	1.092+03	5.326+00	9.465+03	2.237+01	1.5
$12p_{3/2}$	5.457+01	7.673+03	1.046+00	7.815+02	5.236+00	9.473+03	1.660+01	1.5
$3d_{3/2}$	8.732+02	1.634+04	7.121+01	2.797+02	5.508+00	6.171+01	4.202−01	0.4
$4d_{3/2}$	4.911+02	1.270+04	2.334+01	1.859+02	8.333+00	6.134+01	1.711+00	0.6
$5d_{3/2}$	3.142+02	9.960+03	2.287+01	6.258+01	8.661+00	6.203+01	2.898+00	0.2

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$6d_{3/2}$	2.182+02	7.836+03	2.309+01	3.030+01	8.757+00	6.230+01	3.248+00	0.2
$7d_{3/2}$	1.602+02	7.778+03	3.205+01	1.529+01	8.132+00	6.135+01	2.050+00	0.6
$8d_{3/2}$	1.227+02	6.139+03	4.260+00	7.987+01	8.585+00	4.095+02	1.026+01	0.6
$9d_{3/2}$	9.690+01	6.114+03	4.913+00	5.987+01	8.354+00	4.064+02	7.678+00	0.9
$10d_{3/2}$	7.848+01	4.830+03	5.875+00	4.440+01	8.087+00	4.039+02	5.480+00	1.2
$11d_{3/2}$	6.486+01	4.817+03	8.792−02	1.049+04	8.183+00	2.627+04	2.912+02	1.2
$12d_{3/2}$	5.449+01	3.807+03	1.041−01	1.177+04	7.967+00	2.623+04	1.966+02	1.4
$3d_{5/2}$	8.717+02	1.634+04	5.608+01	4.712+02	5.809+00	6.218+01	2.156−01	0.4
$4d_{5/2}$	4.905+02	1.270+04	2.431+01	1.861+02	8.294+00	5.844+01	3.459−03	0.4
$5d_{5/2}$	3.139+02	9.960+03	2.205+01	6.314+01	8.778+00	6.030+01	3.151+00	0.2
$6d_{5/2}$	2.180+02	7.836+03	2.350+01	3.020+01	8.761+00	6.021+01	3.187+00	0.2
$7d_{5/2}$	1.601+02	7.778+03	7.594+00	5.346+01	8.799+00	1.974+02	7.169+00	0.4
$8d_{5/2}$	1.226+02	6.139+03	9.021+00	3.721+01	8.477+00	1.985+02	5.186+00	0.7
$9d_{5/2}$	9.685+01	6.114+03	1.057+01	2.599+01	8.200+00	1.986+02	3.872+00	1.1
$10d_{5/2}$	7.844+01	4.830+03	1.291+01	1.768+01	7.870+00	2.009+02	2.784+00	1.3
$11d_{5/2}$	6.482+01	4.817+03	8.705−02	1.072+04	8.181+00	2.627+04	2.912+02	1.3
$12d_{5/2}$	5.447+01	3.807+03	1.016−01	1.171+04	7.983+00	2.623+04	2.034+02	1.5
$4f_{5/2}$	4.904+02	6.507+03	1.019+02	7.604+01	7.052+00	2.236+01	1.182+00	0.0
$5f_{5/2}$	3.138+02	6.331+03	7.688+01	6.920+01	9.077+00	1.629+01	1.144+00	0.1
$6f_{5/2}$	2.179+02	4.970+03	6.180+01	5.009+01	1.004+01	1.652+01	1.283+00	0.3
$7f_{5/2}$	1.601+02	3.913+03	2.439+01	5.871+01	1.114+01	3.412+01	2.330+00	0.2
$8f_{5/2}$	1.226+02	3.876+03	1.515+01	4.714+01	1.125+01	5.703+01	3.131+00	0.4
$9f_{5/2}$	9.684+01	3.850+03	5.379+00	5.761+01	1.143+01	1.602+02	7.250+00	0.6
$10f_{5/2}$	7.843+01	3.042+03	6.344+00	4.617+01	1.106+01	1.594+02	5.297+00	0.9
$11f_{5/2}$	6.482+01	3.029+03	7.143+00	3.629+01	1.079+01	1.603+02	4.193+00	1.2
$12f_{5/2}$	5.446+01	2.395+03	8.641+00	2.783+01	1.040+01	1.602+02	3.033+00	1.4
$4f_{7/2}$	4.900+02	6.507+03	2.680+02	2.422+00	3.911+00	1.530+02	6.218−01	1.2
$5f_{7/2}$	3.137+02	6.330+03	3.385+01	2.236+02	1.023+01	2.621+01	1.564+00	0.1
$6f_{7/2}$	2.178+02	4.970+03	2.992+01	9.996+01	1.100+01	2.655+01	2.082+00	0.1
$7f_{7/2}$	1.600+02	3.913+03	3.701+01	4.393+01	1.053+01	2.681+01	1.603+00	0.4
$8f_{7/2}$	1.225+02	3.875+03	6.526+00	6.972+01	1.158+01	1.211+02	6.606+00	0.5
$9f_{7/2}$	9.681+01	3.850+03	7.142+00	4.970+01	1.137+01	1.222+02	5.563+00	0.7
$10f_{7/2}$	7.841+01	3.042+03	8.608+00	3.781+01	1.096+01	1.204+02	4.011+00	0.9
$11f_{7/2}$	6.480+01	3.029+03	9.877+00	2.868+01	1.065+01	1.209+02	3.115+00	1.3
$12f_{7/2}$	5.445+01	2.395+03	5.038+00	4.384+01	1.062+01	2.518+02	4.985+00	1.3
$5g_{7/2}$	3.137+02	3.278+03	6.779+01	1.575+02	9.044+00	1.950+01	1.113+00	0.1
$6g_{7/2}$	2.178+02	3.182+03	2.900+01	4.487+02	1.235+01	2.055+01	1.587+00	0.0
$7g_{7/2}$	1.600+02	2.501+03	2.739+01	2.262+02	1.314+01	2.009+01	1.750+00	0.1
$8g_{7/2}$	1.225+02	2.463+03	2.861+01	1.225+02	1.324+01	2.009+01	1.649+00	0.3
$9g_{7/2}$	9.681+01	2.438+03	6.980+00	1.003+02	1.433+01	6.982+01	5.264+00	0.3
$10g_{7/2}$	7.841+01	1.927+03	8.000+00	7.500+01	1.393+01	7.010+01	4.092+00	0.5
$11g_{7/2}$	6.480+01	1.914+03	8.977+00	5.683+01	1.360+01	7.053+01	3.306+00	0.8
$12g_{7/2}$	5.445+01	1.903+03	1.031+01	4.357+01	1.322+01	7.012+01	2.601+00	1.1
$5g_{9/2}$	3.136+02	3.278+03	6.300+01	1.970+02	9.242+00	1.941+01	1.167+00	0.1
$6g_{9/2}$	2.178+02	3.182+03	5.170+01	2.011+02	1.142+01	1.435+01	1.183+00	0.1
$7g_{9/2}$	1.600+02	2.501+03	6.028+01	7.746+01	1.128+01	1.445+01	9.657−01	0.4
$8g_{9/2}$	1.225+02	2.463+03	2.157+01	1.413+02	1.366+01	2.426+01	2.093+00	0.2
$9g_{9/2}$	9.679+01	2.438+03	9.313+00	1.007+02	1.417+01	5.397+01	3.988+00	0.4
$10g_{9/2}$	7.840+01	1.927+03	1.096+01	7.117+01	1.373+01	5.343+01	3.050+00	0.6
$11g_{9/2}$	6.479+01	1.914+03	1.022+00	9.172+01	1.421+01	5.348+02	2.766+01	0.6
$12g_{9/2}$	5.444+01	1.903+03	1.121+00	9.025+01	1.397+01	5.331+02	2.255+01	0.9
$6h_{9/2}$	2.178+02	2.067+03	6.107+02	3.899−03	1.604+01	3.264+00	7.022+00	0.2
$7h_{9/2}$	1.600+02	2.009+03	1.768+02	3.462−02	1.816+01	6.976+00	2.107+01	0.3
$8h_{9/2}$	1.225+02	1.583+03	1.921+02	3.079−02	1.880+01	6.114+00	2.091+01	0.3
$9h_{9/2}$	9.679+01	1.557+03	1.855+02	2.717−02	1.909+01	6.263+00	2.044+01	0.1
$10h_{9/2}$	7.840+01	1.539+03	1.877+02	1.775−02	1.913+01	6.464+00	2.046+01	0.3
$11h_{9/2}$	6.479+01	1.218+03	5.656+02	3.753−03	1.896+01	2.399+00	1.842+01	0.3
$12h_{9/2}$	5.444+01	1.208+03	6.766+02	1.963−03	1.889+01	2.117+00	1.839+01	0.5
$6h_{11/2}$	2.177+02	2.067+03	5.761+02	4.250−03	1.607+01	3.415+00	7.392+00	0.2
$7h_{11/2}$	1.600+02	2.009+03	2.735+02	5.925−02	1.823+01	4.419+00	1.234+01	0.5
$8h_{11/2}$	1.225+02	1.583+03	4.016+02	2.768−02	1.861+01	3.139+00	1.250+01	0.6
$9h_{11/2}$	9.678+01	1.557+03	1.936+02	2.859−02	1.910+01	5.996+00	1.955+01	0.1
$10h_{11/2}$	7.839+01	1.539+03	1.956+02	1.939−02	1.914+01	6.178+00	1.931+01	0.4
$11h_{11/2}$	6.479+01	1.218+03	4.888+02	2.992−03	1.896+01	2.770+00	2.227+01	0.3

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$12h_{11/2}$	5.444+01	1.208+03	1.098+03	4.026−04	1.888+01	1.304+00	3.142+01	0.4
$7i_{11/2}$	1.600+02	1.313+03	7.286+01	3.570+01	1.067+01	1.679+01	7.142−01	0.4
$8i_{11/2}$	1.225+02	1.276+03	5.520+01	1.772+02	1.346+01	1.114+01	7.703−01	0.3
$9i_{11/2}$	9.678+01	1.008+03	3.146+01	7.773+02	1.660+01	1.109+01	1.108+00	0.2
$10i_{11/2}$	7.839+01	9.892+02	1.482+01	9.655+02	1.916+01	1.626+01	2.168+00	0.4
$11i_{11/2}$	6.479+01	9.756+02	1.872+01	4.541+02	1.769+01	1.810+01	1.377+00	0.5
$12i_{11/2}$	5.444+01	9.652+02	7.086+00	2.751+02	1.956+01	3.596+01	3.576+00	0.3
$7i_{13/2}$	1.600+02	1.313+03	7.302+01	3.554+01	1.067+01	1.671+01	7.138−01	0.4
$8i_{13/2}$	1.225+02	1.276+03	2.759+01	1.248+03	1.604+01	1.291+01	1.249+00	0.1
$9i_{13/2}$	9.677+01	1.008+03	3.196+01	6.196+02	1.612+01	1.221+01	1.025+00	0.2
$10i_{13/2}$	7.839+01	9.892+02	1.997+01	7.680+02	1.789+01	1.518+01	1.462+00	0.2
$11i_{13/2}$	6.478+01	9.756+02	1.981+01	4.764+02	1.781+01	1.649+01	1.366+00	0.4
$12i_{13/2}$	5.443+01	9.652+02	8.104+00	3.015+02	1.933+01	3.265+01	3.068+00	0.3
Fe^{24+}								
$1s_{1/2}$	8.838+03	5.917+04	1.678−02	1.827+04	5.884+00	9.650+04	2.218+01	0.4
$2s_{1/2}$	2.184+03	5.251+04	3.356−02	8.303+03	5.257+00	9.650+04	2.152+01	0.2
$3s_{1/2}$	9.630+02	5.129+04	8.019−02	1.345+05	4.053+00	9.650+04	2.157+01	0.2
$4s_{1/2}$	5.393+02	5.087+04	1.307−01	1.567+05	3.601+00	9.650+04	2.199+01	0.7
$5s_{1/2}$	3.442+02	5.067+04	1.831−01	1.091+05	3.362+00	9.650+04	2.218+01	1.3
$6s_{1/2}$	2.386+02	3.999+04	2.471−01	6.378+04	3.202+00	9.650+04	2.232+01	1.6
$7s_{1/2}$	1.751+02	3.157+04	3.235−01	3.484+04	3.089+00	9.650+04	2.225+01	1.8
$8s_{1/2}$	1.339+02	2.493+04	3.230−01	2.398+04	3.085+00	9.654+04	8.452+01	1.3
$9s_{1/2}$	1.057+02	1.969+04	4.135−01	1.326+04	3.005+00	9.652+04	5.132+01	1.3
$10s_{1/2}$	8.557+01	1.555+04	5.353−01	6.987+03	2.938+00	9.652+04	3.172+01	1.3
$11s_{1/2}$	7.068+01	1.554+04	6.205−01	4.357+03	2.899+00	9.652+04	2.420+01	1.5
$12s_{1/2}$	5.936+01	1.227+04	8.315−01	2.106+03	2.846+00	9.651+04	1.532+01	1.4
$2p_{1/2}$	2.159+03	5.249+04	5.835+02	3.753+00	2.464+00	1.542+02	1.011+00	0.2
$3p_{1/2}$	9.560+02	4.070+04	2.280+01	1.188+02	6.160+00	1.532+02	5.029−02	1.2
$4p_{1/2}$	5.364+02	3.193+04	2.970+01	3.687+01	5.872+00	1.534+02	5.151−01	0.4
$5p_{1/2}$	3.428+02	2.514+04	3.106+01	1.652+01	5.874+00	1.516+02	3.108+00	0.2
$6p_{1/2}$	2.378+02	1.982+04	3.983+01	7.884+00	5.555+00	1.514+02	2.291+00	0.6
$7p_{1/2}$	1.745+02	1.564+04	3.823+00	1.570+02	5.797+00	1.422+03	1.329+01	0.6
$8p_{1/2}$	1.335+02	1.235+04	4.496+00	1.064+02	5.619+00	1.438+03	9.422+00	0.9
$9p_{1/2}$	1.055+02	1.232+04	5.196+00	7.168+01	5.482+00	1.434+03	7.035+00	1.2
$10p_{1/2}$	8.539+01	9.731+03	6.293+00	4.585+01	5.328+00	1.432+03	5.036+00	1.5
$11p_{1/2}$	7.054+01	7.689+03	7.803+00	2.794+01	5.177+00	1.430+03	3.665+00	1.6
$12p_{1/2}$	5.926+01	7.677+03	8.948+00	1.880+01	5.077+00	1.430+03	2.969+00	1.8
$2p_{3/2}$	2.140+03	5.247+04	7.051+02	2.304+00	2.240+00	1.538+02	9.479−01	0.2
$3p_{3/2}$	9.504+02	4.070+04	1.895+01	1.379+02	6.354+00	1.530+02	8.703−02	0.8
$4p_{3/2}$	5.341+02	3.193+04	2.562+01	4.401+01	5.994+00	1.533+02	6.736−01	0.3
$5p_{3/2}$	3.416+02	2.513+04	2.609+01	2.005+01	6.021+00	1.534+02	3.779+00	0.2
$6p_{3/2}$	2.371+02	1.982+04	1.727+00	5.476+02	6.056+00	2.407+03	3.588+01	0.5
$7p_{3/2}$	1.741+02	1.564+04	2.032+00	3.945+02	5.859+00	2.410+03	2.514+01	0.7
$8p_{3/2}$	1.332+02	1.235+04	2.431+00	2.785+02	5.672+00	2.402+03	1.700+01	1.0
$9p_{3/2}$	1.053+02	9.751+03	2.921+00	1.907+02	5.505+00	2.401+03	1.159+01	1.2
$10p_{3/2}$	8.524+01	9.731+03	3.336+00	1.329+02	5.392+00	2.396+03	8.753+00	1.5
$11p_{3/2}$	7.043+01	7.689+03	4.036+00	8.636+01	5.257+00	2.395+03	6.251+00	1.6
$12p_{3/2}$	5.917+01	7.677+03	4.663+00	5.855+01	5.159+00	2.393+03	4.864+00	1.7
$3d_{3/2}$	9.476+02	2.053+04	7.118+01	3.112+02	5.604+00	6.216+01	8.185−02	0.5
$4d_{3/2}$	5.329+02	1.275+04	2.557+01	1.753+02	8.302+00	6.090+01	1.587−01	0.4
$5d_{3/2}$	3.410+02	1.255+04	2.552+01	5.612+01	8.671+00	5.973+01	2.864+00	0.2
$6d_{3/2}$	2.367+02	9.883+03	2.814+01	2.648+01	8.580+00	5.960+01	2.783+00	0.2
$7d_{3/2}$	1.739+02	7.792+03	5.165+00	7.222+01	8.886+00	3.081+02	1.129+01	0.3
$8d_{3/2}$	1.331+02	7.751+03	6.011+00	5.436+01	8.589+00	3.110+02	8.169+00	0.7
$9d_{3/2}$	1.052+02	6.122+03	7.119+00	4.028+01	8.299+00	3.114+02	5.860+00	0.9
$10d_{3/2}$	8.516+01	6.102+03	8.196+00	2.956+01	8.073+00	3.113+02	4.456+00	1.3
$11d_{3/2}$	7.038+01	4.822+03	9.911+00	2.080+01	7.799+00	3.122+02	3.250+00	1.5
$12d_{3/2}$	5.913+01	4.811+03	1.124+01	1.518+01	7.614+00	3.137+02	2.607+00	1.8
$3d_{5/2}$	9.458+02	2.053+04	5.801+01	4.816+02	5.870+00	6.213+01	3.106−01	0.5
$4d_{5/2}$	5.322+02	1.275+04	2.383+01	1.860+02	8.419+00	6.098+01	3.420−03	0.3
$5d_{5/2}$	3.406+02	1.255+04	2.362+01	5.834+01	8.820+00	5.973+01	3.224+00	0.2
$6d_{5/2}$	2.365+02	9.882+03	2.626+01	2.769+01	8.706+00	5.954+01	3.028+00	0.2
$7d_{5/2}$	1.737+02	7.792+03	5.077+00	7.383+01	8.894+00	3.081+02	1.134+01	0.4
$8d_{5/2}$	1.330+02	7.751+03	5.660+00	5.612+01	8.636+00	3.182+02	8.764+00	0.7

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$9d_{5/2}$	1.051+02	6.122+03	6.789+00	4.174+01	8.335+00	3.159+02	6.177+00	1.0
$10d_{5/2}$	8.512+01	6.102+03	7.806+00	3.087+01	8.108+00	3.159+02	4.698+00	1.4
$11d_{5/2}$	7.034+01	4.822+03	9.519+00	2.176+01	7.825+00	3.152+02	3.372+00	1.6
$12d_{5/2}$	5.910+01	4.811+03	1.081+01	1.598+01	7.631+00	3.190+02	2.689+00	1.9
$4f_{5/2}$	5.321+02	8.150+03	1.123+02	6.727+01	7.053+00	2.202+01	1.191+00	0.1
$5f_{5/2}$	3.406+02	6.357+03	4.682+01	1.603+02	1.022+01	2.018+01	1.577+00	0.5
$6f_{5/2}$	2.365+02	4.988+03	4.380+01	7.282+01	1.072+01	2.115+01	1.732+00	0.1
$7f_{5/2}$	1.737+02	4.926+03	2.359+01	5.778+01	1.119+01	3.803+01	2.511+00	0.3
$8f_{5/2}$	1.330+02	3.886+03	2.858+01	3.181+01	1.073+01	3.819+01	1.917+00	0.5
$9f_{5/2}$	1.051+02	3.858+03	9.198+00	4.284+01	1.126+01	1.074+02	4.666+00	0.6
$10f_{5/2}$	8.511+01	3.049+03	1.114+01	3.165+01	1.082+01	1.068+02	3.352+00	0.9
$11f_{5/2}$	7.034+01	3.034+03	1.299+01	2.300+01	1.050+01	1.060+02	2.601+00	1.2
$12f_{5/2}$	5.910+01	3.023+03	7.610−01	2.312+02	1.092+01	1.623+03	3.411+01	1.2
$4f_{7/2}$	5.318+02	8.150+03	1.107+02	7.007+01	7.032+00	2.241+01	1.165+00	0.1
$5f_{7/2}$	3.404+02	6.357+03	7.848+01	7.260+01	9.236+00	1.630+01	1.189+00	0.1
$6f_{7/2}$	2.364+02	4.988+03	6.354+01	4.992+01	1.016+01	1.680+01	1.331+00	0.2
$7f_{7/2}$	1.737+02	4.926+03	6.888+00	9.052+01	1.185+01	1.091+02	7.661+00	0.2
$8f_{7/2}$	1.330+02	3.886+03	7.149+00	5.322+01	1.185+01	1.093+02	7.413+00	0.3
$9f_{7/2}$	1.050+02	3.858+03	8.609+00	4.415+01	1.130+01	1.126+02	4.982+00	0.6
$10f_{7/2}$	8.509+01	3.049+03	1.024+01	3.331+01	1.089+01	1.132+02	3.640+00	0.9
$11f_{7/2}$	7.032+01	3.034+03	2.190+00	8.879+01	1.105+01	5.208+02	1.386+01	1.0
$12f_{7/2}$	5.909+01	3.023+03	2.421+00	7.851+01	1.084+01	5.211+02	1.104+01	1.3
$5g_{7/2}$	3.404+02	4.093+03	7.198+01	1.547+02	9.118+00	1.943+01	1.145+00	0.1
$6g_{7/2}$	2.364+02	3.200+03	5.925+01	1.635+02	1.126+01	1.427+01	1.142+00	0.1
$7g_{7/2}$	1.737+02	3.138+03	4.188+01	1.553+02	1.262+01	1.595+01	1.387+00	0.1
$8g_{7/2}$	1.330+02	2.474+03	2.519+01	1.255+02	1.355+01	2.323+01	1.960+00	0.2
$9g_{7/2}$	1.050+02	2.446+03	3.900+00	9.431+01	1.450+01	1.315+02	9.820+00	0.3
$10g_{7/2}$	8.509+01	2.426+03	4.244+00	7.262+01	1.427+01	1.327+02	8.257+00	0.5
$11g_{7/2}$	7.032+01	1.919+03	4.908+00	6.211+01	1.390+01	1.309+02	6.304+00	0.6
$12g_{7/2}$	5.909+01	1.908+03	5.424+00	5.232+01	1.360+01	1.319+02	5.106+00	0.9
$5g_{9/2}$	3.403+02	4.093+03	7.324+01	1.475+02	9.050+00	1.948+01	1.107+00	0.1
$6g_{9/2}$	2.363+02	3.200+03	7.985+01	7.961+01	1.035+01	1.372+01	9.378−01	0.2
$7g_{9/2}$	1.736+02	3.138+03	4.748+01	1.434+02	1.256+01	1.398+01	1.319+00	0.3
$8g_{9/2}$	1.329+02	2.474+03	3.277+01	1.049+02	1.298+01	2.047+01	1.519+00	0.3
$9g_{9/2}$	1.050+02	2.446+03	7.604+00	9.448+01	1.428+01	7.037+01	5.160+00	0.3
$10g_{9/2}$	8.507+01	2.426+03	8.404+00	6.830+01	1.401+01	7.071+01	4.283+00	0.6
$11g_{9/2}$	7.031+01	1.919+03	9.875+00	5.274+01	1.355+01	7.062+01	3.225+00	0.7
$12g_{9/2}$	5.908+01	1.908+03	1.178+00	8.874+01	1.393+01	5.588+02	2.291+01	0.8
$6h_{9/2}$	2.363+02	2.085+03	6.436+02	3.952−03	1.606+01	3.340+00	7.033+00	0.2
$7h_{9/2}$	1.736+02	2.022+03	4.350+02	5.358−02	1.811+01	3.164+00	8.615+00	0.3
$8h_{9/2}$	1.329+02	1.982+03	4.184+02	7.450−02	1.883+01	3.033+00	8.940+00	0.3
$9h_{9/2}$	1.050+02	1.565+03	4.223+02	5.985−02	1.906+01	3.047+00	8.913+00	0.1
$10h_{9/2}$	8.507+01	1.545+03	5.122+02	3.111−02	1.904+01	2.685+00	8.754+00	0.1
$11h_{9/2}$	7.031+01	1.530+03	7.173+02	1.213−02	1.895+01	2.062+00	8.985+00	0.3
$12h_{9/2}$	5.908+01	1.212+03	1.519+03	7.315−04	1.888+01	1.026+00	1.952+01	0.4
$6h_{11/2}$	2.363+02	2.085+03	6.447+02	3.980−03	1.606+01	3.326+00	7.014+00	0.2
$7h_{11/2}$	1.736+02	2.022+03	5.226+02	4.080−02	1.799+01	2.755+00	7.775+00	0.3
$8h_{11/2}$	1.329+02	1.982+03	4.586+02	8.005−02	1.882+01	2.779+00	8.109+00	0.3
$9h_{11/2}$	1.050+02	1.565+03	4.512+02	7.205−02	1.907+01	2.841+00	7.931+00	0.2
$10h_{11/2}$	8.506+01	1.545+03	4.365+02	4.799−02	1.912+01	3.049+00	8.190+00	0.4
$11h_{11/2}$	7.030+01	1.530+03	7.853+02	1.370−02	1.895+01	1.887+00	8.025+00	0.3
$12h_{11/2}$	5.907+01	1.212+03	1.835+03	3.338−03	1.887+01	8.548−01	8.105+00	0.4
$7i_{11/2}$	1.736+02	1.327+03	7.839+01	3.419+01	1.071+01	1.674+01	7.193−01	0.3
$8i_{11/2}$	1.329+02	1.286+03	4.911+01	2.726+02	1.396+01	1.250+01	8.325−01	0.4
$9i_{11/2}$	1.050+02	1.258+03	2.347+01	1.053+03	1.740+01	1.423+01	1.421+00	0.1
$10i_{11/2}$	8.506+01	9.958+02	2.363+01	6.647+02	1.768+01	1.444+01	1.360+00	0.2
$11i_{11/2}$	7.030+01	9.811+02	1.533+01	4.872+02	1.857+01	2.036+01	1.872+00	0.3
$12i_{11/2}$	5.907+01	9.698+02	1.454+01	3.105+02	1.830+01	2.384+01	1.771+00	0.5
$7i_{13/2}$	1.736+02	1.327+03	7.761+01	3.567+01	1.074+01	1.674+01	7.225−01	0.3
$8i_{13/2}$	1.329+02	1.286+03	5.721+01	1.933+02	1.367+01	1.113+01	7.955−01	0.3
$9i_{13/2}$	1.050+02	1.258+03	3.528+01	6.913+02	1.654+01	1.082+01	1.088+00	0.2
$10i_{13/2}$	8.506+01	9.958+02	2.339+01	6.320+02	1.754+01	1.509+01	1.333+00	0.2
$11i_{13/2}$	7.029+01	9.811+02	2.169+01	3.912+02	1.747+01	1.773+01	1.288+00	0.5
$12i_{13/2}$	5.907+01	9.698+02	1.264+01	3.193+02	1.877+01	2.498+01	2.111+00	0.4

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
Fe^{25+}								
$1s_{1/2}$	9.282+03	5.961+04	1.657−01	8.234+03	5.781+00	9.841+03	2.246+01	0.4
$2s_{1/2}$	2.326+03	5.265+04	3.397−01	1.485+03	5.189+00	9.841+03	2.293+01	0.1
$3s_{1/2}$	1.031+03	5.136+04	8.054−01	5.417+03	4.018+00	9.841+03	2.502+01	0.3
$4s_{1/2}$	5.791+02	5.091+04	1.303+00	3.675+03	3.577+00	9.841+03	2.512+01	0.8
$5s_{1/2}$	3.702+02	5.070+04	1.481+00	2.081+03	3.463+00	9.852+03	5.241+01	0.8
$6s_{1/2}$	2.568+02	4.000+04	1.974+00	1.129+03	3.284+00	9.819+03	2.877+01	1.0
$7s_{1/2}$	1.886+02	3.158+04	2.585+00	5.882+02	3.150+00	9.818+03	1.681+01	1.2
$8s_{1/2}$	1.443+02	2.494+04	3.383+00	2.951+02	3.042+00	9.811+03	1.046+01	1.3
$9s_{1/2}$	1.140+02	1.969+04	4.518+00	1.405+02	2.948+00	9.812+03	6.793+00	1.4
$10s_{1/2}$	9.229+01	1.556+04	6.137+00	6.412+01	2.864+00	9.813+03	4.661+00	1.4
$11s_{1/2}$	7.625+01	1.554+04	6.792+00	4.221+01	2.826+00	9.813+03	4.001+00	1.5
$12s_{1/2}$	6.406+01	1.228+04	7.081+00	3.149+01	2.802+00	9.813+03	3.603+00	1.7
$2p_{1/2}$	2.326+03	5.265+04	6.476+02	3.271+00	2.386+00	1.543+02	9.908−01	0.2
$3p_{1/2}$	1.031+03	4.078+04	2.203+01	1.212+02	6.274+00	1.524+02	1.234−01	1.0
$4p_{1/2}$	5.791+02	3.197+04	2.924+01	3.794+01	5.954+00	1.524+02	5.909−01	0.4
$5p_{1/2}$	3.702+02	2.516+04	3.043+01	1.700+01	5.961+00	1.510+02	3.442+00	0.2
$6p_{1/2}$	2.568+02	1.984+04	3.885+01	8.321+00	5.634+00	1.518+02	2.496+00	0.6
$7p_{1/2}$	1.886+02	1.565+04	2.164+00	3.723+02	5.850+00	2.517+03	2.494+01	0.6
$8p_{1/2}$	1.443+02	1.236+04	2.579+00	2.627+02	5.667+00	2.515+03	1.697+01	0.9
$9p_{1/2}$	1.140+02	1.233+04	2.958+00	1.851+02	5.536+00	2.509+03	1.251+01	1.2
$10p_{1/2}$	9.229+01	9.738+03	3.536+00	1.251+02	5.390+00	2.512+03	8.753+00	1.4
$11p_{1/2}$	7.625+01	9.722+03	4.038+00	8.674+01	5.289+00	2.512+03	6.774+00	1.5
$12p_{1/2}$	6.406+01	7.682+03	4.955+00	5.474+01	5.160+00	2.510+03	4.876+00	1.7
$2p_{3/2}$	2.305+03	5.263+04	7.734+02	2.058+00	2.163+00	1.562+02	9.311−01	0.2
$3p_{3/2}$	1.025+03	4.077+04	1.755+01	1.443+02	6.488+00	1.577+02	2.677−02	0.7
$4p_{3/2}$	5.765+02	3.197+04	2.416+01	4.730+01	6.090+00	1.579+02	6.633−01	0.4
$5p_{3/2}$	3.688+02	2.516+04	2.458+01	2.138+01	6.123+00	1.580+02	4.351+00	0.3
$6p_{3/2}$	2.561+02	1.984+04	3.267+01	1.047+01	5.754+00	1.554+02	2.917+00	0.7
$7p_{3/2}$	1.881+02	1.565+04	1.251+01	2.860+01	5.745+00	4.360+02	5.214+00	0.9
$8p_{3/2}$	1.440+02	1.236+04	1.598+01	1.659+01	5.483+00	4.368+02	3.516+00	1.2
$9p_{3/2}$	1.137+02	1.233+04	1.902+01	1.027+01	5.301+00	4.377+02	2.671+00	1.5
$10p_{3/2}$	9.212+01	9.738+03	2.564+00	2.182+02	5.415+00	3.181+03	1.185+01	1.4
$11p_{3/2}$	7.612+01	9.722+03	2.861+00	1.577+02	5.325+00	3.185+03	9.306+00	1.7
$12p_{3/2}$	6.396+01	7.682+03	3.489+00	1.027+02	5.196+00	3.195+03	6.558+00	1.7
$3d_{3/2}$	1.025+03	2.061+04	6.530+01	4.079+02	5.825+00	6.257+01	1.395−01	0.4
$4d_{3/2}$	5.765+02	1.604+04	2.710+01	1.643+02	8.338+00	6.094+01	5.334−01	0.5
$5d_{3/2}$	3.688+02	1.258+04	3.024+01	5.262+01	8.385+00	6.153+01	2.052+00	0.5
$6d_{3/2}$	2.561+02	9.902+03	2.871+01	2.564+01	8.635+00	6.159+01	2.923+00	0.2
$7d_{3/2}$	1.881+02	7.806+03	3.805+00	9.681+01	8.904+00	4.496+02	1.591+01	0.4
$8d_{3/2}$	1.440+02	7.762+03	4.423+00	7.329+01	8.647+00	4.453+02	1.174+01	0.7
$9d_{3/2}$	1.137+02	6.130+03	5.240+00	5.682+01	8.364+00	4.443+02	8.320+00	0.9
$10d_{3/2}$	9.212+01	6.109+03	5.963+00	4.352+01	8.151+00	4.463+02	6.323+00	1.2
$11d_{3/2}$	7.612+01	4.828+03	7.126+00	3.198+01	7.901+00	4.463+02	4.588+00	1.4
$12d_{3/2}$	6.396+01	4.816+03	8.138+00	2.367+01	7.721+00	4.459+02	3.599+00	1.7
$3d_{5/2}$	1.023+03	2.060+04	5.474+01	5.846+02	6.057+00	6.249+01	2.846−01	0.4
$4d_{5/2}$	5.756+02	1.604+04	2.341+01	1.683+02	8.685+00	6.028+01	2.929+00	0.4
$5d_{5/2}$	3.684+02	1.258+04	2.378+01	5.551+01	8.932+00	6.100+01	3.556+00	0.1
$6d_{5/2}$	2.558+02	9.902+03	2.515+01	2.670+01	8.927+00	6.099+01	3.579+00	0.2
$7d_{5/2}$	1.879+02	7.806+03	8.710+00	4.445+01	8.861+00	1.948+02	7.498+00	0.4
$8d_{5/2}$	1.439+02	7.762+03	1.029+01	3.144+01	8.541+00	1.957+02	5.424+00	0.8
$9d_{5/2}$	1.137+02	6.130+03	6.867+00	4.149+01	8.347+00	3.354+02	6.545+00	1.0
$10d_{5/2}$	9.206+01	6.109+03	7.871+00	3.110+01	8.117+00	3.375+02	4.961+00	1.3
$11d_{5/2}$	7.608+01	4.828+03	9.598+00	2.201+01	7.837+00	3.371+02	3.555+00	1.5
$12d_{5/2}$	6.393+01	4.816+03	1.095+01	1.606+01	7.649+00	3.378+02	2.825+00	1.8
$4f_{5/2}$	5.756+02	8.194+03	1.197+02	6.491+01	7.105+00	2.183+01	1.214+00	0.1
$5f_{5/2}$	3.684+02	6.385+03	1.497+02	1.497+01	7.330+00	2.077+01	7.973−01	0.6
$6f_{5/2}$	2.558+02	6.273+03	5.504+01	5.676+01	1.035+01	2.041+01	1.492+00	0.1
$7f_{5/2}$	1.879+02	4.940+03	2.523+01	5.300+01	1.128+01	3.738+01	2.620+00	0.2
$8f_{5/2}$	1.439+02	4.896+03	8.166+00	6.075+01	1.147+01	1.184+02	5.967+00	0.5
$9f_{5/2}$	1.137+02	3.867+03	8.950+00	4.240+01	1.127+01	1.196+02	5.100+00	0.6
$10f_{5/2}$	9.206+01	3.845+03	1.010+01	3.217+01	1.096+01	1.211+02	4.001+00	0.9
$11f_{5/2}$	7.608+01	3.040+03	1.212+01	2.406+01	1.055+01	1.218+02	2.928+00	1.1
$12f_{5/2}$	6.393+01	3.028+03	8.131+00	2.826+01	1.052+01	1.899+02	3.729+00	1.3
$4f_{7/2}$	5.752+02	8.193+03	1.204+02	6.386+01	7.046+00	2.213+01	1.177+00	0.1

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$5f_{7/2}$	3.682+02	6.385+03	1.470+02	1.642+01	7.473+00	1.928+01	8.166−01	0.5
$6f_{7/2}$	2.557+02	6.272+03	3.169+01	9.060+01	1.108+01	2.888+01	2.242+00	0.1
$7f_{7/2}$	1.878+02	4.940+03	3.439+01	4.506+01	1.102+01	2.904+01	2.038+00	0.2
$8f_{7/2}$	1.438+02	4.896+03	8.718+00	5.490+01	1.158+01	1.061+02	5.953+00	0.4
$9f_{7/2}$	1.136+02	3.867+03	1.006+01	3.966+01	1.124+01	1.064+02	4.595+00	0.6
$10f_{7/2}$	9.203+01	3.845+03	1.155+01	2.948+01	1.091+01	1.068+02	3.551+00	0.9
$11f_{7/2}$	7.606+01	3.040+03	1.396+01	2.158+01	1.048+01	1.077+02	2.587+00	1.1
$12f_{7/2}$	6.391+01	3.028+03	9.583−01	1.906+02	1.089+01	1.406+03	2.903+01	1.2
$5g_{7/2}$	3.682+02	4.121+03	7.785+01	1.427+02	9.122+00	1.944+01	1.148+00	0.1
$6g_{7/2}$	2.557+02	4.009+03	6.975+01	1.262+02	1.104+01	1.392+01	1.088+00	0.1
$7g_{7/2}$	1.878+02	3.152+03	6.222+01	9.579+01	1.198+01	1.337+01	1.121+00	0.3
$8g_{7/2}$	1.438+02	3.108+03	2.398+01	1.211+02	1.367+01	2.578+01	2.168+00	0.2
$9g_{7/2}$	1.136+02	2.455+03	1.673+01	8.248+01	1.372+01	3.936+01	2.617+00	0.4
$10g_{7/2}$	9.203+01	2.433+03	1.907+01	5.406+01	1.337+01	3.935+01	2.132+00	0.6
$11g_{7/2}$	7.606+01	2.417+03	4.484+00	5.778+01	1.400+01	1.506+02	7.530+00	0.7
$12g_{7/2}$	6.391+01	1.913+03	5.157+00	5.159+01	1.361+01	1.507+02	5.704+00	0.8
$5g_{9/2}$	3.680+02	4.121+03	7.868+01	1.397+02	9.118+00	1.913+01	1.146+00	0.1
$6g_{9/2}$	2.556+02	4.009+03	4.738+01	2.506+02	1.184+01	1.669+01	1.333+00	0.0
$7g_{9/2}$	1.878+02	3.152+03	5.688+01	8.956+01	1.162+01	1.693+01	1.063+00	0.5
$8g_{9/2}$	1.438+02	3.108+03	1.563+01	1.330+02	1.406+01	3.654+01	3.105+00	0.2
$9g_{9/2}$	1.136+02	2.455+03	1.809+01	8.087+01	1.369+01	3.650+01	2.468+00	0.4
$10g_{9/2}$	9.202+01	2.433+03	1.197+01	6.135+01	1.379+01	5.665+01	3.265+00	0.6
$11g_{9/2}$	7.605+01	2.417+03	5.343+00	5.547+01	1.396+01	1.271+02	6.378+00	0.7
$12g_{9/2}$	6.390+01	1.913+03	6.252+00	4.824+01	1.354+01	1.262+02	4.744+00	0.9
$6h_{9/2}$	2.556+02	2.597+03	6.885+02	4.098−03	1.611+01	3.314+00	6.995+00	0.3
$7h_{9/2}$	1.878+02	2.037+03	6.628+02	3.016−02	1.789+01	2.448+00	7.018+00	0.4
$8h_{9/2}$	1.438+02	1.993+03	7.689+02	1.087−01	1.874+01	1.872+00	4.747+00	0.3
$9h_{9/2}$	1.136+02	1.962+03	7.966+02	8.583−02	1.896+01	1.834+00	4.842+00	0.2
$10h_{9/2}$	9.202+01	1.552+03	7.736+02	5.621−02	1.902+01	1.958+00	5.099+00	0.1
$11h_{9/2}$	7.605+01	1.536+03	1.012+03	1.637−02	1.893+01	1.601+00	6.300+00	0.2
$12h_{9/2}$	6.390+01	1.524+03	2.028+03	6.804−03	1.884+01	8.503−01	5.151+00	0.4
$6h_{11/2}$	2.556+02	2.596+03	6.901+02	4.065−03	1.610+01	3.304+00	6.994+00	0.3
$7h_{11/2}$	1.878+02	2.037+03	5.889+02	3.904−02	1.798+01	2.656+00	7.347+00	0.3
$8h_{11/2}$	1.438+02	1.993+03	5.689+02	6.922−02	1.875+01	2.488+00	7.305+00	0.2
$9h_{11/2}$	1.136+02	1.962+03	6.760+02	3.840−02	1.890+01	2.192+00	7.542+00	0.4
$10h_{11/2}$	9.201+01	1.552+03	6.833+02	2.875−02	1.900+01	2.211+00	7.594+00	0.2
$11h_{11/2}$	7.604+01	1.536+03	6.989+02	2.001−02	1.898+01	2.270+00	7.236+00	0.3
$12h_{11/2}$	6.389+01	1.524+03	3.167+03	1.598−02	1.873+01	5.853−01	2.037+00	0.5
$7i_{11/2}$	1.878+02	1.648+03	5.216+01	2.964+02	1.302+01	1.346+01	1.047+00	0.1
$8i_{11/2}$	1.438+02	1.297+03	5.967+01	1.528+02	1.331+01	1.320+01	7.621−01	0.4
$9i_{11/2}$	1.136+02	1.267+03	2.900+01	8.353+02	1.704+01	1.330+01	1.275+00	0.1
$10i_{11/2}$	9.201+01	1.245+03	2.739+01	6.340+02	1.773+01	1.318+01	1.333+00	0.3
$11i_{11/2}$	7.604+01	1.229+03	1.530+01	4.489+02	1.871+01	2.156+01	2.018+00	0.3
$12i_{11/2}$	6.389+01	9.747+02	6.365+00	2.099+02	1.941+01	4.903+01	4.272+00	0.3
$7i_{13/2}$	1.877+02	1.648+03	8.182+01	3.642+01	1.080+01	1.695+01	7.247−01	0.4
$8i_{13/2}$	1.437+02	1.297+03	5.624+01	2.435+02	1.403+01	1.134+01	8.432−01	0.2
$9i_{13/2}$	1.136+02	1.267+03	2.860+01	8.713+02	1.714+01	1.319+01	1.307+00	0.1
$10i_{13/2}$	9.200+01	1.245+03	1.997+01	8.077+02	1.879+01	1.505+01	1.868+00	0.4
$11i_{13/2}$	7.603+01	1.229+03	2.069+01	4.126+02	1.794+01	1.828+01	1.479+00	0.4
$12i_{13/2}$	6.389+01	9.747+02	1.285+01	2.885+02	1.879+01	2.658+01	2.214+00	0.3
Ni^{9+}								
$4s_{1/2}$	1.412+02	3.989+04	1.029−02	8.878+04	4.269+00	8.539+05	1.911+01	1.0
$5s_{1/2}$	7.995+01	2.487+04	2.186−02	1.119+05	3.790+00	8.539+05	1.905+01	2.8
$6s_{1/2}$	5.164+01	1.963+04	3.892−02	6.249+04	3.548+00	8.539+05	1.920+01	3.8
$7s_{1/2}$	3.612+01	1.225+04	7.585−02	2.114+04	3.383+00	8.539+05	1.816+01	3.8
$8s_{1/2}$	2.669+01	9.673+03	1.295−01	7.078+03	3.288+00	8.539+05	2.645+01	3.8
$9s_{1/2}$	2.053+01	7.639+03	2.850−01	1.437+03	3.198+00	8.539+05	1.126+01	3.8
$10s_{1/2}$	1.628+01	7.634+03	4.032−01	6.008+02	3.154+00	8.539+05	9.452+00	4.0
$11s_{1/2}$	1.323+01	6.030+03	6.101−01	2.202+02	3.117+00	8.539+05	7.167+00	3.6
$12s_{1/2}$	1.096+01	6.028+03	6.017−01	1.801+02	3.102+00	8.539+05	7.184+00	3.9
$4p_{1/2}$	1.273+02	1.559+04	1.467+01	5.441+00	7.464+00	1.374+02	1.805−02	0.7
$5p_{1/2}$	7.381+01	1.229+04	2.312+00	1.408+01	7.190+00	1.068+03	7.315+00	0.7
$6p_{1/2}$	4.838+01	9.694+03	3.188+00	1.086+01	6.736+00	1.068+03	6.091+00	1.7

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$7p_{1/2}$	3.419+01	7.652+03	4.393+00	7.253+00	6.370+00	1.067+03	4.071+00	2.7
$8p_{1/2}$	2.545+01	6.042+03	4.839−01	9.760+01	6.284+00	1.121+04	2.636+01	3.1
$9p_{1/2}$	1.969+01	6.036+03	5.915−01	7.378+01	6.116+00	1.118+04	1.901+01	3.8
$10p_{1/2}$	1.568+01	4.768+03	6.112−04	1.977+06	6.002+00	1.304+07	1.536+04	4.0
$11p_{1/2}$	1.279+01	4.765+03	5.963−04	1.714+06	5.986+00	1.304+07	1.536+04	3.6
$12p_{1/2}$	1.063+01	3.764+03	5.791−04	1.449+06	5.980+00	1.304+07	1.536+04	3.9
$4p_{3/2}$	1.266+02	1.559+04	1.403+01	6.033+00	7.455+00	1.370+02	5.741−01	0.5
$5p_{3/2}$	7.349+01	1.229+04	5.572−01	4.981+01	7.221+00	4.143+03	2.711+01	0.7
$6p_{3/2}$	4.821+01	9.694+03	7.528−01	5.065+01	6.794+00	4.136+03	2.276+01	1.7
$7p_{3/2}$	3.409+01	7.652+03	1.001+00	4.163+01	6.473+00	4.113+03	1.513+01	2.6
$8p_{3/2}$	2.539+01	6.042+03	1.323+00	3.004+01	6.215+00	4.112+03	9.904+00	3.2
$9p_{3/2}$	1.964+01	6.036+03	1.618+00	2.105+01	6.041+00	4.112+03	7.236+00	4.0
$10p_{3/2}$	1.565+01	4.768+03	5.911−04	2.539+06	5.975+00	1.304+07	1.536+04	4.0
$11p_{3/2}$	1.276+01	4.765+03	5.759−04	2.202+06	5.959+00	1.304+07	1.536+04	3.8
$12p_{3/2}$	1.061+01	3.764+03	5.580−04	1.882+06	5.952+00	1.304+07	1.536+04	3.8
$3d_{3/2}$	2.245+02	7.843+03	6.697+01	6.158+01	5.675+00	7.005+01	6.649−01	0.2
$4d_{3/2}$	1.051+02	4.857+03	1.847+01	5.096+01	8.431+00	6.564+01	6.984−04	0.5
$5d_{3/2}$	6.393+01	4.816+03	7.411+00	4.225+01	8.865+00	1.496+02	1.133−03	0.5
$6d_{3/2}$	4.309+01	3.796+03	2.122+00	6.412+01	9.005+00	5.172+02	1.855−01	0.6
$7d_{3/2}$	3.103+01	2.995+03	2.447+00	4.237+01	8.783+00	5.165+02	3.213+00	1.1
$8d_{3/2}$	2.341+01	2.987+03	2.795+00	2.930+01	8.581+00	5.158+02	3.137+00	1.6
$9d_{3/2}$	1.829+01	2.359+03	3.315+00	2.046+01	8.344+00	5.173+02	2.612+00	1.9
$10d_{3/2}$	1.469+01	2.356+03	4.372−01	1.416+02	8.520+00	3.605+03	1.421+01	1.9
$11d_{3/2}$	1.205+01	2.353+03	4.916−01	1.147+02	8.386+00	3.597+03	1.182+01	1.7
$12d_{3/2}$	1.007+01	1.859+03	5.831−01	9.000+01	8.224+00	3.600+03	9.110+00	1.2
$3d_{5/2}$	2.240+02	7.842+03	6.390+01	6.859+01	5.869+00	5.990+01	7.101−01	0.5
$4d_{5/2}$	1.050+02	4.857+03	1.795+01	5.250+01	8.485+00	6.491+01	6.666−02	0.5
$5d_{5/2}$	6.388+01	4.816+03	7.410+00	4.245+01	8.880+00	1.467+02	4.125−01	0.5
$6d_{5/2}$	4.307+01	3.796+03	1.927+00	6.921+01	9.027+00	5.572+02	9.634−02	0.7
$7d_{5/2}$	3.101+01	2.995+03	2.219+00	4.635+01	8.804+00	5.574+02	3.471+00	1.1
$8d_{5/2}$	2.340+01	2.987+03	2.521+00	3.241+01	8.606+00	5.581+02	3.414+00	1.6
$9d_{5/2}$	1.828+01	2.359+03	2.997+00	2.276+01	8.371+00	5.572+02	2.824+00	2.0
$10d_{5/2}$	1.468+01	2.356+03	4.354−01	1.453+02	8.513+00	3.605+03	1.427+01	1.8
$11d_{5/2}$	1.205+01	2.353+03	4.801−01	1.181+02	8.394+00	3.606+03	1.224+01	2.0
$12d_{5/2}$	1.006+01	1.859+03	5.568−01	9.429+01	8.245+00	3.607+03	9.646+00	1.7
$4f_{5/2}$	8.809+01	1.937+03	8.483−01	1.096+04	9.854+00	6.110+02	5.231+01	1.3
$5f_{5/2}$	5.639+01	1.517+03	1.657+00	4.354+03	9.185+00	4.987+02	9.334−01	1.6
$6f_{5/2}$	3.903+01	1.499+03	1.410+00	1.740+03	9.673+00	4.984+02	2.486−02	1.3
$7f_{5/2}$	2.858+01	1.182+03	1.452+00	8.891+02	9.743+00	4.982+02	9.483−03	0.9
$8f_{5/2}$	2.181+01	1.175+03	1.616+00	5.199+02	9.640+00	4.980+02	2.201−02	1.0
$9f_{5/2}$	1.719+01	9.280+02	1.589+00	3.376+02	9.706+00	5.017+02	2.227+00	0.5
$10f_{5/2}$	1.390+01	9.247+02	1.593+00	2.339+02	9.729+00	5.019+02	2.659+00	0.5
$11f_{5/2}$	1.146+01	9.222+02	1.768+00	1.638+02	9.594+00	5.016+02	2.258+00	0.7
$12f_{5/2}$	9.618+00	7.289+02	1.812+00	1.209+02	9.577+00	5.016+02	2.323+00	0.3
$4f_{7/2}$	8.808+01	1.937+03	6.995+00	5.436+02	9.471+00	8.293+01	6.338+00	1.3
$5f_{7/2}$	5.639+01	1.517+03	1.593+00	4.566+03	9.210+00	5.096+02	1.766+00	1.6
$6f_{7/2}$	3.903+01	1.499+03	1.366+00	1.819+03	9.682+00	5.105+02	1.131−02	1.3
$7f_{7/2}$	2.857+01	1.182+03	1.396+00	9.283+02	9.764+00	5.101+02	1.947−02	0.9
$8f_{7/2}$	2.181+01	1.175+03	1.491+00	5.457+02	9.728+00	5.094+02	1.477+00	0.8
$9f_{7/2}$	1.719+01	9.280+02	1.515+00	3.483+02	9.756+00	5.081+02	2.515+00	0.5
$10f_{7/2}$	1.389+01	9.247+02	1.640+00	2.367+02	9.664+00	5.078+02	2.332+00	0.5
$11f_{7/2}$	1.146+01	9.222+02	1.739+00	1.678+02	9.597+00	5.077+02	2.275+00	0.7
$12f_{7/2}$	9.617+00	7.289+02	1.784+00	1.238+02	9.578+00	5.079+02	2.337+00	0.3
$5g_{7/2}$	5.452+01	7.738+02	1.226+01	3.147+02	6.424+00	5.559+02	6.589−01	1.1
$6g_{7/2}$	3.789+01	7.572+02	2.060+01	2.838+01	6.372+00	5.566+02	5.921−01	0.4
$7g_{7/2}$	2.784+01	5.959+02	1.475+01	4.987+01	7.777+00	1.480+02	6.321−01	0.8
$8g_{7/2}$	2.131+01	5.894+02	1.295+01	4.401+01	8.151+00	1.477+02	6.182−01	0.9
$9g_{7/2}$	1.684+01	4.655+02	8.625+00	8.060+01	9.547+00	8.500+01	7.694−01	1.1
$10g_{7/2}$	1.364+01	4.623+02	6.718+00	9.064+01	1.012+01	8.483+01	8.620−01	1.2
$11g_{7/2}$	1.127+01	4.599+02	5.260+00	9.857+01	1.059+01	8.955+01	9.755−01	1.4
$12g_{7/2}$	9.468+00	3.638+02	4.082+00	1.078+02	1.114+01	8.923+01	1.168+00	1.2
$5g_{9/2}$	5.452+01	7.738+02	1.223+01	3.179+02	6.424+00	5.559+02	6.475−01	1.1
$6g_{9/2}$	3.788+01	7.572+02	2.056+01	2.858+01	6.373+00	5.561+02	5.907−01	0.4
$7g_{9/2}$	2.784+01	5.959+02	1.480+01	4.943+01	7.771+00	1.480+02	6.323−01	0.8
$8g_{9/2}$	2.131+01	5.894+02	1.296+01	4.389+01	8.147+00	1.480+02	6.180−01	0.9

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$9g_{9/2}$	1.684+01	4.655+02	8.623+00	8.072+01	9.550+00	8.476+01	7.699−01	1.1
$10g_{9/2}$	1.364+01	4.623+02	6.683+00	9.158+01	1.014+01	8.455+01	8.650−01	1.3
$11g_{9/2}$	1.127+01	4.599+02	5.245+00	9.909+01	1.059+01	8.950+01	9.772−01	1.4
$12g_{9/2}$	9.468+00	3.638+02	3.755+00	1.195+02	1.118+01	9.683+01	1.216+00	1.0
$6h_{9/2}$	3.780+01	3.921+02	7.497+01	6.198−02	1.595+01	4.820+00	6.069+00	0.1
$7h_{9/2}$	2.777+01	3.821+02	2.815+00	1.325−01	1.838+01	6.934+01	1.438+02	0.1
$8h_{9/2}$	2.126+01	3.011+02	2.810+00	5.920−02	1.905+01	6.564+01	1.451+02	0.1
$9h_{9/2}$	1.680+01	2.967+02	2.926+00	3.169−02	1.921+01	6.564+01	1.450+02	0.2
$10h_{9/2}$	1.361+01	2.935+02	3.128+00	1.858−02	1.920+01	6.560+01	1.448+02	0.2
$11h_{9/2}$	1.125+01	2.911+02	3.847+00	1.111−02	1.906+01	5.867+01	1.372+02	0.4
$12h_{9/2}$	9.450+00	2.305+02	4.933+00	6.302−03	1.894+01	4.956+01	1.329+02	0.5
$6h_{11/2}$	3.780+01	3.921+02	7.522+01	6.355−02	1.597+01	4.777+00	6.027+00	0.1
$7h_{11/2}$	2.777+01	3.821+02	8.648+01	5.010−01	1.787+01	2.834+00	4.771+00	0.4
$8h_{11/2}$	2.126+01	3.011+02	8.016+01	9.522−01	1.870+01	2.702+00	4.930+00	0.3
$9h_{11/2}$	1.680+01	2.967+02	8.084+01	7.831−01	1.896+01	2.698+00	5.009+00	0.2
$10h_{11/2}$	1.361+01	2.935+02	8.577+01	5.019−01	1.899+01	2.674+00	4.932+00	0.2
$11h_{11/2}$	1.125+01	2.911+02	9.489+01	2.852−01	1.892+01	2.589+00	4.797+00	0.2
$12h_{11/2}$	9.450+00	2.305+02	1.255+02	1.837−01	1.881+01	2.129+00	3.836+00	0.3
$7i_{11/2}$	2.777+01	2.488+02	7.328+01	7.255−02	1.819+01	2.923+00	6.406+00	0.1
$8i_{11/2}$	2.126+01	2.423+02	5.171+01	9.166−01	2.022+01	2.880+00	8.237+00	0.2
$9i_{11/2}$	1.680+01	1.914+02	4.711+01	1.962+00	2.114+01	2.832+00	8.486+00	0.2
$10i_{11/2}$	1.361+01	1.882+02	4.865+01	1.627+00	2.144+01	2.766+00	8.786+00	0.1
$11i_{11/2}$	1.125+01	1.858+02	4.842+01	1.202+00	2.156+01	2.855+00	8.969+00	0.3
$12i_{11/2}$	9.449+00	1.840+02	5.157+01	8.770−01	2.165+01	2.725+00	9.138+00	0.2
$7i_{13/2}$	2.777+01	2.488+02	7.195+01	7.324−02	1.817+01	2.991+00	6.432+00	0.2
$8i_{13/2}$	2.126+01	2.423+02	2.248+01	1.274+00	2.078+01	5.613+00	1.749+01	0.6
$9i_{13/2}$	1.680+01	1.914+02	2.206+01	1.171+00	2.130+01	5.724+00	1.752+01	0.3
$10i_{13/2}$	1.361+01	1.882+02	2.357+01	6.716−01	2.150+01	5.575+00	1.906+01	0.1
$11i_{13/2}$	1.124+01	1.858+02	2.184+01	5.603−01	2.171+01	6.010+00	1.950+01	0.3
$12i_{13/2}$	9.449+00	1.840+02	3.217+01	2.428−01	2.154+01	4.496+00	1.901+01	0.2
Ni^{17+}								
$3s_{1/2}$	6.067+02	5.093+04	2.101−02	8.681+04	4.421+00	3.539+05	2.171+01	0.7
$4s_{1/2}$	3.215+02	5.065+04	3.988−02	2.179+05	3.811+00	3.539+05	2.139+01	1.7
$5s_{1/2}$	1.991+02	3.995+04	6.255−02	1.775+05	3.518+00	3.539+05	2.115+01	2.2
$6s_{1/2}$	1.354+02	3.153+04	9.105−02	1.048+05	3.340+00	3.539+05	2.068+01	2.5
$7s_{1/2}$	9.798+01	2.489+04	1.293−01	5.378+04	3.216+00	3.539+05	2.065+01	2.6
$8s_{1/2}$	7.420+01	1.965+04	1.829−01	2.526+04	3.125+00	3.539+05	2.126+01	2.5
$9s_{1/2}$	5.813+01	1.552+04	2.261−01	1.355+04	3.080+00	3.539+05	3.867+01	2.1
$10s_{1/2}$	4.677+01	1.226+04	3.366−01	5.469+03	3.014+00	3.539+05	2.139+01	1.9
$11s_{1/2}$	3.844+01	9.684+03	5.446−01	1.829+03	2.956+00	3.539+05	1.213+01	1.7
$12s_{1/2}$	3.216+01	9.678+03	6.755−01	9.858+02	2.926+00	3.539+05	1.004+01	1.9
$3p_{1/2}$	5.679+02	3.196+04	2.086+01	3.894+01	6.807+00	1.349+02	7.452−02	0.8
$4p_{1/2}$	3.060+02	2.510+04	3.269+01	1.339+01	6.129+00	1.351+02	1.899+00	0.3
$5p_{1/2}$	1.914+02	1.977+04	4.950−01	1.638+03	6.258+00	8.830+03	3.935+01	0.5
$6p_{1/2}$	1.310+02	1.560+04	5.884−01	1.236+03	6.049+00	8.833+03	4.370+01	0.7
$7p_{1/2}$	9.529+01	1.231+04	6.987−01	9.173+02	5.869+00	8.831+03	3.345+01	1.0
$8p_{1/2}$	7.242+01	9.718+03	8.323−01	6.604+02	5.712+00	8.824+03	2.395+01	1.2
$9p_{1/2}$	5.690+01	7.675+03	9.916−01	4.595+02	5.578+00	8.824+03	1.725+01	1.3
$10p_{1/2}$	4.588+01	7.664+03	1.119+00	3.296+02	5.487+00	8.825+03	1.355+01	1.7
$11p_{1/2}$	3.778+01	6.054+03	1.368+00	2.148+02	5.372+00	8.824+03	9.616+00	1.7
$12p_{1/2}$	3.165+01	6.048+03	1.518+00	1.551+02	5.306+00	8.824+03	7.931+00	2.2
$3p_{3/2}$	5.640+02	3.196+04	1.883+01	4.370+01	6.887+00	1.337+02	1.623−01	0.5
$4p_{3/2}$	3.045+02	2.510+04	2.895+01	1.547+01	6.236+00	1.330+02	2.237+00	0.5
$5p_{3/2}$	1.907+02	1.566+04	3.109+00	1.458+02	6.232+00	1.342+03	9.892+00	0.6
$6p_{3/2}$	1.306+02	1.234+04	3.856+00	9.111+01	5.978+00	1.342+03	8.137+00	0.8
$7p_{3/2}$	9.503+01	1.231+04	4.588+00	5.774+01	5.789+00	1.342+03	6.329+00	1.2
$8p_{3/2}$	7.224+01	9.718+03	7.840−01	7.630+02	5.708+00	8.822+03	2.583+01	1.3
$9p_{3/2}$	5.677+01	7.675+03	9.342−01	5.359+02	5.570+00	8.844+03	1.833+01	1.4
$10p_{3/2}$	4.579+01	7.664+03	1.064+00	3.817+02	5.474+00	8.845+03	1.413+01	1.7
$11p_{3/2}$	3.771+01	6.054+03	1.279+00	2.539+02	5.365+00	8.841+03	1.020+01	1.8
$12p_{3/2}$	3.160+01	6.048+03	1.499+00	1.709+02	5.280+00	8.841+03	7.849+00	1.9
$3d_{3/2}$	5.115+02	1.272+04	6.634+01	8.849+01	5.993+00	6.242+01	2.105+00	0.5
$4d_{3/2}$	2.851+02	9.931+03	4.470+01	4.791+01	7.019+00	6.295+01	1.347+00	0.3

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$5d_{3/2}$	1.813+02	7.799+03	3.037+01	3.546+01	7.349+00	8.838+01	1.344+00	0.2
$6d_{3/2}$	1.253+02	6.142+03	1.549+01	4.400+01	7.745+00	1.508+02	1.948+00	0.1
$7d_{3/2}$	9.178+01	4.844+03	1.755+01	2.378+01	7.583+00	1.514+02	1.822+00	0.2
$8d_{3/2}$	7.010+01	4.822+03	5.545+00	6.825+01	7.918+00	4.144+02	3.877+00	0.2
$9d_{3/2}$	5.528+01	3.808+03	6.323+00	4.511+01	7.748+00	4.144+02	3.181+00	0.5
$10d_{3/2}$	4.471+01	3.798+03	7.177+00	3.062+01	7.585+00	4.146+02	2.620+00	0.9
$11d_{3/2}$	3.690+01	3.001+03	1.277+00	2.867+02	7.772+00	2.144+03	9.953+00	0.8
$12d_{3/2}$	3.098+01	2.995+03	1.401+00	2.204+02	7.672+00	2.142+03	8.217+00	1.0
$3d_{5/2}$	5.108+02	1.272+04	5.613+01	1.234+02	6.212+00	6.239+01	2.478+00	0.4
$4d_{5/2}$	2.848+02	9.931+03	4.850+01	4.358+01	6.860+00	6.233+01	1.174+00	0.4
$5d_{5/2}$	1.811+02	7.799+03	2.804+01	3.939+01	7.455+00	8.828+01	1.413+00	0.2
$6d_{5/2}$	1.252+02	6.142+03	1.425+01	4.850+01	7.808+00	1.558+02	2.064+00	0.1
$7d_{5/2}$	9.173+01	4.844+03	1.614+01	2.634+01	7.649+00	1.559+02	1.933+00	0.2
$8d_{5/2}$	7.006+01	4.822+03	5.494+00	6.933+01	7.923+00	4.114+02	3.887+00	0.2
$9d_{5/2}$	5.526+01	3.808+03	6.206+00	4.602+01	7.765+00	4.112+02	3.246+00	0.5
$10d_{5/2}$	4.469+01	3.798+03	5.691−01	1.042+03	7.925+00	4.195+03	2.407+01	0.5
$11d_{5/2}$	3.689+01	3.001+03	6.255−01	8.260+02	7.817+00	4.188+03	1.943+01	0.8
$12d_{5/2}$	3.097+01	2.995+03	6.825−01	6.565+02	7.722+00	4.186+03	1.598+01	1.0
$4f_{5/2}$	2.763+02	4.029+03	4.931+01	1.402+02	5.634+00	1.515+02	2.078−01	0.3
$5f_{5/2}$	1.769+02	3.930+03	9.663+01	7.371+00	5.342+00	1.541+02	6.106−01	1.1
$6f_{5/2}$	1.228+02	3.087+03	7.454+01	7.736+00	5.944+00	1.514+02	5.833−01	2.3
$7f_{5/2}$	9.020+01	2.431+03	1.532+01	8.918+01	9.671+00	6.564+01	1.406+00	0.6
$8f_{5/2}$	6.905+01	2.410+03	1.542+01	5.315+01	9.733+00	6.662+01	1.530+00	0.5
$9f_{5/2}$	5.455+01	1.903+03	2.888+00	1.703+02	1.066+01	2.609+02	5.830+00	0.5
$10f_{5/2}$	4.417+01	1.893+03	3.199+00	1.240+02	1.047+01	2.612+02	4.796+00	0.3
$11f_{5/2}$	3.650+01	1.885+03	3.470+00	9.173+01	1.034+01	2.606+02	4.154+00	0.4
$12f_{5/2}$	3.067+01	1.491+03	3.853+00	6.941+01	1.015+01	2.601+02	3.439+00	0.8
$4f_{7/2}$	2.762+02	4.029+03	5.002+01	1.349+02	5.609+00	1.516+02	1.945−01	0.2
$5f_{7/2}$	1.768+02	3.930+03	9.686+01	7.336+00	5.337+00	1.525+02	6.098−01	1.1
$6f_{7/2}$	1.228+02	3.087+03	4.631+01	2.817+01	7.847+00	4.519+01	8.472−01	0.4
$7f_{7/2}$	9.019+01	2.431+03	2.593+01	4.473+01	9.107+00	4.786+01	1.140+00	0.4
$8f_{7/2}$	6.903+01	2.410+03	1.142+01	7.342+01	1.000+01	8.107+01	1.857+00	0.6
$9f_{7/2}$	5.454+01	1.903+03	1.215+01	4.638+01	9.920+00	8.105+01	1.755+00	0.3
$10f_{7/2}$	4.417+01	1.893+03	3.455+00	1.137+02	1.047+01	2.405+02	4.539+00	0.3
$11f_{7/2}$	3.650+01	1.885+03	3.716+00	8.578+01	1.032+01	2.444+02	3.910+00	0.5
$12f_{7/2}$	3.066+01	1.491+03	4.121+00	6.465+01	1.013+01	2.443+02	3.251+00	0.8
$5g_{7/2}$	1.764+02	2.025+03	3.656+01	2.391+02	8.058+00	3.672+01	6.701−01	0.3
$6g_{7/2}$	1.225+02	1.971+03	5.321+01	4.881+01	8.754+00	2.157+01	7.414−01	0.3
$7g_{7/2}$	9.001+01	1.550+03	2.700+01	1.711+02	1.148+01	1.845+01	1.075+00	0.2
$8g_{7/2}$	6.891+01	1.529+03	2.075+01	1.421+02	1.213+01	2.193+01	1.217+00	0.2
$9g_{7/2}$	5.445+01	1.208+03	9.855+00	1.578+02	1.335+01	3.571+01	2.151+00	0.2
$10g_{7/2}$	4.410+01	1.197+03	7.955+00	1.174+02	1.331+01	4.722+01	2.346+00	0.4
$11g_{7/2}$	3.645+01	1.190+03	1.020+00	1.667+02	1.398+01	3.268+02	1.505+01	0.4
$12g_{7/2}$	3.062+01	9.414+02	1.139+00	1.555+02	1.370+01	3.255+02	1.190+01	0.7
$5g_{9/2}$	1.764+02	2.025+03	3.508+01	2.725+02	8.134+00	3.678+01	6.348−01	0.3
$6g_{9/2}$	1.225+02	1.971+03	3.298+01	1.896+02	1.018+01	2.044+01	8.983−01	0.4
$7g_{9/2}$	8.999+01	1.550+03	2.867+01	1.349+02	1.092+01	2.138+01	9.327−01	0.6
$8g_{9/2}$	6.890+01	1.529+03	1.765+01	1.737+02	1.254+01	2.302+01	1.398+00	0.2
$9g_{9/2}$	5.444+01	1.208+03	1.321+01	1.323+02	1.275+01	3.147+01	1.586+00	0.5
$10g_{9/2}$	4.410+01	1.197+03	5.393+00	1.303+02	1.370+01	6.302+01	3.426+00	0.3
$11g_{9/2}$	3.644+01	1.190+03	1.166+00	1.598+02	1.396+01	2.868+02	1.317+01	0.5
$12g_{9/2}$	3.062+01	9.414+02	1.274+00	1.447+02	1.370+01	2.897+02	1.082+01	0.7
$6h_{9/2}$	1.225+02	1.276+03	3.073+02	7.545−03	1.606+01	3.588+00	7.922+00	0.2
$7h_{9/2}$	8.999+01	1.001+03	2.871+02	8.025−02	1.798+01	2.608+00	7.295+00	0.3
$8h_{9/2}$	6.890+01	9.797+02	2.322+02	1.476−01	1.886+01	2.802+00	8.716+00	0.5
$9h_{9/2}$	5.444+01	9.652+02	2.471+02	9.401−02	1.900+01	2.750+00	8.881+00	0.2
$10h_{9/2}$	4.409+01	7.634+02	2.564+02	5.849−02	1.906+01	2.755+00	9.189+00	0.1
$11h_{9/2}$	3.644+01	7.558+02	2.311+02	3.687−02	1.904+01	3.188+00	9.931+00	0.4
$12h_{9/2}$	3.062+01	7.499+02	7.505+02	3.223−03	1.890+01	1.068+00	1.355+01	0.5
$6h_{11/2}$	1.225+02	1.276+03	3.078+02	7.480−03	1.606+01	3.585+00	7.926+00	0.2
$7h_{11/2}$	8.998+01	1.001+03	1.817+02	1.051−01	1.817+01	3.813+00	1.055+01	0.3
$8h_{11/2}$	6.889+01	9.797+02	1.796+02	1.340−01	1.888+01	3.583+00	1.071+01	0.3
$9h_{11/2}$	5.443+01	9.652+02	1.751+02	1.147−01	1.914+01	3.677+00	1.072+01	0.4
$10h_{11/2}$	4.409+01	7.634+02	2.153+02	4.792−02	1.907+01	3.256+00	1.122+01	0.1
$11h_{11/2}$	3.644+01	7.558+02	4.336+02	2.692−02	1.897+01	1.758+00	7.840+00	0.3

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$12h_{11/2}$	3.062+01	7.499+02	7.150+02	1.729−03	1.890+01	1.119+00	1.902+01	0.5
$7i_{11/2}$	8.998+01	8.093+02	4.400+01	4.103+01	1.016+01	1.904+01	6.662−01	0.7
$8i_{11/2}$	6.889+01	6.370+02	3.544+01	1.709+02	1.270+01	1.186+01	6.967−01	0.4
$9i_{11/2}$	5.443+01	6.225+02	1.591+01	1.595+03	1.684+01	1.183+01	1.186+00	0.2
$10i_{11/2}$	4.409+01	6.122+02	1.615+01	1.022+03	1.703+01	1.207+01	1.106+00	0.4
$11i_{11/2}$	3.644+01	6.045+02	9.513+00	9.416+02	1.828+01	1.770+01	1.612+00	0.4
$12i_{11/2}$	3.062+01	4.793+02	6.205+00	6.147+02	1.893+01	2.553+01	2.277+00	0.4
$7i_{13/2}$	8.997+01	8.093+02	4.541+01	3.566+01	1.005+01	1.905+01	6.576−01	0.7
$8i_{13/2}$	6.889+01	6.370+02	2.542+01	4.338+02	1.348+01	1.435+01	7.371−01	0.7
$9i_{13/2}$	5.443+01	6.225+02	1.142+01	2.275+03	1.768+01	1.427+01	1.531+00	0.1
$10i_{13/2}$	4.409+01	6.122+02	4.771+00	1.336+03	1.932+01	2.836+01	3.193+00	0.1
$11i_{13/2}$	3.644+01	6.045+02	4.935+00	8.327+02	1.943+01	2.833+01	3.066+00	0.3
$12i_{13/2}$	3.062+01	4.793+02	1.764+00	2.890+02	1.985+01	7.849+01	7.592+00	0.3
Ni^{25+}								
$2s_{1/2}$	2.400+03	5.273+04	3.798−03	3.280+04	5.336+00	9.539+05	2.112+01	0.2
$3s_{1/2}$	1.052+03	5.138+04	9.253−03	2.719+06	4.085+00	9.539+05	1.787+01	0.1
$4s_{1/2}$	5.878+02	5.091+04	1.520−02	5.514+06	3.624+00	9.539+05	1.798+01	0.6
$5s_{1/2}$	3.746+02	5.070+04	2.142−02	5.078+06	3.381+00	9.539+05	1.806+01	1.1
$6s_{1/2}$	2.594+02	4.001+04	2.904−02	3.558+06	3.220+00	9.539+05	1.809+01	1.4
$7s_{1/2}$	1.902+02	3.158+04	3.828−02	2.196+06	3.106+00	9.539+05	1.804+01	1.6
$8s_{1/2}$	1.454+02	2.494+04	5.003−02	1.256+06	3.019+00	9.539+05	1.819+01	1.7
$9s_{1/2}$	1.147+02	1.970+04	6.560−02	6.763+05	2.951+00	9.539+05	1.819+01	1.7
$10s_{1/2}$	9.283+01	1.967+04	7.858−02	4.105+05	2.905+00	9.539+05	1.843+01	2.0
$11s_{1/2}$	7.666+01	1.554+04	7.564−02	3.237+05	2.914+00	9.541+05	1.882+02	1.4
$12s_{1/2}$	6.437+01	1.228+04	1.019−01	1.623+05	2.864+00	9.539+05	1.095+02	1.3
$2p_{1/2}$	2.347+03	5.267+04	5.256+02	5.494+00	2.669+00	1.540+02	1.050+00	0.2
$3p_{1/2}$	1.038+03	5.136+04	2.637+02	4.488+00	4.260+00	5.537+01	9.297−01	0.6
$4p_{1/2}$	5.818+02	3.197+04	1.394+02	4.610+00	5.165+00	5.610+01	1.365+00	0.3
$5p_{1/2}$	3.715+02	2.516+04	3.715+01	1.372+01	5.763+00	1.566+02	2.763+00	0.2
$6p_{1/2}$	2.576+02	1.984+04	1.512+01	2.983+01	5.796+00	3.961+02	4.880+00	0.3
$7p_{1/2}$	1.891+02	1.565+04	1.847+01	1.695+01	5.571+00	3.963+02	3.587+00	0.7
$8p_{1/2}$	1.446+02	1.561+04	2.246+01	9.850+00	5.366+00	3.952+02	2.682+00	1.1
$9p_{1/2}$	1.142+02	1.233+04	3.270−01	7.941+03	5.541+00	2.487+04	1.005+02	1.0
$10p_{1/2}$	9.246+01	9.738+03	3.804−01	6.150+03	5.422+00	2.488+04	7.011+01	1.2
$11p_{1/2}$	7.638+01	9.722+03	4.243−01	4.716+03	5.341+00	2.490+04	5.389+01	1.3
$12p_{1/2}$	6.415+01	7.682+03	4.984−01	3.442+03	5.244+00	2.492+04	3.769+01	1.4
$2p_{3/2}$	2.325+03	5.265+04	7.120+02	2.523+00	2.362+00	1.530+02	9.831−01	0.2
$3p_{3/2}$	1.031+03	4.078+04	2.348+01	1.137+02	6.226+00	1.513+02	7.756−02	0.8
$4p_{3/2}$	5.790+02	3.197+04	3.163+01	3.525+01	5.885+00	1.514+02	5.461−01	0.3
$5p_{3/2}$	3.701+02	2.516+04	3.233+01	1.613+01	5.903+00	1.517+02	3.271+00	0.2
$6p_{3/2}$	2.568+02	1.984+04	4.212+01	7.647+00	5.560+00	1.519+02	2.336+00	0.6
$7p_{3/2}$	1.885+02	1.565+04	1.006+01	4.055+01	5.709+00	6.127+02	6.040+00	0.7
$8p_{3/2}$	1.443+02	1.236+04	1.254+01	2.413+01	5.488+00	6.114+02	4.178+00	1.0
$9p_{3/2}$	1.140+02	1.233+04	1.496+01	1.494+01	5.318+00	6.112+02	3.150+00	1.4
$10p_{3/2}$	9.228+01	9.738+03	1.709−01	2.574+04	5.431+00	5.144+04	1.574+02	1.2
$11p_{3/2}$	7.624+01	9.722+03	1.674−01	2.047+04	5.430+00	5.144+04	1.573+02	1.2
$12p_{3/2}$	6.405+01	7.682+03	2.200−01	1.590+04	5.254+00	5.181+04	8.521+01	1.5
$3d_{3/2}$	1.025+03	2.061+04	9.410+01	1.832+02	5.300+00	6.501+01	1.469−02	0.4
$4d_{3/2}$	5.766+02	1.604+04	1.424+02	1.743+01	6.559+00	2.482+01	1.043+00	0.3
$5d_{3/2}$	3.689+02	1.258+04	1.015+02	1.338+01	7.551+00	2.433+01	1.300+00	0.4
$6d_{3/2}$	2.561+02	9.902+03	2.193+01	3.293+01	8.650+00	8.248+01	3.476+00	0.2
$7d_{3/2}$	1.881+02	7.806+03	2.784+00	1.427+02	8.848+00	6.400+02	2.073+01	0.3
$8d_{3/2}$	1.440+02	7.762+03	3.124+00	1.119+02	8.623+00	6.484+02	1.597+01	0.6
$9d_{3/2}$	1.138+02	6.130+03	3.628+00	8.948+01	8.371+00	6.496+02	1.159+01	0.8
$10d_{3/2}$	9.213+01	6.109+03	4.112+00	7.002+01	8.175+00	6.490+02	8.809+00	1.1
$11d_{3/2}$	7.613+01	4.828+03	4.856+00	5.311+01	7.952+00	6.453+02	6.419+00	1.3
$12d_{3/2}$	6.396+01	4.816+03	5.478+00	4.052+01	7.792+00	6.450+02	5.040+00	1.6
$3d_{5/2}$	1.023+03	2.060+04	7.547+01	3.000+02	5.640+00	6.102+01	1.884−01	0.5
$4d_{5/2}$	5.757+02	1.604+04	2.787+01	1.611+02	8.290+00	6.044+01	9.588−01	0.5
$5d_{5/2}$	3.685+02	1.258+04	2.622+01	5.423+01	8.710+00	6.145+01	2.996+00	0.2
$6d_{5/2}$	2.559+02	9.902+03	2.917+01	2.564+01	8.590+00	6.162+01	2.852+00	0.2
$7d_{5/2}$	1.880+02	7.806+03	8.308+00	4.928+01	8.786+00	2.143+02	7.566+00	0.4
$8d_{5/2}$	1.439+02	7.762+03	9.673+00	3.448+01	8.503+00	2.151+02	5.633+00	0.7

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$9d_{5/2}$	1.137+02	6.130+03	1.174+01	2.401+01	8.176+00	2.150+02	3.987+00	1.0
$10d_{5/2}$	9.207+01	6.109+03	3.882+00	7.340+01	8.207+00	6.647+02	9.408+00	1.2
$11d_{5/2}$	7.609+01	4.828+03	4.586+00	5.657+01	7.976+00	6.635+02	6.794+00	1.3
$12d_{5/2}$	6.393+01	4.816+03	5.144+00	4.362+01	7.818+00	6.645+02	5.359+00	1.7
$4f_{5/2}$	5.756+02	8.194+03	3.141+02	2.077+00	3.931+00	1.530+02	6.237−01	1.2
$5f_{5/2}$	3.684+02	6.385+03	8.592+01	6.442+01	9.199+00	1.651+01	1.189+00	0.1
$6f_{5/2}$	2.558+02	6.273+03	7.441+01	4.037+01	9.951+00	1.669+01	1.252+00	0.3
$7f_{5/2}$	1.879+02	4.940+03	1.197+01	7.566+01	1.157+01	7.419+01	4.685+00	0.2
$8f_{5/2}$	1.439+02	4.896+03	1.265+01	4.504+01	1.151+01	7.435+01	4.401+00	0.3
$9f_{5/2}$	1.137+02	3.867+03	1.491+01	3.223+01	1.102+01	7.731+01	3.184+00	0.6
$10f_{5/2}$	9.206+01	3.845+03	3.678+00	6.170+01	1.123+01	3.062+02	1.041+01	0.8
$11f_{5/2}$	7.608+01	3.040+03	4.273+00	5.334+01	1.092+01	3.051+02	7.718+00	1.0
$12f_{5/2}$	6.393+01	3.028+03	4.765+00	4.452+01	1.069+01	3.056+02	6.121+00	1.3
$4f_{7/2}$	5.752+02	8.193+03	3.156+02	2.039+00	3.909+00	1.531+02	6.207−01	1.2
$5f_{7/2}$	3.682+02	6.385+03	8.618+01	6.417+01	9.163+00	1.656+01	1.169+00	0.1
$6f_{7/2}$	2.557+02	6.272+03	7.033+01	4.468+01	1.012+01	1.662+01	1.315+00	0.3
$7f_{7/2}$	1.878+02	4.940+03	1.235+01	7.215+01	1.165+01	6.956+01	4.747+00	0.2
$8f_{7/2}$	1.438+02	4.896+03	1.390+01	4.481+01	1.140+01	6.968+01	3.914+00	0.4
$9f_{7/2}$	1.136+02	3.867+03	1.637+01	3.058+01	1.097+01	7.087+01	2.934+00	0.7
$10f_{7/2}$	9.203+01	3.845+03	1.005−01	1.180+03	1.130+01	1.106+04	3.467+02	0.9
$11f_{7/2}$	7.606+01	3.040+03	1.008−01	8.315+02	1.131+01	1.106+04	3.466+02	0.7
$12f_{7/2}$	6.391+01	3.028+03	1.208−01	1.503+03	1.093+01	1.102+04	2.273+02	1.2
$5g_{7/2}$	3.682+02	4.121+03	7.620+01	1.521+02	9.190+00	1.938+01	1.176+00	0.1
$6g_{7/2}$	2.557+02	4.009+03	6.968+01	1.254+02	1.102+01	1.405+01	1.082+00	0.1
$7g_{7/2}$	1.878+02	3.152+03	4.785+01	1.420+02	1.268+01	1.467+01	1.387+00	0.2
$8g_{7/2}$	1.438+02	3.108+03	3.764+01	9.191+01	1.287+01	1.981+01	1.449+00	0.3
$9g_{7/2}$	1.136+02	2.455+03	1.760+01	8.018+01	1.387+01	3.572+01	2.646+00	0.3
$10g_{7/2}$	9.203+01	2.433+03	3.243+00	7.210+01	1.430+01	1.876+02	1.139+01	0.5
$11g_{7/2}$	7.606+01	2.417+03	3.584+00	6.048+01	1.406+01	1.859+02	9.373+00	0.7
$12g_{7/2}$	6.391+01	1.913+03	4.056+00	5.607+01	1.369+01	1.879+02	7.199+00	0.8
$5g_{9/2}$	3.680+02	4.121+03	7.640+01	1.519+02	9.179+00	1.930+01	1.162+00	0.1
$6g_{9/2}$	2.556+02	4.009+03	6.109+01	1.653+02	1.135+01	1.459+01	1.168+00	0.1
$7g_{9/2}$	1.878+02	3.152+03	7.105+01	6.465+01	1.125+01	1.458+01	9.608−01	0.4
$8g_{9/2}$	1.438+02	3.108+03	2.699+01	1.156+02	1.346+01	2.401+01	1.927+00	0.2
$9g_{9/2}$	1.136+02	2.455+03	2.209+01	7.598+01	1.347+01	3.140+01	2.069+00	0.4
$10g_{9/2}$	9.202+01	2.433+03	8.918+00	6.410+01	1.398+01	7.293+01	4.310+00	0.5
$11g_{9/2}$	7.605+01	2.417+03	1.014+01	4.874+01	1.364+01	7.223+01	3.439+00	0.8
$12g_{9/2}$	6.390+01	1.913+03	8.074+00	4.412+01	1.341+01	1.010+02	3.714+00	0.9
$6h_{9/2}$	2.556+02	2.597+03	6.217+02	5.857−03	1.625+01	3.455+00	7.448+00	0.4
$7h_{9/2}$	1.878+02	2.037+03	3.963+02	5.133−02	1.816+01	3.687+00	9.961+00	0.3
$8h_{9/2}$	1.438+02	1.993+03	4.159+02	7.041−02	1.885+01	3.270+00	9.453+00	0.3
$9h_{9/2}$	1.136+02	1.962+03	4.193+02	5.388−02	1.908+01	3.287+00	9.627+00	0.3
$10h_{9/2}$	9.202+01	1.552+03	4.251+02	3.407−02	1.910+01	3.416+00	9.642+00	0.3
$11h_{9/2}$	7.605+01	1.536+03	8.068+02	1.175−02	1.895+01	1.988+00	8.562+00	0.3
$12h_{9/2}$	6.390+01	1.524+03	1.922+03	1.787−03	1.887+01	8.827−01	1.086+01	0.4
$6h_{11/2}$	2.556+02	2.596+03	5.958+02	6.615−03	1.630+01	3.533+00	7.650+00	0.4
$7h_{11/2}$	1.878+02	2.037+03	5.899+02	5.855−02	1.809+01	2.560+00	6.521+00	0.3
$8h_{11/2}$	1.438+02	1.993+03	5.660+02	8.981−02	1.881+01	2.453+00	6.753+00	0.3
$9h_{11/2}$	1.136+02	1.962+03	5.720+02	6.202−02	1.902+01	2.476+00	7.237+00	0.2
$10h_{11/2}$	9.201+01	1.552+03	6.363+02	3.402−02	1.903+01	2.355+00	7.382+00	0.1
$11h_{11/2}$	7.604+01	1.536+03	9.221+02	1.257−02	1.894+01	1.744+00	7.657+00	0.3
$12h_{11/2}$	6.389+01	1.524+03	1.327+03	4.170−03	1.887+01	1.281+00	8.618+00	0.4
$7i_{11/2}$	1.878+02	1.648+03	8.443+01	3.243+01	1.073+01	1.666+01	7.195−01	0.4
$8i_{11/2}$	1.438+02	1.297+03	5.550+01	2.036+02	1.367+01	1.296+01	7.993−01	0.4
$9i_{11/2}$	1.136+02	1.267+03	3.284+01	6.987+02	1.666+01	1.256+01	1.155+00	0.2
$10i_{11/2}$	9.201+01	1.245+03	2.775+01	6.169+02	1.766+01	1.321+01	1.309+00	0.3
$11i_{11/2}$	7.604+01	1.229+03	1.004+01	3.952+02	1.909+01	3.121+01	2.865+00	0.3
$12i_{11/2}$	6.389+01	9.747+02	1.026+01	2.666+02	1.917+01	3.122+01	2.804+00	0.3
$7i_{13/2}$	1.877+02	1.648+03	8.771+01	2.504+01	1.042+01	1.819+01	6.901−01	0.5
$8i_{13/2}$	1.437+02	1.297+03	6.313+01	1.538+02	1.345+01	1.162+01	7.733−01	0.3
$9i_{13/2}$	1.136+02	1.267+03	3.899+01	5.617+02	1.629+01	1.120+01	1.044+00	0.2
$10i_{13/2}$	9.200+01	1.245+03	2.038+01	6.600+02	1.799+01	1.739+01	1.578+00	0.3
$11i_{13/2}$	7.603+01	1.229+03	2.087+01	4.353+02	1.812+01	1.737+01	1.520+00	0.3
$12i_{13/2}$	6.389+01	9.747+02	9.798+00	2.644+02	1.889+01	3.479+01	2.714+00	0.4

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
Ni^{26+}								
$1s_{1/2}$	1.030+04	6.063+04	1.871−03	3.137+04	5.995+00	9.539+05	2.139+01	0.4
$2s_{1/2}$	2.550+03	5.288+04	3.926−03	5.062+04	5.265+00	9.539+05	2.103+01	0.2
$3s_{1/2}$	1.124+03	5.145+04	9.494−03	3.418+06	4.049+00	9.539+05	2.002+01	0.2
$4s_{1/2}$	6.295+02	5.096+04	1.556−02	6.625+06	3.596+00	9.539+05	2.021+01	0.6
$5s_{1/2}$	4.017+02	5.073+04	2.188−02	5.989+06	3.358+00	9.539+05	2.038+01	1.1
$6s_{1/2}$	2.784+02	4.003+04	2.964−02	4.152+06	3.199+00	9.539+05	2.016+01	1.4
$7s_{1/2}$	2.043+02	3.160+04	3.908−02	2.542+06	3.086+00	9.539+05	2.024+01	1.6
$8s_{1/2}$	1.562+02	2.495+04	5.098−02	1.448+06	3.001+00	9.539+05	2.054+01	1.7
$9s_{1/2}$	1.233+02	2.492+04	6.139−02	8.909+05	2.943+00	9.539+05	2.159+01	2.0
$10s_{1/2}$	9.984+01	1.968+04	7.969−02	4.732+05	2.887+00	9.539+05	2.190+01	1.9
$11s_{1/2}$	8.246+01	1.555+04	1.060−01	2.345+05	2.840+00	9.539+05	2.152+01	1.8
$12s_{1/2}$	6.926+01	1.553+04	8.818−02	2.438+05	2.865+00	9.542+05	1.471+02	1.5
$2p_{1/2}$	2.522+03	5.285+04	6.204+02	4.070+00	2.551+00	1.541+02	1.032+00	0.2
$3p_{1/2}$	1.116+03	5.144+04	2.924+01	9.602+01	6.042+00	1.531+02	4.212−02	1.4
$4p_{1/2}$	6.263+02	3.202+04	3.597+01	3.033+01	5.839+00	1.531+02	3.842−01	0.4
$5p_{1/2}$	4.001+02	2.519+04	3.748+01	1.366+01	5.839+00	1.521+02	2.988+00	0.2
$6p_{1/2}$	2.775+02	1.986+04	4.765+01	6.567+00	5.518+00	1.545+02	2.223+00	0.5
$7p_{1/2}$	2.037+02	1.978+04	9.807+00	4.223+01	5.728+00	6.853+02	6.563+00	0.6
$8p_{1/2}$	1.558+02	1.562+04	1.190+01	2.605+01	5.529+00	6.847+02	4.656+00	1.0
$9p_{1/2}$	1.231+02	1.234+04	4.872−02	1.890+05	5.590+00	1.642+05	7.724+02	0.9
$10p_{1/2}$	9.964+01	1.231+04	5.988+00	5.432+01	5.356+00	1.717+03	5.970+00	1.4
$11p_{1/2}$	8.232+01	9.728+03	1.693+00	4.218+02	5.320+00	6.655+03	1.539+01	1.3
$12p_{1/2}$	6.915+01	9.715+03	4.341−01	4.369+03	5.282+00	2.756+04	4.888+01	1.7
$2p_{3/2}$	2.497+03	5.282+04	7.828+02	2.235+00	2.286+00	1.545+02	9.645−01	0.2
$3p_{3/2}$	1.109+03	5.144+04	2.304+01	1.186+02	6.275+00	1.550+02	5.662−03	1.0
$4p_{3/2}$	6.231+02	3.201+04	3.003+01	3.787+01	5.975+00	1.550+02	4.595−01	0.3
$5p_{3/2}$	3.985+02	2.519+04	2.968+01	1.793+01	6.006+00	1.597+02	3.802+00	0.2
$6p_{3/2}$	2.766+02	1.986+04	6.007+00	1.008+02	6.017+00	8.268+02	1.293+01	0.4
$7p_{3/2}$	2.031+02	1.567+04	7.426+00	6.423+01	5.773+00	8.215+02	8.508+00	0.7
$8p_{3/2}$	1.555+02	1.562+04	8.748+00	4.169+01	5.595+00	8.221+02	6.164+00	1.1
$9p_{3/2}$	1.228+02	1.234+04	4.891+00	8.985+01	5.491+00	1.682+03	8.444+00	1.2
$10p_{3/2}$	9.944+01	9.745+03	5.350−02	2.021+05	5.452+00	1.665+05	5.539+02	1.2
$11p_{3/2}$	8.216+01	9.728+03	8.503−01	1.449+03	5.345+00	1.197+04	3.007+01	1.5
$12p_{3/2}$	6.903+01	7.687+03	7.299+00	3.081+01	5.108+00	1.918+03	3.806+00	1.7
$3d_{3/2}$	1.106+03	2.069+04	7.759+01	3.073+02	5.654+00	6.555+01	1.902−01	0.4
$4d_{3/2}$	6.219+02	1.609+04	2.855+01	1.537+02	8.318+00	6.409+01	1.436+00	0.6
$5d_{3/2}$	3.979+02	1.261+04	2.794+01	5.099+01	8.667+00	6.435+01	2.944+00	0.2
$6d_{3/2}$	2.762+02	9.922+03	3.110+01	2.398+01	8.557+00	6.427+01	2.845+00	0.2
$7d_{3/2}$	2.029+02	9.849+03	2.524+00	1.498+02	8.889+00	7.447+02	2.491+01	0.3
$8d_{3/2}$	1.553+02	7.773+03	2.903+00	1.207+02	8.638+00	7.462+02	1.842+01	0.6
$9d_{3/2}$	1.227+02	7.741+03	3.270+00	9.697+01	8.429+00	7.491+02	1.406+01	0.9
$10d_{3/2}$	9.936+01	6.116+03	3.796+00	7.882+01	8.188+00	7.540+02	1.014+01	1.1
$11d_{3/2}$	8.210+01	6.099+03	4.236+00	6.204+01	8.024+00	7.555+02	7.965+00	1.4
$12d_{3/2}$	6.898+01	4.821+03	5.015+00	4.698+01	7.813+00	7.531+02	5.799+00	1.5
$3d_{5/2}$	1.103+03	2.068+04	6.190+01	4.935+02	5.937+00	6.591+01	4.503−01	0.4
$4d_{5/2}$	6.209+02	1.609+04	2.610+01	1.683+02	8.427+00	6.542+01	1.015+00	0.4
$5d_{5/2}$	3.974+02	1.261+04	2.445+01	5.518+01	8.842+00	6.724+01	3.474+00	0.2
$6d_{5/2}$	2.759+02	9.922+03	2.629+01	2.646+01	8.795+00	6.744+01	3.468+00	0.2
$7d_{5/2}$	2.027+02	9.849+03	1.352+01	3.168+01	8.713+00	1.447+02	5.219+00	0.4
$8d_{5/2}$	1.552+02	7.773+03	1.610+01	2.109+01	8.374+00	1.464+02	3.814+00	0.7
$9d_{5/2}$	1.226+02	7.741+03	1.911+01	1.409+01	8.069+00	1.468+02	2.849+00	1.1
$10d_{5/2}$	9.929+01	6.116+03	2.335+01	9.170+00	7.745+00	1.463+02	2.103+00	1.3
$11d_{5/2}$	8.206+01	6.099+03	3.514+00	7.746+01	8.067+00	8.742+02	9.570+00	1.4
$12d_{5/2}$	6.895+01	4.821+03	4.124+00	6.061+01	7.855+00	8.776+02	6.954+00	1.5
$4f_{5/2}$	6.208+02	8.239+03	1.568+02	3.739+01	7.068+00	1.751+01	1.218+00	0.4
$5f_{5/2}$	3.973+02	8.016+03	1.246+02	2.986+01	8.309+00	1.720+01	9.642−01	0.2
$6f_{5/2}$	2.759+02	6.293+03	7.438+01	4.110+01	1.008+01	1.744+01	1.318+00	0.2
$7f_{5/2}$	2.027+02	4.955+03	3.765+01	4.097+01	1.101+01	2.887+01	2.027+00	0.2
$8f_{5/2}$	1.552+02	4.907+03	1.701+01	3.890+01	1.134+01	6.290+01	3.518+00	0.3
$9f_{5/2}$	1.226+02	4.874+03	2.156+01	2.493+01	1.085+01	6.021+01	2.479+00	0.7
$10f_{5/2}$	9.929+01	3.852+03	1.383+00	1.236+02	1.131+01	8.621+02	2.891+01	0.7
$11f_{5/2}$	8.205+01	3.835+03	1.523+00	1.152+02	1.110+01	8.642+02	2.305+01	1.0
$12f_{5/2}$	6.894+01	3.033+03	1.758+00	1.114+02	1.082+01	8.575+02	1.701+01	1.1

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$4f_{7/2}$	6.203+02	8.238+03	4.656+01	6.001+02	8.518+00	3.452+01	2.473+00	0.3
$5f_{7/2}$	3.971+02	8.015+03	2.974+01	2.611+02	1.033+01	3.744+01	1.074+00	0.1
$6f_{7/2}$	2.757+02	6.292+03	2.819+01	1.001+02	1.088+01	3.801+01	1.992+00	0.3
$7f_{7/2}$	2.026+02	4.954+03	3.019+01	4.778+01	1.092+01	3.781+01	2.186+00	0.4
$8f_{7/2}$	1.551+02	4.907+03	7.556+00	5.566+01	1.163+01	1.306+02	7.336+00	0.3
$9f_{7/2}$	1.225+02	4.874+03	8.435+00	4.119+01	1.136+01	1.318+02	5.880+00	0.6
$10f_{7/2}$	9.925+01	3.852+03	9.853+00	3.212+01	1.098+01	1.328+02	4.363+00	0.8
$11f_{7/2}$	8.203+01	3.835+03	1.121+01	2.460+01	1.069+01	1.333+02	3.425+00	1.2
$12f_{7/2}$	6.892+01	3.033+03	1.370+01	1.815+01	1.028+01	1.332+02	2.477+00	1.4
$5g_{7/2}$	3.971+02	4.150+03	8.094+01	1.471+02	9.235+00	1.940+01	1.195+00	0.0
$6g_{7/2}$	2.757+02	4.029+03	4.460+01	2.739+02	1.199+01	1.862+01	1.404+00	0.0
$7g_{7/2}$	2.026+02	3.167+03	4.179+01	1.498+02	1.277+01	1.828+01	1.505+00	0.1
$8g_{7/2}$	1.551+02	3.119+03	4.089+01	8.010+01	1.264+01	2.123+01	1.379+00	0.5
$9g_{7/2}$	1.225+02	3.087+03	1.725+01	7.677+01	1.383+01	4.003+01	2.770+00	0.4
$10g_{7/2}$	9.925+01	2.440+03	9.669+00	6.012+01	1.392+01	7.398+01	4.235+00	0.5
$11g_{7/2}$	8.203+01	2.423+03	1.087+01	4.577+01	1.359+01	7.423+01	3.407+00	0.7
$12g_{7/2}$	6.892+01	2.410+03	1.233+01	3.530+01	1.324+01	7.416+01	2.719+00	1.1
$5g_{9/2}$	3.969+02	4.150+03	8.061+01	1.491+02	9.234+00	1.940+01	1.187+00	0.0
$6g_{9/2}$	2.757+02	4.029+03	1.203+02	2.599+01	9.050+00	1.738+01	7.534−01	0.6
$7g_{9/2}$	2.025+02	3.167+03	4.247+01	1.493+02	1.277+01	1.786+01	1.499+00	0.1
$8g_{9/2}$	1.551+02	3.119+03	2.749+01	1.115+02	1.378+01	2.341+01	2.157+00	0.2
$9g_{9/2}$	1.225+02	3.087+03	1.302+01	8.002+01	1.404+01	5.066+01	3.574+00	0.4
$10g_{9/2}$	9.924+01	2.440+03	1.473+01	5.557+01	1.365+01	5.147+01	2.864+00	0.5
$11g_{9/2}$	8.201+01	2.423+03	1.696+01	3.966+01	1.325+01	5.159+01	2.260+00	0.8
$12g_{9/2}$	6.891+01	2.410+03	7.014+00	4.288+01	1.359+01	1.189+02	4.654+00	1.0
$6h_{9/2}$	2.757+02	2.617+03	6.535+02	5.649−03	1.621+01	3.593+00	7.324+00	0.3
$7h_{9/2}$	2.025+02	2.543+03	6.953+02	4.408−02	1.801+01	2.414+00	6.323+00	0.4
$8h_{9/2}$	1.551+02	2.004+03	6.948+02	1.086−01	1.881+01	2.169+00	5.445+00	0.3
$9h_{9/2}$	1.225+02	1.971+03	6.889+02	9.154−02	1.906+01	2.198+00	5.588+00	0.3
$10h_{9/2}$	9.924+01	1.948+03	6.678+02	6.310−02	1.911+01	2.350+00	5.705+00	0.6
$11h_{9/2}$	8.201+01	1.542+03	1.595+03	3.606−02	1.883+01	1.174+00	2.775+00	0.2
$12h_{9/2}$	6.891+01	1.529+03	1.844+03	2.758−02	1.855+01	1.241+00	1.545+00	0.3
$6h_{11/2}$	2.756+02	2.616+03	6.444+02	6.137−03	1.625+01	3.591+00	7.333+00	0.4
$7h_{11/2}$	2.025+02	2.543+03	6.890+02	2.257−02	1.784+01	2.580+00	7.729+00	0.4
$8h_{11/2}$	1.550+02	2.004+03	5.068+02	7.849−02	1.885+01	2.902+00	8.018+00	0.2
$9h_{11/2}$	1.225+02	1.971+03	4.877+02	7.890−02	1.913+01	2.994+00	7.692+00	0.5
$10h_{11/2}$	9.922+01	1.948+03	6.532+02	2.976−02	1.903+01	2.470+00	7.820+00	0.1
$11h_{11/2}$	8.200+01	1.542+03	9.053+02	1.349−02	1.895+01	1.913+00	7.507+00	0.2
$12h_{11/2}$	6.890+01	1.529+03	1.656+03	3.063−02	1.849+01	1.461+00	1.376+00	0.2
$7i_{11/2}$	2.025+02	1.663+03	9.191+01	2.869+01	1.070+01	1.673+01	7.178−01	0.3
$8i_{11/2}$	1.550+02	1.615+03	3.641+01	8.702+02	1.583+01	1.301+01	1.190+00	0.1
$9i_{11/2}$	1.225+02	1.276+03	4.105+01	4.337+02	1.590+01	1.277+01	9.885−01	0.3
$10i_{11/2}$	9.922+01	1.252+03	3.266+01	5.095+02	1.734+01	1.281+01	1.202+00	0.3
$11i_{11/2}$	8.200+01	1.235+03	2.264+01	3.859+02	1.798+01	1.786+01	1.480+00	0.3
$12i_{11/2}$	6.890+01	1.222+03	4.928+00	1.572+02	1.962+01	6.607+01	5.915+00	0.3
$7i_{13/2}$	2.025+02	1.663+03	9.158+01	2.916+01	1.071+01	1.671+01	7.187−01	0.3
$8i_{13/2}$	1.550+02	1.615+03	4.243+01	6.410+02	1.540+01	1.210+01	1.079+00	0.1
$9i_{13/2}$	1.225+02	1.276+03	2.402+01	1.276+03	1.859+01	1.291+01	1.917+00	0.4
$10i_{13/2}$	9.921+01	1.252+03	3.118+01	4.744+02	1.718+01	1.406+01	1.194+00	0.3
$11i_{13/2}$	8.199+01	1.235+03	2.371+01	3.436+02	1.756+01	1.871+01	1.343+00	0.6
$12i_{13/2}$	6.890+01	1.222+03	4.717+00	1.551+02	1.961+01	6.909+01	6.112+00	0.3
Ni^{27+}								
$1s_{1/2}$	1.078+04	6.111+04	1.796−03	3.380+04	6.009+00	9.539+05	2.139+01	0.3
$2s_{1/2}$	2.702+03	5.303+04	3.828−03	5.089+04	5.284+00	9.539+05	2.081+01	0.2
$3s_{1/2}$	1.198+03	5.152+04	9.706−03	4.202+06	4.018+00	9.539+05	1.948+01	0.2
$4s_{1/2}$	6.724+02	5.100+04	1.588−02	7.840+06	3.572+00	9.539+05	1.960+01	0.7
$5s_{1/2}$	4.298+02	5.076+04	2.229−02	6.977+06	3.337+00	9.539+05	1.967+01	1.1
$6s_{1/2}$	2.981+02	4.005+04	3.019−02	4.793+06	3.180+00	9.539+05	1.945+01	1.4
$7s_{1/2}$	2.189+02	3.161+04	3.982−02	2.915+06	3.067+00	9.539+05	1.936+01	1.6
$8s_{1/2}$	1.675+02	3.156+04	4.832−02	1.833+06	2.995+00	9.539+05	1.942+01	1.9
$9s_{1/2}$	1.323+02	2.492+04	6.227−02	1.019+06	2.927+00	9.539+05	1.948+01	1.9
$10s_{1/2}$	1.071+02	1.969+04	8.069−02	5.409+05	2.872+00	9.539+05	1.924+01	1.8
$11s_{1/2}$	8.848+01	1.555+04	1.069−01	2.694+05	2.825+00	9.539+05	1.906+01	1.7
$12s_{1/2}$	7.432+01	1.554+04	8.854−02	2.814+05	2.852+00	9.542+05	1.563+02	1.4

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$2p_{1/2}$	2.702+03	5.303+04	6.472+02	4.159+00	2.515+00	1.540+02	1.003+00	0.2
$3p_{1/2}$	1.198+03	5.152+04	2.803+01	9.997+01	6.146+00	1.539+02	1.298−02	1.3
$4p_{1/2}$	6.724+02	4.042+04	3.578+01	3.112+01	5.891+00	1.540+02	4.095−01	0.5
$5p_{1/2}$	4.298+02	3.182+04	3.674+01	1.422+01	5.901+00	1.542+02	3.237+00	0.3
$6p_{1/2}$	2.981+02	2.509+04	4.554+01	7.085+00	5.610+00	1.557+02	2.456+00	0.5
$7p_{1/2}$	2.189+02	1.980+04	7.776−01	1.927+03	5.865+00	8.152+03	7.802+01	0.6
$8p_{1/2}$	1.675+02	1.563+04	9.136−01	1.514+03	5.693+00	8.167+03	5.284+01	0.8
$9p_{1/2}$	1.323+02	1.235+04	1.072+00	1.140+03	5.547+00	8.176+03	3.657+01	1.0
$10p_{1/2}$	1.071+02	1.232+04	1.202+00	8.565+02	5.445+00	8.187+03	2.747+01	1.3
$11p_{1/2}$	8.848+01	9.734+03	1.421+00	6.083+02	5.329+00	8.191+03	1.927+01	1.3
$12p_{1/2}$	7.432+01	9.720+03	1.560+00	4.550+02	5.261+00	8.193+03	1.546+01	1.7
$2p_{3/2}$	2.674+03	5.300+04	8.513+02	2.025+00	2.221+00	1.545+02	9.502−01	0.2
$3p_{3/2}$	1.189+03	5.152+04	2.251+01	1.187+02	6.383+00	1.530+02	3.957−03	0.9
$4p_{3/2}$	6.689+02	4.042+04	3.017+01	3.809+01	6.036+00	1.531+02	5.562−01	0.4
$5p_{3/2}$	4.279+02	2.522+04	3.073+01	1.718+01	6.072+00	1.524+02	4.024+00	0.3
$6p_{3/2}$	2.971+02	1.988+04	4.094+01	8.298+00	5.691+00	1.519+02	2.707+00	0.6
$7p_{3/2}$	2.182+02	1.980+04	8.657+00	5.083+01	5.815+00	6.998+02	8.206+00	0.8
$8p_{3/2}$	1.670+02	1.563+04	1.076+01	3.153+01	5.590+00	6.934+02	5.520+00	1.1
$9p_{3/2}$	1.319+02	1.235+04	1.357+01	1.886+01	5.377+00	6.917+02	3.802+00	1.3
$10p_{3/2}$	1.069+02	1.232+04	1.329+00	7.305+02	5.453+00	6.847+03	2.545+01	1.4
$11p_{3/2}$	8.830+01	9.734+03	1.570+00	5.187+02	5.333+00	6.836+03	1.789+01	1.5
$12p_{3/2}$	7.419+01	9.720+03	1.770+00	3.779+02	5.250+00	6.841+03	1.373+01	1.6
$3d_{3/2}$	1.189+03	2.598+04	8.442+01	2.802+02	5.642+00	6.482+01	1.747−01	0.6
$4d_{3/2}$	6.689+02	1.613+04	3.063+01	1.458+02	8.317+00	6.370+01	1.501−01	0.4
$5d_{3/2}$	4.279+02	1.589+04	2.892+01	4.901+01	8.690+00	6.610+01	3.002+00	0.3
$6d_{3/2}$	2.971+02	1.251+04	3.135+01	2.334+01	8.626+00	6.639+01	3.030+00	0.2
$7d_{3/2}$	2.182+02	9.864+03	4.060+01	1.199+01	8.196+00	6.413+01	2.172+00	0.5
$8d_{3/2}$	1.670+02	7.785+03	6.252+00	5.428+01	8.575+00	3.813+02	9.478+00	0.6
$9d_{3/2}$	1.319+02	7.750+03	7.155+00	4.068+01	8.343+00	3.816+02	7.174+00	0.9
$10d_{3/2}$	1.069+02	6.124+03	8.563+00	3.011+01	8.067+00	3.819+02	5.106+00	1.1
$11d_{3/2}$	8.830+01	6.105+03	9.824+00	2.207+01	7.871+00	3.806+02	3.960+00	1.4
$12d_{3/2}$	7.419+01	6.091+03	2.080−01	4.289+03	8.013+00	1.711+04	1.383+02	1.5
$3d_{5/2}$	1.187+03	2.598+04	6.554+01	4.774+02	5.950+00	6.589+01	3.541−01	0.5
$4d_{5/2}$	6.677+02	1.613+04	2.660+01	1.622+02	8.509+00	6.624+01	9.980−01	0.3
$5d_{5/2}$	4.273+02	1.264+04	2.497+01	5.208+01	8.929+00	6.802+01	3.758+00	0.1
$6d_{5/2}$	2.967+02	1.251+04	2.704+01	2.498+01	8.868+00	6.816+01	3.684+00	0.2
$7d_{5/2}$	2.180+02	9.864+03	3.514+01	1.372+01	8.346+00	6.812+01	2.466+00	0.6
$8d_{5/2}$	1.669+02	7.785+03	6.565+00	4.995+01	8.611+00	3.499+02	9.219+00	0.6
$9d_{5/2}$	1.318+02	7.750+03	7.630+00	3.712+01	8.365+00	3.469+02	6.843+00	1.0
$10d_{5/2}$	1.068+02	6.123+03	9.259+00	2.714+01	8.072+00	3.452+02	4.801+00	1.2
$11d_{5/2}$	8.825+01	6.105+03	1.713+00	2.064+02	8.116+00	1.883+03	2.016+01	1.3
$12d_{5/2}$	7.415+01	6.091+03	1.896+00	1.725+02	7.975+00	1.883+03	1.582+01	1.6
$4f_{5/2}$	6.677+02	1.031+04	1.653+02	3.672+01	7.133+00	1.745+01	1.250+00	0.5
$5f_{5/2}$	4.273+02	8.046+03	1.047+02	4.878+01	8.994+00	1.706+01	1.128+00	0.1
$6f_{5/2}$	2.967+02	6.313+03	8.604+01	3.372+01	9.854+00	1.749+01	1.230+00	0.2
$7f_{5/2}$	2.180+02	6.235+03	4.406+00	9.200+01	1.193+01	2.128+02	1.461+01	0.1
$8f_{5/2}$	1.669+02	4.919+03	4.528+00	5.264+01	1.197+01	2.128+02	1.439+01	0.3
$9f_{5/2}$	1.318+02	4.884+03	5.352+00	5.181+01	1.144+01	2.209+02	9.595+00	0.5
$10f_{5/2}$	1.068+02	3.860+03	6.062+00	4.379+01	1.111+01	2.256+02	7.290+00	0.7
$11f_{5/2}$	8.825+01	3.841+03	6.802+00	3.562+01	1.086+01	2.262+02	5.736+00	1.0
$12f_{5/2}$	7.415+01	3.827+03	7.642+00	2.864+01	1.062+01	2.252+02	4.566+00	1.3
$4f_{7/2}$	6.671+02	1.031+04	1.644+02	3.744+01	7.115+00	1.749+01	1.236+00	0.4
$5f_{7/2}$	4.270+02	8.045+03	1.615+02	1.754+01	7.813+00	1.714+01	8.713−01	0.3
$6f_{7/2}$	2.966+02	6.313+03	4.442+01	6.812+01	1.083+01	2.568+01	1.924+00	0.1
$7f_{7/2}$	2.179+02	6.235+03	5.293+01	3.083+01	1.050+01	2.572+01	1.562+00	0.4
$8f_{7/2}$	1.668+02	4.919+03	8.702+00	5.003+01	1.162+01	1.224+02	6.910+00	0.3
$9f_{7/2}$	1.318+02	4.884+03	9.624+00	3.761+01	1.132+01	1.262+02	5.517+00	0.6
$10f_{7/2}$	1.067+02	3.860+03	1.131+01	2.901+01	1.093+01	1.274+02	4.062+00	0.8
$11f_{7/2}$	8.822+01	3.841+03	1.298+01	2.188+01	1.062+01	1.273+02	3.168+00	1.1
$12f_{7/2}$	7.413+01	3.827+03	1.485+01	1.649+01	1.034+01	1.275+02	2.505+00	1.5
$5g_{7/2}$	4.270+02	5.179+03	8.725+01	1.353+02	9.242+00	1.936+01	1.207+00	0.1
$6g_{7/2}$	2.966+02	4.050+03	4.587+01	2.674+02	1.203+01	1.937+01	1.424+00	0.0
$7g_{7/2}$	2.179+02	3.971+03	5.565+01	9.579+01	1.185+01	1.924+01	1.127+00	0.6
$8g_{7/2}$	1.668+02	3.131+03	4.729+01	7.309+01	1.271+01	1.904+01	1.363+00	0.3

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$9g_{7/2}$	1.318+02	3.096+03	2.086+01	6.886+01	1.379+01	3.577+01	2.557+00	0.3
$10g_{7/2}$	1.067+02	3.071+03	1.164+01	5.425+01	1.390+01	6.619+01	3.851+00	0.5
$11g_{7/2}$	8.822+01	2.429+03	1.356+01	4.111+01	1.344+01	6.672+01	2.927+00	0.7
$12g_{7/2}$	7.413+01	2.415+03	2.695+00	5.760+01	1.383+01	3.156+02	1.256+01	0.8
$5g_{9/2}$	4.269+02	5.179+03	8.674+01	1.380+02	9.243+00	1.938+01	1.199+00	0.0
$6g_{9/2}$	2.965+02	4.049+03	1.312+02	2.175+01	8.881+00	1.872+01	7.358−01	0.7
$7g_{9/2}$	2.178+02	3.971+03	4.616+01	1.367+02	1.274+01	1.782+01	1.486+00	0.1
$8g_{9/2}$	1.668+02	3.131+03	3.068+01	1.002+02	1.351+01	2.427+01	1.976+00	0.2
$9g_{9/2}$	1.318+02	3.096+03	6.807+00	7.657+01	1.437+01	9.725+01	7.057+00	0.3
$10g_{9/2}$	1.067+02	3.071+03	7.470+00	5.685+01	1.414+01	9.752+01	5.911+00	0.5
$11g_{9/2}$	8.820+01	2.429+03	8.539+00	4.653+01	1.374+01	9.812+01	4.554+00	0.7
$12g_{9/2}$	7.411+01	2.415+03	9.589+00	3.734+01	1.343+01	9.798+01	3.659+00	0.9
$6h_{9/2}$	2.965+02	2.637+03	6.960+02	5.459−03	1.622+01	3.627+00	7.282+00	0.3
$7h_{9/2}$	2.178+02	2.559+03	4.789+02	3.969−02	1.811+01	3.602+00	9.848+00	0.3
$8h_{9/2}$	1.668+02	2.508+03	5.322+02	3.612−02	1.870+01	3.139+00	1.019+01	0.3
$9h_{9/2}$	1.318+02	1.981+03	4.497+02	4.676−02	1.908+01	3.553+00	9.977+00	0.2
$10h_{9/2}$	1.067+02	1.956+03	4.549+02	3.055−02	1.911+01	3.677+00	9.974+00	0.4
$11h_{9/2}$	8.820+01	1.937+03	9.561+02	1.192−02	1.894+01	1.955+00	7.732+00	0.3
$12h_{9/2}$	7.411+01	1.534+03	2.452+03	1.004−03	1.886+01	8.042−01	1.272+01	0.4
$6h_{11/2}$	2.964+02	2.637+03	7.091+02	4.859−03	1.617+01	3.628+00	7.253+00	0.3
$7h_{11/2}$	2.178+02	2.559+03	9.985+02	4.789−02	1.795+01	1.869+00	4.351+00	0.4
$8h_{11/2}$	1.667+02	2.508+03	9.500+02	8.109−02	1.866+01	1.809+00	4.549+00	0.4
$9h_{11/2}$	1.317+02	1.981+03	9.076+02	6.746−02	1.893+01	1.889+00	4.955+00	0.1
$10h_{11/2}$	1.067+02	1.956+03	8.977+02	4.579−02	1.901+01	1.960+00	5.218+00	0.1
$11h_{11/2}$	8.819+01	1.937+03	1.119+03	1.600−02	1.893+01	1.682+00	6.030+00	0.2
$12h_{11/2}$	7.410+01	1.534+03	2.984+03	1.823−02	1.866+01	7.576−01	1.729+00	0.4
$7i_{11/2}$	2.178+02	1.678+03	4.681+01	5.325+02	1.360+01	1.540+01	1.196+00	0.0
$8i_{11/2}$	1.667+02	1.627+03	4.429+01	4.935+02	1.484+01	1.454+01	9.200−01	0.4
$9i_{11/2}$	1.317+02	1.592+03	5.008+01	2.335+02	1.490+01	1.438+01	8.270−01	0.8
$10i_{11/2}$	1.067+02	1.260+03	4.133+01	3.250+02	1.651+01	1.292+01	1.005+00	0.3
$11i_{11/2}$	8.819+01	1.241+03	1.687+01	3.723+02	1.859+01	2.342+01	2.032+00	0.3
$12i_{11/2}$	7.410+01	1.227+03	1.634+01	2.521+02	1.866+01	2.483+01	2.032+00	0.4
$7i_{13/2}$	2.177+02	1.678+03	8.886+01	4.182+01	1.106+01	1.677+01	7.548−01	0.3
$8i_{13/2}$	1.667+02	1.627+03	7.540+01	1.166+02	1.330+01	1.175+01	7.561−01	0.3
$9i_{13/2}$	1.317+02	1.592+03	3.644+01	6.533+02	1.684+01	1.269+01	1.208+00	0.1
$10i_{13/2}$	1.067+02	1.260+03	3.673+01	4.178+02	1.705+01	1.303+01	1.131+00	0.3
$11i_{13/2}$	8.818+01	1.241+03	1.629+01	3.743+02	1.871+01	2.367+01	2.130+00	0.2
$12i_{13/2}$	7.410+01	1.227+03	1.508+01	2.486+02	1.875+01	2.649+01	2.176+00	0.4
Cu^{10+}								
$4s_{1/2}$	1.656+02	3.991+04	1.152−02	1.054+05	4.225+00	8.539+05	1.908+01	1.0
$5s_{1/2}$	9.455+01	2.489+04	2.442−02	1.270+05	3.756+00	8.539+05	1.919+01	2.6
$6s_{1/2}$	6.135+01	1.964+04	4.375−02	6.914+04	3.517+00	8.539+05	1.922+01	3.5
$7s_{1/2}$	4.305+01	1.551+04	7.566−02	2.777+04	3.366+00	8.539+05	1.868+01	4.0
$8s_{1/2}$	3.188+01	1.225+04	1.345−01	8.940+03	3.260+00	8.539+05	1.877+01	4.1
$9s_{1/2}$	2.456+01	9.671+03	2.199−01	2.961+03	3.196+00	8.539+05	1.927+01	3.8
$10s_{1/2}$	1.950+01	7.638+03	4.935−01	5.477+02	3.123+00	8.539+05	8.909+00	3.6
$11s_{1/2}$	1.586+01	7.634+03	5.942−01	3.060+02	3.096+00	8.539+05	7.963+00	3.8
$12s_{1/2}$	1.315+01	6.030+03	6.856−01	1.867+02	3.075+00	8.539+05	7.109+00	3.6
$4p_{1/2}$	1.504+02	1.973+04	1.776+01	5.801+00	7.266+00	1.366+02	6.175−01	0.7
$5p_{1/2}$	8.773+01	1.555+04	3.084+00	1.459+01	7.066+00	9.279+02	6.633+00	0.6
$6p_{1/2}$	5.771+01	9.704+03	4.314+00	1.056+01	6.607+00	9.297+02	5.180+00	1.6
$7p_{1/2}$	4.088+01	9.687+03	5.795+00	6.802+00	6.271+00	9.224+02	3.589+00	2.6
$8p_{1/2}$	3.048+01	7.649+03	7.271+00	4.379+00	6.023+00	9.225+02	2.631+00	3.2
$9p_{1/2}$	2.361+01	6.040+03	8.322−02	1.875+03	6.044+00	9.158+04	1.379+02	3.4
$10p_{1/2}$	1.882+01	6.036+03	9.723−02	1.542+03	5.927+00	9.159+04	1.042+02	4.2
$11p_{1/2}$	1.536+01	4.767+03	1.294−01	1.106+03	5.782+00	9.159+04	6.654+01	4.1
$12p_{1/2}$	1.277+01	4.765+03	1.470−01	8.501+02	5.708+00	9.160+04	5.312+01	4.9
$4p_{3/2}$	1.494+02	1.973+04	1.635+01	6.455+00	7.306+00	1.369+02	1.016+00	0.5
$5p_{3/2}$	8.733+01	1.230+04	1.828+00	2.497+01	7.078+00	1.472+03	1.092+01	0.7
$6p_{3/2}$	5.749+01	9.703+03	2.526+00	1.999+01	6.634+00	1.473+03	8.236+00	1.7
$7p_{3/2}$	4.075+01	7.659+03	3.477+00	1.352+01	6.286+00	1.469+03	5.341+00	2.5
$8p_{3/2}$	3.040+01	7.649+03	4.435+00	8.788+00	6.043+00	1.469+03	3.794+00	3.4
$9p_{3/2}$	2.355+01	6.040+03	5.404+00	5.770+00	5.858+00	1.469+03	2.860+00	3.6
$10p_{3/2}$	1.878+01	4.771+03	2.035−01	6.223+02	5.856+00	4.675+04	4.694+01	3.8

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$11p_{3/2}$	1.533+01	4.767+03	2.390−01	4.634+02	5.759+00	4.674+04	3.561+01	4.3
$12p_{3/2}$	1.275+01	4.765+03	2.767−01	3.422+02	5.678+00	4.674+04	2.768+01	4.9
$3d_{3/2}$	2.658+02	7.884+03	7.354+01	6.013+01	5.811+00	6.019+01	7.855−01	0.5
$4d_{3/2}$	1.258+02	6.143+03	2.598+01	4.073+01	8.220+00	5.604+01	8.100−01	0.6
$5d_{3/2}$	7.676+01	4.829+03	7.351+00	4.567+01	8.887+00	1.649+02	3.399−01	0.5
$6d_{3/2}$	5.182+01	3.805+03	9.186+00	2.323+01	8.563+00	1.610+02	1.697+00	1.0
$7d_{3/2}$	3.735+01	3.790+03	2.927−02	4.059+03	8.902+00	4.517+04	1.752+02	0.9
$8d_{3/2}$	2.820+01	2.992+03	3.265−02	3.973+03	8.740+00	4.519+04	2.138+02	1.2
$9d_{3/2}$	2.205+01	2.986+03	3.511−02	3.586+03	8.631+00	4.519+04	2.137+02	1.4
$10d_{3/2}$	1.771+01	2.359+03	4.014−02	3.644+03	8.465+00	4.516+04	1.674+02	1.8
$11d_{3/2}$	1.453+01	2.355+03	4.467−02	3.418+03	8.342+00	4.515+04	1.378+02	1.7
$12d_{3/2}$	1.214+01	2.353+03	4.864−02	3.074+03	8.248+00	4.513+04	1.179+02	2.4
$3d_{5/2}$	2.652+02	7.883+03	5.226+01	1.203+02	6.124+00	6.903+01	1.817−01	0.4
$4d_{5/2}$	1.257+02	6.142+03	2.020+01	5.123+01	8.462+00	6.409+01	4.433−01	0.6
$5d_{5/2}$	7.670+01	4.829+03	6.632+00	4.875+01	8.953+00	1.750+02	3.662−03	0.5
$6d_{5/2}$	5.179+01	3.805+03	3.362+00	5.068+01	8.902+00	3.733+02	2.440+00	0.8
$7d_{5/2}$	3.733+01	3.790+03	3.898+00	3.260+01	8.665+00	3.734+02	2.923+00	1.3
$8d_{5/2}$	2.819+01	2.992+03	5.657−01	1.729+02	8.703+00	2.625+03	1.391+01	1.3
$9d_{5/2}$	2.204+01	2.986+03	6.258−01	1.373+02	8.558+00	2.626+03	1.260+01	1.7
$10d_{5/2}$	1.770+01	2.359+03	7.147−01	1.095+02	8.395+00	2.622+03	1.023+01	1.9
$11d_{5/2}$	1.453+01	2.355+03	7.883−01	8.678+01	8.277+00	2.618+03	8.742+00	2.2
$12d_{5/2}$	1.214+01	2.353+03	9.106−01	6.720+01	8.132+00	2.619+03	6.975+00	1.8
$4f_{5/2}$	1.068+02	2.448+03	6.871+00	6.224+02	9.792+00	8.337+01	7.632+00	1.0
$5f_{5/2}$	6.832+01	1.917+03	1.246+01	1.665+02	8.879+00	8.016+01	1.676+00	1.6
$6f_{5/2}$	4.727+01	1.507+03	6.496+00	2.292+02	9.253+00	1.498+02	1.376+00	1.2
$7f_{5/2}$	3.460+01	1.495+03	6.624+00	1.244+02	9.329+00	1.499+02	1.423+00	1.3
$8f_{5/2}$	2.641+01	1.180+03	2.804+00	2.389+02	9.722+00	3.117+02	1.934+00	0.6
$9f_{5/2}$	2.081+01	1.174+03	2.916+00	1.541+02	9.701+00	3.113+02	2.086+00	0.7
$10f_{5/2}$	1.682+01	1.170+03	3.104+00	1.046+02	9.626+00	3.116+02	2.001+00	0.8
$11f_{5/2}$	1.388+01	9.246+02	3.502+00	7.031+01	9.463+00	3.117+02	1.750+00	0.7
$12f_{5/2}$	1.164+01	9.224+02	3.675+00	5.307+01	9.377+00	3.117+02	1.591+00	1.3
$4f_{7/2}$	1.068+02	2.448+03	1.454+01	2.321+02	9.396+00	4.404+01	3.636+00	1.0
$5f_{7/2}$	6.831+01	1.917+03	1.105+01	2.020+02	8.955+00	8.739+01	1.782+00	1.6
$6f_{7/2}$	4.726+01	1.507+03	3.535+00	5.488+02	9.496+00	2.470+02	1.513−03	1.1
$7f_{7/2}$	3.459+01	1.495+03	3.433+00	2.981+02	9.638+00	2.513+02	1.466+00	1.1
$8f_{7/2}$	2.640+01	1.180+03	3.614+00	1.739+02	9.620+00	2.527+02	1.765+00	0.7
$9f_{7/2}$	2.081+01	1.174+03	3.799+00	1.116+02	9.578+00	2.530+02	1.804+00	0.8
$10f_{7/2}$	1.682+01	1.170+03	4.146+00	7.400+01	9.462+00	2.527+02	1.657+00	1.0
$11f_{7/2}$	1.387+01	9.246+02	1.714+00	1.738+02	9.743+00	5.487+02	2.727+00	0.5
$12f_{7/2}$	1.164+01	9.224+02	1.765+00	1.299+02	9.711+00	5.487+02	2.714+00	0.7
$5g_{7/2}$	6.599+01	9.768+02	1.588+01	2.048+02	6.374+00	5.565+02	6.645−01	0.6
$6g_{7/2}$	4.586+01	7.652+02	2.503+01	2.327+01	6.380+00	5.564+02	5.896−01	0.5
$7g_{7/2}$	3.370+01	7.530+02	1.791+01	4.092+01	7.788+00	1.476+02	6.317−01	0.5
$8g_{7/2}$	2.580+01	5.939+02	1.552+01	3.732+01	8.181+00	1.480+02	6.179−01	1.0
$9g_{7/2}$	2.038+01	5.885+02	9.971+00	7.295+01	9.654+00	8.499+01	7.834−01	1.0
$10g_{7/2}$	1.651+01	5.846+02	7.538+00	8.544+01	1.029+01	8.475+01	8.980−01	1.3
$11g_{7/2}$	1.364+01	4.623+02	5.281+00	1.076+02	1.097+01	9.039+01	1.106+00	1.0
$12g_{7/2}$	1.146+01	4.601+02	3.935+00	1.179+02	1.133+01	1.073+02	1.307+00	1.1
$5g_{9/2}$	6.598+01	9.768+02	1.468+01	2.675+02	6.525+00	4.667+02	6.857−01	0.8
$6g_{9/2}$	4.585+01	7.652+02	2.439+01	2.546+01	6.474+00	4.667+02	5.969−01	0.4
$7g_{9/2}$	3.369+01	7.530+02	1.775+01	4.206+01	7.814+00	1.451+02	6.327−01	0.5
$8g_{9/2}$	2.580+01	5.939+02	1.544+01	3.791+01	8.206+00	1.446+02	6.206−01	0.9
$9g_{9/2}$	2.038+01	5.885+02	1.009+01	7.105+01	9.613+00	8.609+01	7.761−01	1.0
$10g_{9/2}$	1.651+01	5.846+02	7.695+00	8.224+01	1.023+01	8.570+01	8.854−01	1.2
$11g_{9/2}$	1.364+01	4.623+02	5.308+00	1.069+02	1.096+01	9.007+01	1.103+00	1.0
$12g_{9/2}$	1.146+01	4.601+02	3.981+00	1.163+02	1.132+01	1.064+02	1.299+00	1.1
$6h_{9/2}$	4.574+01	4.944+02	8.918+01	5.855−02	1.600+01	4.833+00	5.970+00	0.2
$7h_{9/2}$	3.360+01	3.880+02	4.389+01	5.399−01	1.824+01	5.783+00	1.080+01	0.2
$8h_{9/2}$	2.573+01	3.801+02	4.937+01	6.062−01	1.888+01	4.891+00	9.697+00	0.2
$9h_{9/2}$	2.033+01	3.747+02	5.174+01	4.165−01	1.907+01	4.818+00	9.656+00	0.2
$10h_{9/2}$	1.647+01	3.708+02	5.533+01	2.380−01	1.906+01	4.813+00	9.672+00	0.1
$11h_{9/2}$	1.361+01	2.935+02	5.773+01	1.470−01	1.901+01	4.885+00	9.599+00	0.3
$12h_{9/2}$	1.144+01	2.913+02	6.229+01	5.335−02	1.886+01	4.954+00	1.155+01	0.5
$6h_{11/2}$	4.574+01	4.944+02	8.053+01	9.948−02	1.626+01	4.786+00	6.277+00	0.4

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$7h_{11/2}$	3.360+01	3.880+02	5.519+01	5.577−01	1.817+01	4.728+00	8.609+00	0.2
$8h_{11/2}$	2.573+01	3.801+02	5.631+01	6.559−01	1.886+01	4.340+00	8.487+00	0.2
$9h_{11/2}$	2.033+01	3.747+02	5.963+01	4.666−01	1.905+01	4.226+00	8.340+00	0.2
$10h_{11/2}$	1.647+01	3.708+02	5.919+01	3.256−01	1.912+01	4.401+00	8.368+00	0.5
$11h_{11/2}$	1.361+01	2.935+02	7.202+01	1.508−01	1.897+01	4.008+00	8.116+00	0.2
$12h_{11/2}$	1.144+01	2.913+02	8.715+01	7.614−02	1.884+01	3.595+00	7.843+00	0.5
$7i_{11/2}$	3.360+01	3.135+02	8.711+01	6.240−02	1.819+01	2.977+00	6.412+00	0.1
$8i_{11/2}$	2.573+01	2.468+02	1.144+02	9.529−01	2.005+01	1.699+00	3.902+00	0.2
$9i_{11/2}$	2.033+01	2.414+02	8.082+01	2.190+00	2.106+01	2.062+00	5.677+00	0.2
$10i_{11/2}$	1.646+01	2.375+02	7.917+01	2.118+00	2.142+01	2.082+00	6.050+00	0.2
$11i_{11/2}$	1.361+01	2.346+02	7.886+01	1.600+00	2.154+01	2.146+00	6.170+00	0.3
$12i_{11/2}$	1.143+01	2.325+02	8.156+01	1.196+00	2.160+01	2.124+00	6.175+00	0.3
$7i_{13/2}$	3.360+01	3.135+02	7.272+01	7.443−02	1.825+01	3.474+00	7.703+00	0.1
$8i_{13/2}$	2.572+01	2.468+02	5.466+01	9.856−01	2.034+01	3.177+00	8.706+00	0.2
$9i_{13/2}$	2.033+01	2.413+02	6.019+01	1.192+00	2.102+01	2.780+00	8.739+00	0.2
$10i_{13/2}$	1.646+01	2.375+02	5.663+01	1.404+00	2.146+01	2.857+00	8.894+00	0.1
$11i_{13/2}$	1.361+01	2.346+02	5.586+01	1.109+00	2.159+01	2.961+00	8.907+00	0.4
$12i_{13/2}$	1.143+01	2.325+02	7.230+01	5.466−01	2.152+01	2.454+00	8.880+00	0.2
Cu^{18+}								
$3s_{1/2}$	6.703+02	5.100+04	8.486−03	3.239+05	4.403+00	9.539+05	1.987+01	0.7
$4s_{1/2}$	3.561+02	5.068+04	1.609−02	1.068+06	3.798+00	9.539+05	1.945+01	1.5
$5s_{1/2}$	2.208+02	3.997+04	2.526−02	9.934+05	3.507+00	9.539+05	1.944+01	2.0
$6s_{1/2}$	1.502+02	3.154+04	3.684−02	6.350+05	3.330+00	9.539+05	1.909+01	2.3
$7s_{1/2}$	1.088+02	2.490+04	5.240−02	3.436+05	3.207+00	9.539+05	1.881+01	2.3
$8s_{1/2}$	8.244+01	1.966+04	7.457−02	1.667+05	3.115+00	9.539+05	1.890+01	2.3
$9s_{1/2}$	6.461+01	1.553+04	1.083−01	7.308+04	3.043+00	9.539+05	1.912+01	2.1
$10s_{1/2}$	5.200+01	1.227+04	1.378−01	3.745+04	3.006+00	9.539+05	4.909+01	1.7
$11s_{1/2}$	4.275+01	1.226+04	1.709−01	2.061+04	2.971+00	9.539+05	3.846+01	1.9
$12s_{1/2}$	3.576+01	9.682+03	2.799−01	6.756+03	2.922+00	9.540+05	2.010+01	1.7
$3p_{1/2}$	6.294+02	4.038+04	2.386+01	3.714+01	6.710+00	1.354+02	7.513−02	1.1
$4p_{1/2}$	3.396+02	2.513+04	3.548+01	1.282+01	6.107+00	1.368+02	1.905+00	0.3
$5p_{1/2}$	2.127+02	1.979+04	1.495+01	2.102+01	6.057+00	3.572+02	3.330+00	0.5
$6p_{1/2}$	1.456+02	1.561+04	1.954+01	1.071+01	5.742+00	3.574+02	2.598+00	1.0
$7p_{1/2}$	1.060+02	1.232+04	1.748−01	8.818+03	5.862+00	3.852+04	1.405+02	0.9
$8p_{1/2}$	8.055+01	9.727+03	2.071−01	7.067+03	5.710+00	3.854+04	1.001+02	1.0
$9p_{1/2}$	6.330+01	9.709+03	2.344−01	5.474+03	5.606+00	3.852+04	7.751+01	1.4
$10p_{1/2}$	5.105+01	7.669+03	2.754−01	4.099+03	5.496+00	3.853+04	5.535+01	1.5
$11p_{1/2}$	4.204+01	7.660+03	3.156−01	3.037+03	5.411+00	3.854+04	4.178+01	1.6
$12p_{1/2}$	3.522+01	6.052+03	3.669−01	2.186+03	5.330+00	3.853+04	3.090+01	1.8
$3p_{3/2}$	6.247+02	3.202+04	1.988+01	4.357+01	6.861+00	1.384+02	3.854−02	0.5
$4p_{3/2}$	3.378+02	2.513+04	2.995+01	1.562+01	6.232+00	1.392+02	2.306+00	0.4
$5p_{3/2}$	2.118+02	1.979+04	1.005+01	3.477+01	6.151+00	4.659+02	4.694+00	0.7
$6p_{3/2}$	1.451+02	1.561+04	1.292+01	1.892+01	5.850+00	4.658+02	3.549+00	1.0
$7p_{3/2}$	1.056+02	1.232+04	1.701+01	1.008+01	5.560+00	4.672+02	2.515+00	1.3
$8p_{3/2}$	8.034+01	9.726+03	2.453−01	5.620+03	5.707+00	3.044+04	8.733+01	1.1
$9p_{3/2}$	6.315+01	9.709+03	2.787−01	4.346+03	5.597+00	3.045+04	6.612+01	1.5
$10p_{3/2}$	5.094+01	7.669+03	3.309−01	3.206+03	5.481+00	3.045+04	4.628+01	1.5
$11p_{3/2}$	4.196+01	7.660+03	3.675−01	2.425+03	5.408+00	3.045+04	3.662+01	1.9
$12p_{3/2}$	3.516+01	6.052+03	4.501−01	1.643+03	5.307+00	3.043+04	2.504+01	1.7
$3d_{3/2}$	5.693+02	1.278+04	7.105+01	8.802+01	6.007+00	6.243+01	2.142+00	0.3
$4d_{3/2}$	3.174+02	9.963+03	5.032+01	4.318+01	6.995+00	6.154+01	1.306+00	0.3
$5d_{3/2}$	2.018+02	7.820+03	5.636+01	1.559+01	6.944+00	6.285+01	1.166+00	0.3
$6d_{3/2}$	1.396+02	6.156+03	1.685+01	4.076+01	7.778+00	1.484+02	1.997+00	0.1
$7d_{3/2}$	1.022+02	6.119+03	1.894+01	2.225+01	7.626+00	1.489+02	1.874+00	0.3
$8d_{3/2}$	7.807+01	4.830+03	5.436+00	7.192+01	7.957+00	4.525+02	4.298+00	0.2
$9d_{3/2}$	6.157+01	4.813+03	6.080+00	4.856+01	7.807+00	4.527+02	3.601+00	0.5
$10d_{3/2}$	4.980+01	3.803+03	6.999+00	3.287+01	7.631+00	4.528+02	2.896+00	0.8
$11d_{3/2}$	4.111+01	3.794+03	7.858+00	2.303+01	7.487+00	4.521+02	2.419+00	1.2
$12d_{3/2}$	3.450+01	2.999+03	3.068−02	9.976+04	7.756+00	1.012+05	3.666+02	1.0
$3d_{5/2}$	5.686+02	1.278+04	6.078+01	1.219+02	6.169+00	6.400+01	2.422+00	0.4
$4d_{5/2}$	3.170+02	9.963+03	4.507+01	5.195+01	7.088+00	6.408+01	1.291+00	0.3
$5d_{5/2}$	2.017+02	7.820+03	5.092+01	1.827+01	7.060+00	6.409+01	1.215+00	0.3
$6d_{5/2}$	1.395+02	6.156+03	1.524+01	4.586+01	7.847+00	1.553+02	2.129+00	0.1
$7d_{5/2}$	1.021+02	6.119+03	1.704+01	2.525+01	7.705+00	1.555+02	2.021+00	0.3

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$8d_{5/2}$	7.803+01	4.830+03	9.677−01	6.953+02	8.124+00	2.299+03	1.917+01	0.1
$9d_{5/2}$	6.154+01	4.813+03	1.048+00	5.101+02	8.026+00	2.288+03	1.678+01	0.3
$10d_{5/2}$	4.978+01	3.803+03	1.149+00	3.901+02	7.911+00	2.288+03	1.381+01	0.6
$11d_{5/2}$	4.109+01	3.794+03	1.251+00	3.022+02	7.809+00	2.286+03	1.141+01	0.8
$12d_{5/2}$	3.449+01	2.998+03	1.399+00	2.328+02	7.689+00	2.286+03	9.039+00	1.0
$4f_{5/2}$	3.078+02	5.060+03	5.633+01	1.176+02	5.598+00	1.515+02	1.993−01	0.2
$5f_{5/2}$	1.971+02	3.950+03	7.956+01	1.697+01	6.447+00	6.163+01	7.362−01	0.3
$6f_{5/2}$	1.368+02	3.101+03	1.973+01	1.330+02	9.213+00	6.380+01	6.796−01	0.7
$7f_{5/2}$	1.005+02	3.065+03	1.797+01	7.510+01	9.628+00	6.336+01	1.391+00	0.7
$8f_{5/2}$	7.694+01	2.418+03	1.770+01	4.612+01	9.750+00	6.359+01	1.523+00	0.4
$9f_{5/2}$	6.078+01	2.402+03	4.595+00	1.163+02	1.049+01	1.948+02	4.037+00	0.5
$10f_{5/2}$	4.922+01	1.898+03	4.879+00	8.140+01	1.040+01	1.949+02	3.701+00	0.3
$11f_{5/2}$	4.067+01	1.889+03	5.389+00	5.916+01	1.022+01	1.947+02	3.124+00	0.5
$12f_{5/2}$	3.417+01	1.883+03	5.995+00	4.393+01	1.003+01	1.953+02	2.595+00	0.8
$4f_{7/2}$	3.077+02	5.060+03	5.473+01	1.279+02	5.669+00	1.423+02	2.436−01	0.3
$5f_{7/2}$	1.970+02	3.950+03	1.069+02	6.802+00	5.377+00	1.437+02	6.132−01	1.0
$6f_{7/2}$	1.368+02	3.101+03	3.518+01	5.360+01	8.583+00	4.592+01	9.554−01	0.5
$7f_{7/2}$	1.005+02	3.064+03	3.174+01	3.500+01	8.969+00	4.596+01	1.084+00	0.5
$8f_{7/2}$	7.692+01	2.418+03	1.370+01	6.062+01	1.000+01	7.439+01	1.811+00	0.4
$9f_{7/2}$	6.077+01	2.402+03	4.795+00	1.112+02	1.049+01	1.858+02	3.925+00	0.5
$10f_{7/2}$	4.921+01	1.898+03	5.125+00	7.765+01	1.039+01	1.855+02	3.551+00	0.3
$11f_{7/2}$	4.067+01	1.889+03	5.734+00	5.561+01	1.020+01	1.836+02	2.971+00	0.5
$12f_{7/2}$	3.417+01	1.883+03	1.881+00	1.459+02	1.039+01	5.354+02	7.265+00	0.6
$5g_{7/2}$	1.966+02	2.537+03	4.033+01	2.198+02	8.086+00	3.674+01	6.963−01	0.5
$6g_{7/2}$	1.365+02	1.985+03	4.421+01	1.123+02	9.861+00	1.863+01	8.852−01	0.3
$7g_{7/2}$	1.003+02	1.949+03	2.952+01	1.548+02	1.146+01	1.908+01	1.071+00	0.3
$8g_{7/2}$	7.678+01	1.537+03	1.653+01	1.861+02	1.303+01	2.392+01	1.685+00	0.3
$9g_{7/2}$	6.067+01	1.521+03	2.645+00	2.013+02	1.410+01	1.264+02	7.558+00	0.2
$10g_{7/2}$	4.914+01	1.202+03	2.695+00	1.285+02	1.415+01	1.263+02	7.555+00	0.2
$11g_{7/2}$	4.061+01	1.194+03	3.127+00	1.122+02	1.372+01	1.267+02	5.561+00	0.5
$12g_{7/2}$	3.412+01	1.187+03	3.511+00	9.045+01	1.345+01	1.249+02	4.501+00	0.8
$5g_{9/2}$	1.965+02	2.537+03	6.994+01	3.627+01	7.215+00	3.107+01	8.232−01	0.4
$6g_{9/2}$	1.365+02	1.985+03	4.598+01	1.003+02	9.722+00	1.882+01	8.629−01	0.3
$7g_{9/2}$	1.003+02	1.949+03	2.991+01	1.525+02	1.145+01	1.885+01	1.066+00	0.3
$8g_{9/2}$	7.677+01	1.537+03	2.113+01	1.512+02	1.258+01	2.083+01	1.379+00	0.3
$9g_{9/2}$	6.066+01	1.521+03	4.377+00	1.850+02	1.392+01	7.937+01	4.697+00	0.2
$10g_{9/2}$	4.913+01	1.202+03	4.737+00	1.280+02	1.375+01	7.979+01	4.117+00	0.3
$11g_{9/2}$	4.061+01	1.194+03	5.223+00	9.565+01	1.347+01	8.047+01	3.436+00	0.6
$12g_{9/2}$	3.412+01	1.187+03	3.850+00	8.707+01	1.341+01	1.148+02	4.138+00	0.8
$6h_{9/2}$	1.365+02	1.290+03	3.162+02	1.062−02	1.620+01	3.672+00	7.763+00	0.3
$7h_{9/2}$	1.003+02	1.253+03	2.711+02	9.040−02	1.809+01	2.953+00	8.101+00	0.3
$8h_{9/2}$	7.677+01	9.875+02	2.657+02	1.710−01	1.886+01	2.732+00	7.532+00	0.2
$9h_{9/2}$	6.065+01	9.714+02	2.488+02	1.679−01	1.914+01	2.894+00	7.454+00	0.6
$10h_{9/2}$	4.913+01	9.599+02	3.400+02	6.559−02	1.904+01	2.336+00	7.395+00	0.1
$11h_{9/2}$	4.060+01	7.599+02	4.775+02	3.951−02	1.896+01	1.789+00	6.088+00	0.2
$12h_{9/2}$	3.412+01	7.534+02	8.835+02	4.800−02	1.877+01	1.107+00	2.509+00	0.3
$6h_{11/2}$	1.365+02	1.290+03	3.090+02	1.815−02	1.640+01	3.475+00	7.106+00	0.5
$7h_{11/2}$	1.003+02	1.253+03	2.110+02	8.000−02	1.812+01	3.735+00	1.065+01	0.3
$8h_{11/2}$	7.676+01	9.875+02	2.023+02	1.315−01	1.889+01	3.532+00	1.026+01	0.2
$9h_{11/2}$	6.065+01	9.714+02	2.162+02	9.023−02	1.908+01	3.398+00	1.036+01	0.1
$10h_{11/2}$	4.913+01	9.599+02	2.100+02	6.444−02	1.913+01	3.625+00	1.031+01	0.5
$11h_{11/2}$	4.060+01	7.599+02	5.229+02	9.872−03	1.896+01	1.621+00	1.183+01	0.3
$12h_{11/2}$	3.412+01	7.534+02	7.081+02	2.747−03	1.889+01	1.263+00	1.507+01	0.5
$7i_{11/2}$	1.003+02	8.196+02	4.907+01	3.674+01	1.017+01	1.896+01	6.697−01	0.5
$8i_{11/2}$	7.676+01	7.961+02	1.632+01	2.309+03	1.630+01	1.292+01	1.328+00	0.1
$9i_{11/2}$	6.065+01	6.288+02	1.775+01	1.206+03	1.644+01	1.299+01	1.103+00	0.3
$10i_{11/2}$	4.913+01	6.172+02	1.572+01	1.036+03	1.734+01	1.320+01	1.221+00	0.3
$11i_{11/2}$	4.060+01	6.087+02	1.123+01	8.060+02	1.806+01	1.742+01	1.506+00	0.4
$12i_{11/2}$	3.412+01	6.022+02	7.901+00	5.571+02	1.859+01	2.378+01	1.953+00	0.5
$7i_{13/2}$	1.002+02	8.196+02	4.088+01	8.160+01	1.077+01	1.882+01	7.105−01	0.7
$8i_{13/2}$	7.675+01	7.961+02	2.315+01	1.144+03	1.527+01	1.106+01	1.037+00	0.1
$9i_{13/2}$	6.065+01	6.287+02	1.158+01	2.857+03	1.891+01	1.246+01	2.051+00	0.4
$10i_{13/2}$	4.912+01	6.172+02	1.658+01	1.014+03	1.728+01	1.258+01	1.182+00	0.3
$11i_{13/2}$	4.060+01	6.087+02	8.976+00	9.089+02	1.887+01	1.876+01	1.972+00	0.3
$12i_{13/2}$	3.411+01	6.022+02	7.302+00	5.530+02	1.873+01	2.514+01	2.105+00	0.5

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
Cu^{26+}								
$2s_{1/2}$	2.588+03	5.292+04	4.068−03	3.012+04	5.339+00	9.539+05	2.113+01	0.2
$3s_{1/2}$	1.135+03	5.146+04	9.972−03	2.559+06	4.083+00	9.539+05	2.001+01	0.1
$4s_{1/2}$	6.340+02	5.096+04	1.643−02	5.171+06	3.621+00	9.539+05	2.008+01	0.6
$5s_{1/2}$	4.040+02	5.073+04	2.322−02	4.736+06	3.378+00	9.539+05	2.020+01	1.0
$6s_{1/2}$	2.798+02	4.003+04	3.155−02	3.296+06	3.217+00	9.539+05	2.041+01	1.3
$7s_{1/2}$	2.051+02	3.160+04	4.176−02	2.017+06	3.103+00	9.539+05	2.033+01	1.5
$8s_{1/2}$	1.568+02	2.495+04	5.475−02	1.144+06	3.016+00	9.539+05	2.050+01	1.6
$9s_{1/2}$	1.237+02	2.492+04	6.638−02	6.978+05	2.958+00	9.539+05	2.054+01	1.9
$10s_{1/2}$	1.001+02	1.968+04	8.673−02	3.669+05	2.902+00	9.539+05	2.063+01	1.9
$11s_{1/2}$	8.267+01	1.555+04	1.165−01	1.789+05	2.853+00	9.539+05	2.065+01	1.8
$12s_{1/2}$	6.942+01	1.553+04	1.391−01	1.067+05	2.822+00	9.539+05	2.042+01	2.0
$2p_{1/2}$	2.533+03	5.286+04	5.660+02	5.079+00	2.679+00	1.543+02	1.066+00	0.2
$3p_{1/2}$	1.120+03	5.145+04	3.275+01	8.524+01	5.934+00	1.545+02	6.303−02	1.5
$4p_{1/2}$	6.277+02	4.037+04	3.894+01	2.686+01	5.785+00	1.552+02	1.364+00	0.7
$5p_{1/2}$	4.008+02	2.519+04	4.157+01	1.212+01	5.747+00	1.534+02	2.697+00	0.2
$6p_{1/2}$	2.779+02	1.986+04	9.979+00	5.209+01	5.897+00	6.043+02	7.740+00	0.2
$7p_{1/2}$	2.040+02	1.978+04	1.223+01	3.131+01	5.668+00	6.023+02	5.335+00	0.6
$8p_{1/2}$	1.560+02	1.562+04	1.491+01	1.878+01	5.467+00	6.019+02	3.841+00	0.9
$9p_{1/2}$	1.232+02	1.234+04	1.858+01	1.095+01	5.269+00	6.013+02	2.795+00	1.2
$10p_{1/2}$	9.973+01	1.231+04	1.260+00	7.709+02	5.423+00	8.020+03	2.416+01	1.3
$11p_{1/2}$	8.238+01	9.728+03	1.487+00	5.379+02	5.313+00	7.980+03	1.717+01	1.3
$12p_{1/2}$	6.920+01	9.715+03	1.630+00	4.009+02	5.247+00	7.979+03	1.380+01	1.7
$2p_{3/2}$	2.507+03	5.283+04	8.819+01	3.533+02	4.081+00	1.378+02	2.229+00	0.6
$3p_{3/2}$	1.112+03	5.144+04	2.911+01	9.397+01	6.126+00	1.404+02	3.736−02	1.1
$4p_{3/2}$	6.244+02	3.202+04	3.806+01	2.896+01	5.828+00	1.405+02	4.453−01	0.3
$5p_{3/2}$	3.991+02	2.519+04	4.304+01	1.160+01	5.821+00	1.290+02	2.795+00	0.2
$6p_{3/2}$	2.770+02	1.986+04	5.413+00	1.250+02	5.963+00	9.970+02	1.343+01	0.4
$7p_{3/2}$	2.033+02	1.567+04	6.471+00	8.077+01	5.754+00	9.993+02	9.424+00	0.6
$8p_{3/2}$	1.556+02	1.562+04	7.548+00	5.307+01	5.587+00	1.002+03	6.902+00	1.0
$9p_{3/2}$	1.229+02	1.234+04	9.227+00	3.319+01	5.406+00	1.001+03	4.854+00	1.2
$10p_{3/2}$	9.952+01	1.231+04	1.074+01	2.171+01	5.273+00	1.001+03	3.738+00	1.6
$11p_{3/2}$	8.222+01	9.728+03	1.308+01	1.340+01	5.124+00	1.000+03	2.827+00	1.7
$12p_{3/2}$	6.908+01	9.715+03	1.299+00	6.285+02	5.247+00	9.371+03	1.699+01	1.5
$3d_{3/2}$	1.106+03	2.069+04	8.563+01	2.402+02	5.553+00	6.530+01	1.136+00	0.5
$4d_{3/2}$	6.219+02	1.609+04	2.852+01	1.571+02	8.241+00	6.710+01	1.192+00	0.6
$5d_{3/2}$	3.979+02	1.261+04	2.872+01	5.085+01	8.580+00	6.546+01	2.755+00	0.2
$6d_{3/2}$	2.762+02	9.922+03	3.042+01	2.420+01	8.577+00	6.556+01	2.938+00	0.1
$7d_{3/2}$	2.029+02	9.849+03	3.807+01	1.284+01	8.142+00	6.605+01	2.135+00	0.5
$8d_{3/2}$	1.553+02	7.774+03	6.414+00	5.414+01	8.534+00	3.549+02	8.577+00	0.6
$9d_{3/2}$	1.227+02	7.741+03	7.232+00	4.062+01	8.310+00	3.595+02	6.614+00	0.9
$10d_{3/2}$	9.936+01	6.116+03	8.610+00	2.974+01	8.042+00	3.594+02	4.766+00	1.1
$11d_{3/2}$	8.211+01	6.099+03	9.817+00	2.180+01	7.849+00	3.598+02	3.734+00	1.5
$12d_{3/2}$	6.899+01	4.821+03	1.148+01	1.583+01	7.607+00	3.720+02	2.843+00	1.6
$3d_{5/2}$	1.104+03	2.068+04	6.532+01	4.091+02	5.985+00	6.227+01	2.156+00	0.5
$4d_{5/2}$	6.209+02	1.609+04	2.902+01	1.541+02	8.312+00	6.217+01	9.814−01	0.5
$5d_{5/2}$	3.974+02	1.261+04	2.787+01	5.085+01	8.713+00	6.243+01	3.032+00	0.2
$6d_{5/2}$	2.759+02	9.922+03	2.978+01	2.427+01	8.687+00	6.250+01	3.089+00	0.2
$7d_{5/2}$	2.027+02	9.849+03	3.772+01	1.296+01	8.211+00	6.303+01	2.183+00	0.5
$8d_{5/2}$	1.552+02	7.773+03	5.098+00	6.604+01	8.608+00	4.242+02	1.085+01	0.6
$9d_{5/2}$	1.226+02	7.741+03	5.862+00	4.995+01	8.378+00	4.215+02	8.135+00	0.9
$10d_{5/2}$	9.930+01	6.116+03	6.916+00	3.801+01	8.112+00	4.240+02	5.849+00	1.2
$11d_{5/2}$	8.206+01	6.099+03	7.880+00	2.831+01	7.925+00	4.221+02	4.553+00	1.5
$12d_{5/2}$	6.895+01	4.821+03	9.512+00	2.016+01	7.676+00	4.239+02	3.329+00	1.7
$4f_{5/2}$	6.208+02	8.239+03	3.344+02	2.003+00	3.960+00	1.527+02	6.288−01	1.1
$5f_{5/2}$	3.973+02	8.016+03	1.003+02	4.922+01	8.903+00	1.710+01	1.101+00	0.1
$6f_{5/2}$	2.759+02	6.293+03	7.437+01	3.815+01	9.793+00	1.960+01	1.231+00	0.3
$7f_{5/2}$	2.027+02	4.955+03	3.178+01	4.516+01	1.113+01	3.329+01	2.305+00	0.2
$8f_{5/2}$	1.552+02	4.907+03	7.033+00	5.869+01	1.161+01	1.425+02	7.735+00	0.3
$9f_{5/2}$	1.226+02	4.874+03	7.799+00	4.327+01	1.136+01	1.438+02	6.300+00	0.6
$10f_{5/2}$	9.929+01	3.852+03	8.912+00	3.448+01	1.100+01	1.472+02	4.765+00	0.8
$11f_{5/2}$	8.205+01	3.835+03	1.008+01	2.666+01	1.072+01	1.476+02	3.760+00	1.1
$12f_{5/2}$	6.894+01	3.033+03	1.216+01	2.010+01	1.034+01	1.479+02	2.751+00	1.3
$4f_{7/2}$	6.203+02	8.238+03	3.366+02	1.954+00	3.930+00	1.553+02	6.248−01	1.1

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$5f_{7/2}$	3.971+02	8.015+03	1.003+02	4.966+01	8.885+00	1.706+01	1.081+00	0.1
$6f_{7/2}$	2.757+02	6.292+03	7.551+01	4.055+01	1.004+01	1.725+01	1.297+00	0.2
$7f_{7/2}$	2.026+02	4.954+03	4.482+01	3.589+01	1.062+01	2.734+01	1.678+00	0.3
$8f_{7/2}$	1.551+02	4.907+03	7.644+00	5.021+01	1.177+01	1.233+02	7.747+00	0.2
$9f_{7/2}$	1.225+02	4.874+03	9.404+00	3.904+01	1.132+01	1.196+02	5.304+00	0.6
$10f_{7/2}$	9.926+01	3.852+03	1.094+01	3.003+01	1.094+01	1.213+02	3.963+00	0.9
$11f_{7/2}$	8.203+01	3.835+03	1.257+01	2.264+01	1.063+01	1.214+02	3.081+00	1.2
$12f_{7/2}$	6.892+01	3.033+03	3.281+00	6.246+01	1.076+01	4.677+02	9.283+00	1.2
$5g_{7/2}$	3.971+02	4.150+03	8.121+01	1.455+02	9.223+00	1.942+01	1.191+00	0.0
$6g_{7/2}$	2.757+02	4.029+03	2.920+01	4.347+02	1.268+01	2.408+01	1.954+00	0.1
$7g_{7/2}$	2.026+02	3.167+03	2.557+01	2.090+02	1.345+01	2.574+01	2.159+00	0.1
$8g_{7/2}$	1.551+02	3.119+03	2.657+01	1.104+02	1.358+01	2.576+01	2.089+00	0.2
$9g_{7/2}$	1.225+02	3.087+03	4.872+00	8.103+01	1.447+01	1.238+02	9.187+00	0.3
$10g_{7/2}$	9.925+01	2.440+03	5.563+00	6.438+01	1.416+01	1.220+02	7.201+00	0.4
$11g_{7/2}$	8.203+01	2.423+03	6.219+00	5.208+01	1.387+01	1.211+02	5.819+00	0.7
$12g_{7/2}$	6.892+01	2.410+03	6.921+00	4.310+01	1.359+01	1.209+02	4.711+00	0.9
$5g_{9/2}$	3.969+02	4.150+03	8.316+01	1.397+02	9.260+00	1.848+01	1.208+00	0.0
$6g_{9/2}$	2.757+02	4.029+03	5.192+01	2.253+02	1.179+01	1.665+01	1.317+00	0.0
$7g_{9/2}$	2.025+02	3.167+03	4.567+01	1.391+02	1.265+01	1.707+01	1.427+00	0.1
$8g_{9/2}$	1.551+02	3.119+03	2.949+01	1.075+02	1.355+01	2.308+01	1.961+00	0.2
$9g_{9/2}$	1.225+02	3.087+03	1.135+01	7.798+01	1.423+01	5.534+01	4.222+00	0.3
$10g_{9/2}$	9.924+01	2.440+03	1.385+01	5.635+01	1.370+01	5.412+01	3.032+00	0.5
$11g_{9/2}$	8.201+01	2.423+03	2.757+00	6.197+01	1.409+01	2.587+02	1.293+01	0.6
$12g_{9/2}$	6.891+01	2.410+03	2.985+00	5.631+01	1.384+01	2.621+02	1.070+01	0.9
$6h_{9/2}$	2.757+02	2.617+03	5.888+02	8.568−03	1.637+01	3.741+00	7.597+00	0.5
$7h_{9/2}$	2.025+02	2.543+03	5.108+02	4.019−02	1.807+01	3.196+00	8.843+00	0.3
$8h_{9/2}$	1.551+02	2.004+03	3.685+02	7.764−02	1.895+01	3.839+00	1.040+01	0.4
$9h_{9/2}$	1.225+02	1.971+03	4.237+02	4.127−02	1.906+01	3.540+00	1.071+01	0.1
$10h_{9/2}$	9.924+01	1.948+03	4.325+02	2.657−02	1.909+01	3.633+00	1.073+01	0.3
$11h_{9/2}$	8.201+01	1.542+03	4.450+02	1.702−02	1.903+01	3.739+00	1.046+01	0.5
$12h_{9/2}$	6.891+01	1.529+03	2.163+03	9.418−04	1.887+01	8.454−01	1.411+01	0.4
$6h_{11/2}$	2.756+02	2.616+03	5.763+02	9.309−03	1.641+01	3.752+00	7.728+00	0.5
$7h_{11/2}$	2.025+02	2.543+03	1.052+02	1.820−02	1.819+01	1.466+01	4.474+01	0.3
$8h_{11/2}$	1.550+02	2.004+03	1.039+02	1.455−02	1.889+01	1.382+01	4.512+01	0.2
$9h_{11/2}$	1.225+02	1.971+03	1.023+02	1.023−02	1.913+01	1.412+01	4.498+01	0.2
$10h_{11/2}$	9.922+01	1.948+03	1.074+02	6.210−03	1.915+01	1.418+01	4.498+01	0.4
$11h_{11/2}$	8.200+01	1.542+03	2.869+02	1.243−03	1.896+01	5.970+00	4.556+01	0.3
$12h_{11/2}$	6.890+01	1.529+03	9.606+02	2.027−04	1.887+01	1.895+00	4.736+01	0.4
$7i_{11/2}$	2.025+02	1.663+03	7.717+01	5.276+01	1.099+01	1.904+01	7.304−01	0.6
$8i_{11/2}$	1.550+02	1.615+03	3.764+01	8.160+02	1.573+01	1.282+01	1.162+00	0.1
$9i_{11/2}$	1.225+02	1.276+03	4.159+01	4.219+02	1.585+01	1.271+01	9.794−01	0.3
$10i_{11/2}$	9.922+01	1.252+03	3.401+01	4.739+02	1.717+01	1.273+01	1.152+00	0.3
$11i_{11/2}$	8.200+01	1.235+03	4.148+00	2.231+02	1.959+01	7.608+01	6.838+00	0.3
$12i_{11/2}$	6.890+01	1.222+03	4.226+00	1.409+02	1.970+01	7.607+01	6.907+00	0.3
$7i_{13/2}$	2.025+02	1.663+03	8.353+01	3.789+01	1.075+01	1.896+01	7.154−01	0.6
$8i_{13/2}$	1.550+02	1.615+03	3.690+01	8.528+02	1.580+01	1.289+01	1.182+00	0.1
$9i_{13/2}$	1.225+02	1.276+03	4.108+01	4.353+02	1.590+01	1.273+01	9.883−01	0.3
$10i_{13/2}$	9.921+01	1.252+03	3.508+01	4.685+02	1.713+01	1.237+01	1.131+00	0.4
$11i_{13/2}$	8.199+01	1.235+03	1.627+01	4.155+02	1.874+01	2.174+01	2.053+00	0.2
$12i_{13/2}$	6.890+01	1.222+03	1.303+01	2.643+02	1.896+01	2.743+01	2.385+00	0.4
Cu^{27+}								
$1s_{1/2}$	1.108+04	6.140+04	2.083−03	4.618+04	5.911+00	9.539+05	2.069+01	0.3
$2s_{1/2}$	2.743+03	5.307+04	4.206−03	4.615+04	5.270+00	9.539+05	2.001+01	0.2
$3s_{1/2}$	1.209+03	5.154+04	1.023−02	3.195+06	4.048+00	9.539+05	1.701+01	0.2
$4s_{1/2}$	6.772+02	5.100+04	1.682−02	6.172+06	3.594+00	9.539+05	1.697+01	0.6
$5s_{1/2}$	4.322+02	5.076+04	2.371−02	5.549+06	3.356+00	9.539+05	1.708+01	1.1
$6s_{1/2}$	2.995+02	5.063+04	3.086−02	3.971+06	3.207+00	9.539+05	1.699+01	1.5
$7s_{1/2}$	2.198+02	3.997+04	4.033−02	2.485+06	3.094+00	9.539+05	1.696+01	1.7
$8s_{1/2}$	1.681+02	3.156+04	5.201−02	1.452+06	3.009+00	9.539+05	1.707+01	1.8
$9s_{1/2}$	1.327+02	2.493+04	6.739−02	8.009+05	2.941+00	9.539+05	1.729+01	1.9
$10s_{1/2}$	1.074+02	1.969+04	8.793−02	4.205+05	2.885+00	9.539+05	1.695+01	1.8
$11s_{1/2}$	8.870+01	1.555+04	1.174−01	2.066+05	2.838+00	9.539+05	1.688+01	1.7

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$12s_{1/2}$	7.450+01	1.554+04	1.405−01	1.225+05	2.806+00	9.539+05	1.685+01	1.9
$2p_{1/2}$	2.715+03	5.304+04	6.339+02	4.307+00	2.598+00	1.540+02	1.042+00	0.2
$3p_{1/2}$	1.201+03	5.153+04	3.234+01	8.640+01	6.026+00	1.514+02	2.614−02	1.4
$4p_{1/2}$	6.739+02	4.042+04	4.105+01	2.649+01	5.786+00	1.513+02	4.318−01	0.6
$5p_{1/2}$	4.305+02	3.182+04	4.302+01	1.185+01	5.787+00	1.491+02	2.798+00	0.3
$6p_{1/2}$	2.986+02	2.509+04	5.419+01	5.643+00	5.499+00	1.484+02	2.146+00	0.5
$7p_{1/2}$	2.191+02	1.980+04	7.864+00	6.081+01	5.748+00	9.159+02	8.394+00	0.6
$8p_{1/2}$	1.677+02	1.563+04	9.502+00	3.827+01	5.559+00	9.114+02	5.898+00	0.9
$9p_{1/2}$	1.324+02	1.235+04	1.169+01	2.341+01	5.376+00	9.103+02	4.193+00	1.1
$10p_{1/2}$	1.072+02	1.232+04	1.372+01	1.500+01	5.240+00	9.069+02	3.246+00	1.5
$11p_{1/2}$	8.855+01	9.735+03	1.625+01	9.533+00	5.107+00	9.064+02	2.551+00	1.6
$12p_{1/2}$	7.438+01	9.720+03	8.058−01	1.522+03	5.267+00	1.648+04	2.851+01	1.6
$2p_{3/2}$	2.685+03	5.301+04	4.177+02	1.380+01	2.742+00	1.537+02	7.891−03	0.5
$3p_{3/2}$	1.193+03	5.152+04	6.202+02	9.390−01	2.844+00	1.536+02	6.964−01	1.6
$4p_{3/2}$	6.703+02	4.042+04	1.103+02	7.044+00	5.591+00	5.458+01	1.722+00	0.3
$5p_{3/2}$	4.286+02	2.522+04	7.598+00	9.926+01	6.209+00	6.056+02	1.266+01	0.1
$6p_{3/2}$	2.975+02	2.509+04	9.040+00	6.011+01	5.980+00	6.053+02	9.379+00	0.4
$7p_{3/2}$	2.185+02	1.980+04	1.092+01	3.749+01	5.753+00	6.053+02	6.546+00	0.7
$8p_{3/2}$	1.672+02	1.563+04	1.355+01	2.273+01	5.530+00	6.032+02	4.496+00	1.1
$9p_{3/2}$	1.321+02	1.235+04	1.741+01	1.295+01	5.311+00	5.957+02	3.115+00	1.3
$10p_{3/2}$	1.069+02	1.232+04	2.744+00	2.161+02	5.414+00	3.582+03	1.273+01	1.4
$11p_{3/2}$	8.837+01	9.734+03	3.272+00	1.457+02	5.291+00	3.575+03	9.077+00	1.5
$12p_{3/2}$	7.424+01	9.720+03	3.733+00	1.017+02	5.202+00	3.570+03	7.039+00	1.6
$3d_{3/2}$	1.190+03	2.598+04	1.685+02	5.586+01	4.735+00	6.449+01	9.163−02	0.4
$4d_{3/2}$	6.689+02	1.613+04	1.407+02	2.033+01	6.782+00	2.621+01	1.045+00	0.2
$5d_{3/2}$	4.280+02	1.589+04	1.376+02	8.758+00	7.073+00	2.641+01	1.112+00	0.3
$6d_{3/2}$	2.971+02	1.251+04	1.845+01	3.466+01	8.869+00	1.043+02	4.884+00	0.2
$7d_{3/2}$	2.182+02	9.864+03	2.180+01	2.122+01	8.505+00	1.074+02	3.588+00	0.4
$8d_{3/2}$	1.670+02	9.813+03	6.507+00	5.169+01	8.577+00	3.665+02	9.203+00	0.6
$9d_{3/2}$	1.320+02	7.750+03	7.601+00	3.868+01	8.314+00	3.668+02	6.741+00	0.9
$10d_{3/2}$	1.069+02	6.124+03	9.089+00	2.835+01	8.040+00	3.671+02	4.822+00	1.1
$11d_{3/2}$	8.831+01	6.105+03	1.042+01	2.070+01	7.842+00	3.670+02	3.746+00	1.4
$12d_{3/2}$	7.420+01	6.091+03	6.604−01	8.038+02	7.992+00	5.483+03	4.393+01	1.5
$3d_{5/2}$	1.187+03	2.598+04	7.167+01	3.878+02	5.865+00	6.486+01	1.174+00	0.6
$4d_{5/2}$	6.678+02	1.613+04	2.670+01	1.618+02	8.468+00	6.787+01	1.414+00	0.4
$5d_{5/2}$	4.274+02	1.264+04	2.582+01	5.218+01	8.836+00	6.882+01	3.502+00	0.1
$6d_{5/2}$	2.968+02	1.251+04	2.759+01	2.489+01	8.814+00	6.878+01	3.571+00	0.2
$7d_{5/2}$	2.180+02	9.864+03	3.600+01	1.348+01	8.295+00	6.858+01	2.397+00	0.5
$8d_{5/2}$	1.669+02	7.785+03	3.820+00	8.877+01	8.646+00	5.980+02	1.528+01	0.6
$9d_{5/2}$	1.319+02	7.750+03	4.387+00	6.944+01	8.422+00	5.933+02	1.141+01	0.9
$10d_{5/2}$	1.068+02	6.123+03	5.217+00	5.430+01	8.163+00	5.900+02	8.048+00	1.1
$11d_{5/2}$	8.825+01	6.105+03	5.849+00	4.213+01	7.988+00	5.931+02	6.295+00	1.4
$12d_{5/2}$	7.415+01	6.091+03	6.552+00	3.246+01	7.826+00	5.953+02	4.991+00	1.7
$4f_{5/2}$	6.677+02	1.031+04	1.901+02	2.146+01	6.400+00	2.299+01	1.026+00	0.1
$5f_{5/2}$	4.273+02	8.046+03	9.634+01	5.632+01	9.117+00	1.791+01	1.160+00	0.1
$6f_{5/2}$	2.967+02	6.313+03	8.417+01	3.425+01	9.847+00	1.803+01	1.236+00	0.2
$7f_{5/2}$	2.180+02	6.235+03	4.350+01	3.576+01	1.068+01	3.016+01	1.791+00	0.3
$8f_{5/2}$	1.669+02	4.919+03	8.873+00	4.774+01	1.166+01	1.191+02	6.975+00	0.2
$9f_{5/2}$	1.318+02	4.884+03	1.038+01	3.646+01	1.127+01	1.199+02	5.107+00	0.6
$10f_{5/2}$	1.068+02	3.860+03	1.288+01	2.665+01	1.085+01	1.154+02	3.604+00	0.8
$11f_{5/2}$	8.825+01	3.841+03	8.278+00	3.077+01	1.080+01	1.899+02	4.767+00	1.0
$12f_{5/2}$	7.415+01	3.827+03	1.449+00	1.247+02	1.089+01	1.083+03	2.260+01	1.2
$4f_{7/2}$	6.671+02	1.031+04	1.457+02	5.367+01	7.472+00	1.687+01	1.387+00	0.5
$5f_{7/2}$	4.270+02	8.045+03	1.440+02	2.327+01	8.099+00	1.726+01	9.210−01	0.3
$6f_{7/2}$	2.966+02	6.313+03	7.393+01	4.214+01	1.019+01	1.822+01	1.381+00	0.2
$7f_{7/2}$	2.179+02	6.235+03	1.337+01	6.315+01	1.168+01	7.409+01	5.103+00	0.1
$8f_{7/2}$	1.668+02	4.919+03	1.426+01	3.828+01	1.159+01	7.413+01	4.620+00	0.3
$9f_{7/2}$	1.318+02	4.884+03	1.776+01	2.727+01	1.103+01	7.449+01	3.126+00	0.7
$10f_{7/2}$	1.067+02	3.860+03	9.199+00	3.320+01	1.101+01	1.528+02	4.923+00	0.8
$11f_{7/2}$	8.822+01	3.841+03	1.038+01	2.592+01	1.072+01	1.542+02	3.878+00	1.1
$12f_{7/2}$	7.413+01	3.827+03	2.476+00	7.557+01	1.085+01	6.371+02	1.339+01	1.2
$5g_{7/2}$	4.270+02	5.179+03	8.790+01	1.325+02	9.216+00	1.939+01	1.192+00	0.1
$6g_{7/2}$	2.966+02	4.050+03	1.244+02	2.760+01	9.224+00	1.702+01	7.769−01	0.5
$7g_{7/2}$	2.179+02	3.971+03	4.567+01	1.368+02	1.274+01	1.810+01	1.494+00	0.1
$8g_{7/2}$	1.668+02	3.131+03	2.734+01	1.039+02	1.362+01	2.676+01	2.166+00	0.2

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$9g_{7/2}$	1.318+02	3.096+03	8.772+00	7.608+01	1.427+01	7.733+01	5.547+00	0.3
$10g_{7/2}$	1.067+02	3.071+03	9.688+00	5.557+01	1.400+01	7.775+01	4.586+00	0.5
$11g_{7/2}$	8.822+01	2.429+03	1.113+01	4.367+01	1.358+01	7.873+01	3.519+00	0.7
$12g_{7/2}$	7.413+01	2.415+03	1.263+01	3.365+01	1.324+01	7.833+01	2.821+00	1.0
$5g_{9/2}$	4.269+02	5.179+03	8.747+01	1.348+02	9.226+00	1.933+01	1.194+00	0.0
$6g_{9/2}$	2.965+02	4.049+03	1.315+02	2.152+01	8.866+00	1.882+01	7.340−01	0.7
$7g_{9/2}$	2.178+02	3.971+03	4.603+01	1.370+02	1.274+01	1.787+01	1.487+00	0.1
$8g_{9/2}$	1.668+02	3.131+03	3.525+01	9.477+01	1.340+01	2.149+01	1.796+00	0.2
$9g_{9/2}$	1.318+02	3.096+03	1.750+01	7.222+01	1.385+01	4.225+01	2.909+00	0.4
$10g_{9/2}$	1.067+02	3.071+03	1.981+01	4.842+01	1.350+01	4.244+01	2.362+00	0.6
$11g_{9/2}$	8.820+01	2.429+03	3.528+00	5.669+01	1.403+01	2.214+02	1.079+01	0.6
$12g_{9/2}$	7.411+01	2.415+03	3.872+00	5.055+01	1.377+01	2.224+02	8.797+00	0.8
$6h_{9/2}$	2.965+02	2.637+03	7.810+02	3.152−03	1.605+01	3.465+00	7.303+00	0.2
$7h_{9/2}$	2.178+02	2.559+03	4.502+02	3.889−02	1.812+01	3.814+00	1.050+01	0.3
$8h_{9/2}$	1.668+02	2.508+03	5.633+02	2.665−02	1.862+01	3.055+00	1.072+01	0.5
$9h_{9/2}$	1.318+02	1.981+03	4.690+02	4.209−02	1.906+01	3.439+00	1.010+01	0.1
$10h_{9/2}$	1.067+02	1.956+03	4.800+02	2.778−02	1.910+01	3.512+00	1.003+01	0.3
$11h_{9/2}$	8.820+01	1.937+03	7.729+02	8.710−03	1.895+01	2.401+00	1.025+01	0.3
$12h_{9/2}$	7.411+01	1.534+03	1.941+03	1.226−03	1.886+01	1.016+00	1.305+01	0.4
$6h_{11/2}$	2.964+02	2.637+03	6.215+02	8.857−03	1.640+01	3.758+00	7.557+00	0.4
$7h_{11/2}$	2.178+02	2.559+03	5.351+02	4.167−02	1.810+01	3.240+00	8.763+00	0.3
$8h_{11/2}$	1.667+02	2.508+03	5.997+02	3.676−02	1.867+01	2.814+00	9.189+00	0.4
$9h_{11/2}$	1.317+02	1.981+03	7.421+02	2.259−02	1.889+01	2.324+00	9.325+00	0.5
$10h_{11/2}$	1.067+02	1.956+03	7.510+02	1.619−02	1.898+01	2.353+00	9.465+00	0.3
$11h_{11/2}$	8.819+01	1.937+03	8.002+02	1.025−02	1.895+01	2.317+00	9.287+00	0.2
$12h_{11/2}$	7.410+01	1.534+03	2.468+03	1.942−03	1.886+01	7.998−01	9.059+00	0.4
$7i_{11/2}$	2.178+02	1.678+03	8.289+01	4.893+01	1.100+01	1.913+01	7.352−01	0.5
$8i_{11/2}$	1.667+02	1.627+03	4.438+01	6.221+02	1.546+01	1.236+01	1.096+00	0.1
$9i_{11/2}$	1.317+02	1.592+03	3.408+01	6.967+02	1.697+01	1.332+01	1.257+00	0.1
$10i_{11/2}$	1.067+02	1.260+03	3.677+01	4.385+02	1.716+01	1.268+01	1.150+00	0.3
$11i_{11/2}$	8.819+01	1.241+03	2.633+01	3.438+02	1.780+01	1.705+01	1.382+00	0.3
$12i_{11/2}$	7.410+01	1.227+03	1.766+01	2.461+02	1.833+01	2.453+01	1.817+00	0.5
$7i_{13/2}$	2.177+02	1.678+03	8.325+01	4.827+01	1.099+01	1.901+01	7.363−01	0.5
$8i_{13/2}$	1.667+02	1.627+03	5.372+01	3.823+02	1.479+01	1.170+01	9.592−01	0.1
$9i_{13/2}$	1.317+02	1.592+03	3.692+01	6.460+02	1.682+01	1.256+01	1.200+00	0.1
$10i_{13/2}$	1.067+02	1.260+03	3.114+01	4.135+02	1.700+01	1.603+01	1.186+00	0.4
$11i_{13/2}$	8.818+01	1.241+03	1.892+01	3.858+02	1.858+01	2.069+01	1.898+00	0.2
$12i_{13/2}$	7.410+01	1.227+03	3.643+00	1.162+02	1.973+01	9.476+01	8.457+00	0.3
Cu^{28+}								
$1s_{1/2}$	1.157+04	6.190+04	4.699−03	1.310+08	4.359+00	9.539+05	2.054+01	0.1
$2s_{1/2}$	2.902+03	5.323+04	4.327−03	6.716+04	5.210+00	9.539+05	2.626+01	0.1
$3s_{1/2}$	1.286+03	5.161+04	1.046−02	3.908+06	4.017+00	9.539+05	2.465+01	0.2
$4s_{1/2}$	7.218+02	5.105+04	1.717−02	7.264+06	3.570+00	9.539+05	2.490+01	0.6
$5s_{1/2}$	4.612+02	5.079+04	2.415−02	6.430+06	3.335+00	9.539+05	2.501+01	1.1
$6s_{1/2}$	3.200+02	5.065+04	3.137−02	4.567+06	3.189+00	9.539+05	2.484+01	1.5
$7s_{1/2}$	2.349+02	3.998+04	4.100−02	2.842+06	3.077+00	9.539+05	2.490+01	1.7
$8s_{1/2}$	1.797+02	3.157+04	5.277−02	1.656+06	2.993+00	9.539+05	2.490+01	1.8
$9s_{1/2}$	1.419+02	2.493+04	6.829−02	9.117+05	2.925+00	9.539+05	2.564+01	1.8
$10s_{1/2}$	1.149+02	1.970+04	8.887−02	4.792+05	2.870+00	9.539+05	2.622+01	1.7
$11s_{1/2}$	9.493+01	1.968+04	1.047−01	2.945+05	2.834+00	9.539+05	2.616+01	2.0
$12s_{1/2}$	7.975+01	1.554+04	1.404−01	1.415+05	2.794+00	9.539+05	2.542+01	1.8
$2p_{1/2}$	2.902+03	5.323+04	7.031+02	3.717+00	2.522+00	1.542+02	1.022+00	0.2
$3p_{1/2}$	1.286+03	5.161+04	3.749+02	2.894+00	4.127+00	4.729+01	9.396−01	0.4
$4p_{1/2}$	7.218+02	4.047+04	1.386+02	5.242+00	5.359+00	5.735+01	1.501+00	0.4
$5p_{1/2}$	4.612+02	3.185+04	1.171+01	6.248+01	6.095+00	4.729+02	8.078+00	0.3
$6p_{1/2}$	3.200+02	2.511+04	1.362+01	3.578+01	5.906+00	4.720+02	6.646+00	0.3
$7p_{1/2}$	2.349+02	1.982+04	1.649+01	2.129+01	5.684+00	4.715+02	4.787+00	0.7
$8p_{1/2}$	1.797+02	1.564+04	2.077+01	1.233+01	5.445+00	4.721+02	3.322+00	1.0
$9p_{1/2}$	1.419+02	1.561+04	2.442+01	7.671+00	5.280+00	4.723+02	2.583+00	1.4
$10p_{1/2}$	1.149+02	1.233+04	1.335+00	7.647+02	5.435+00	8.100+03	2.626+01	1.2
$11p_{1/2}$	9.493+01	1.231+04	1.497+00	5.663+02	5.347+00	8.098+03	2.000+01	1.4
$12p_{1/2}$	7.975+01	9.726+03	1.741+00	4.004+02	5.250+00	8.105+03	1.472+01	1.6
$2p_{3/2}$	2.869+03	5.320+04	8.890+02	2.020+00	2.250+00	1.539+02	9.595−01	0.1

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$3p_{3/2}$	1.276+03	5.160+04	2.440+01	1.100+02	6.369+00	1.531+02	1.405−02	0.9
$4p_{3/2}$	7.177+02	4.046+04	3.279+01	3.512+01	6.021+00	1.532+02	6.277−01	0.4
$5p_{3/2}$	4.591+02	3.185+04	3.352+01	1.583+01	6.052+00	1.525+02	3.936+00	0.2
$6p_{3/2}$	3.187+02	2.511+04	4.300+01	7.905+00	5.710+00	1.531+02	2.766+00	0.6
$7p_{3/2}$	2.341+02	1.981+04	9.931−02	6.780+04	5.791+00	6.913+04	5.408+02	1.0
$8p_{3/2}$	1.792+02	1.564+04	1.022−01	4.926+04	5.756+00	6.913+04	5.407+02	0.8
$9p_{3/2}$	1.416+02	1.561+04	9.950−02	3.640+04	5.760+00	6.913+04	5.407+02	0.9
$10p_{3/2}$	1.146+02	1.233+04	1.397−01	4.014+04	5.463+00	6.991+04	2.462+02	1.3
$11p_{3/2}$	9.474+01	9.741+03	1.642−01	3.242+04	5.349+00	6.981+04	1.693+02	1.4
$12p_{3/2}$	7.960+01	9.726+03	1.833−01	2.579+04	5.273+00	6.984+04	1.292+02	1.4
$3d_{3/2}$	1.276+03	2.607+04	1.916+02	4.524+01	4.651+00	6.449+01	6.326−02	0.4
$4d_{3/2}$	7.177+02	2.030+04	1.630+02	1.663+01	6.731+00	2.453+01	1.072+00	0.3
$5d_{3/2}$	4.591+02	1.592+04	1.107+02	1.285+01	7.745+00	2.563+01	1.410+00	0.3
$6d_{3/2}$	3.187+02	1.253+04	2.380+01	2.887+01	8.760+00	9.012+01	3.988+00	0.2
$7d_{3/2}$	2.341+02	9.880+03	2.881+01	1.637+01	8.422+00	8.962+01	3.016+00	0.4
$8d_{3/2}$	1.792+02	9.825+03	4.138+00	8.273+01	8.631+00	6.043+02	1.503+01	0.6
$9d_{3/2}$	1.416+02	7.760+03	4.756+00	6.609+01	8.386+00	6.092+02	1.110+01	0.8
$10d_{3/2}$	1.146+02	7.733+03	5.347+00	5.192+01	8.192+00	6.120+02	8.539+00	1.1
$11d_{3/2}$	9.474+01	6.111+03	6.359+00	3.941+01	7.957+00	6.086+02	6.123+00	1.3
$12d_{3/2}$	7.960+01	6.096+03	7.114+00	3.007+01	7.805+00	6.079+02	4.902+00	1.6
$3d_{5/2}$	1.273+03	2.607+04	1.380+02	1.015+02	5.311+00	4.918+01	5.091−01	0.3
$4d_{5/2}$	7.163+02	2.030+04	2.954+02	4.530+00	5.403+00	2.749+01	8.129−01	0.5
$5d_{5/2}$	4.585+02	1.592+04	1.088+02	1.351+01	7.794+00	2.487+01	1.419+00	0.2
$6d_{5/2}$	3.183+02	1.253+04	1.296+01	4.400+01	9.033+00	1.464+02	7.106+00	0.1
$7d_{5/2}$	2.339+02	9.880+03	1.527+01	2.782+01	8.726+00	1.468+02	5.338+00	0.4
$8d_{5/2}$	1.790+02	9.825+03	1.791+01	1.868+01	8.414+00	1.483+02	3.970+00	0.8
$9d_{5/2}$	1.414+02	7.760+03	2.226+01	1.220+01	8.039+00	1.484+02	2.792+00	1.0
$10d_{5/2}$	1.146+02	7.733+03	2.635+00	1.203+02	8.283+00	1.165+03	1.689+01	1.1
$11d_{5/2}$	9.467+01	6.111+03	3.067+00	1.000+02	8.063+00	1.168+03	1.215+01	1.3
$12d_{5/2}$	7.955+01	6.096+03	3.398+00	8.059+01	7.921+00	1.170+03	9.635+00	1.5
$4f_{5/2}$	7.163+02	1.036+04	2.024+02	2.044+01	6.418+00	2.301+01	1.031+00	0.1
$5f_{5/2}$	4.585+02	8.077+03	6.557+01	1.050+02	9.698+00	2.387+01	1.275+00	0.1
$6f_{5/2}$	3.183+02	7.937+03	5.094+01	5.919+01	1.072+01	2.511+01	1.831+00	0.1
$7f_{5/2}$	2.339+02	6.251+03	5.960+01	2.714+01	1.042+01	2.527+01	1.512+00	0.3
$8f_{5/2}$	1.790+02	6.196+03	1.728+01	3.678+01	1.132+01	7.261+01	3.810+00	0.4
$9f_{5/2}$	1.414+02	4.893+03	2.042+01	2.456+01	1.093+01	7.242+01	2.902+00	0.6
$10f_{5/2}$	1.146+02	4.866+03	1.285+00	1.232+02	1.134+01	1.063+03	3.606+01	0.7
$11f_{5/2}$	9.467+01	3.848+03	1.460+00	1.274+02	1.105+01	1.069+03	2.682+01	0.9
$12f_{5/2}$	7.955+01	3.832+03	1.605+00	1.168+02	1.086+01	1.065+03	2.164+01	1.1
$4f_{7/2}$	7.157+02	1.036+04	1.998+02	2.138+01	6.421+00	2.297+01	1.023+00	0.1
$5f_{7/2}$	4.581+02	8.076+03	1.903+02	1.103+01	7.207+00	2.178+01	7.815−01	0.6
$6f_{7/2}$	3.181+02	7.936+03	4.945+01	6.135+01	1.075+01	2.548+01	1.849+00	0.1
$7f_{7/2}$	2.337+02	6.250+03	6.063+01	2.663+01	1.032+01	2.564+01	1.458+00	0.4
$8f_{7/2}$	1.789+02	6.196+03	1.406+01	3.817+01	1.154+01	8.250+01	4.852+00	0.3
$9f_{7/2}$	1.414+02	4.893+03	1.755+01	2.673+01	1.106+01	8.049+01	3.348+00	0.6
$10f_{7/2}$	1.145+02	4.866+03	3.412+00	5.954+01	1.129+01	4.022+02	1.394+01	0.7
$11f_{7/2}$	9.464+01	3.848+03	3.942+00	5.443+01	1.097+01	4.029+02	1.024+01	0.9
$12f_{7/2}$	7.952+01	3.832+03	4.346+00	4.667+01	1.076+01	4.046+02	8.223+00	1.2
$5g_{7/2}$	4.581+02	5.210+03	9.391+01	1.243+02	9.237+00	1.939+01	1.211+00	0.1
$6g_{7/2}$	3.181+02	5.070+03	1.412+02	2.042+01	8.912+00	1.841+01	7.386−01	0.7
$7g_{7/2}$	2.337+02	3.987+03	6.231+01	9.480+01	1.221+01	1.623+01	1.245+00	0.2
$8g_{7/2}$	1.789+02	3.932+03	3.657+01	8.876+01	1.342+01	2.227+01	1.840+00	0.2
$9g_{7/2}$	1.414+02	3.105+03	1.045+01	6.930+01	1.426+01	6.972+01	5.110+00	0.2
$10g_{7/2}$	1.145+02	3.079+03	1.158+01	5.166+01	1.391+01	7.164+01	4.093+00	0.5
$11g_{7/2}$	9.464+01	3.059+03	1.302+01	3.921+01	1.357+01	7.180+01	3.287+00	0.8
$12g_{7/2}$	7.952+01	2.420+03	1.555+01	2.979+01	1.309+01	7.156+01	2.452+00	1.0
$5g_{9/2}$	4.579+02	5.210+03	9.362+01	1.258+02	9.231+00	1.940+01	1.201+00	0.0
$6g_{9/2}$	3.180+02	5.070+03	5.602+01	2.088+02	1.181+01	1.792+01	1.329+00	0.1
$7g_{9/2}$	2.337+02	3.987+03	5.540+01	1.114+02	1.248+01	1.700+01	1.357+00	0.1
$8g_{9/2}$	1.789+02	3.932+03	1.332+01	1.107+02	1.423+01	5.203+01	4.273+00	0.1
$9g_{9/2}$	1.413+02	3.105+03	1.351+01	6.574+01	1.429+01	5.287+01	4.210+00	0.2
$10g_{9/2}$	1.145+02	3.078+03	1.592+01	4.884+01	1.371+01	5.434+01	3.041+00	0.5
$11g_{9/2}$	9.462+01	3.059+03	8.566+00	4.307+01	1.383+01	1.022+02	4.930+00	0.7
$12g_{9/2}$	7.950+01	2.420+03	1.075+01	3.469+01	1.336+01	9.594+01	3.466+00	0.9
$6h_{9/2}$	3.180+02	3.282+03	8.246+02	3.127−03	1.607+01	3.504+00	7.288+00	0.3

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$7h_{9/2}$	2.337+02	2.575+03	8.738+02	4.820−02	1.803+01	2.218+00	5.305+00	0.3
$8h_{9/2}$	1.789+02	2.520+03	9.529+02	3.343−02	1.854+01	2.003+00	6.489+00	0.5
$9h_{9/2}$	1.413+02	2.482+03	9.164+02	3.545−02	1.891+01	2.012+00	6.777+00	0.5
$10h_{9/2}$	1.145+02	1.963+03	9.617+02	2.189−02	1.897+01	1.987+00	7.080+00	0.3
$11h_{9/2}$	9.462+01	1.943+03	8.703+02	1.821−02	1.898+01	2.276+00	6.773+00	0.2
$12h_{9/2}$	7.950+01	1.928+03	2.301+03	2.105−03	1.885+01	9.258−01	8.950+00	0.4
$6h_{11/2}$	3.179+02	3.282+03	7.553+02	2.746−03	1.603+01	3.865+00	8.471+00	0.2
$7h_{11/2}$	2.336+02	2.575+03	5.229+02	4.156−02	1.814+01	3.509+00	9.334+00	0.3
$8h_{11/2}$	1.789+02	2.520+03	4.831+02	5.257−02	1.885+01	3.505+00	1.014+01	0.3
$9h_{11/2}$	1.413+02	2.482+03	5.131+02	3.553−02	1.904+01	3.393+00	1.035+01	0.2
$10h_{11/2}$	1.145+02	1.963+03	5.370+02	2.328−02	1.907+01	3.401+00	1.014+01	0.1
$11h_{11/2}$	9.460+01	1.943+03	8.408+02	6.978−03	1.895+01	2.371+00	1.093+01	0.3
$12h_{11/2}$	7.949+01	1.928+03	2.134+03	1.537−03	1.886+01	9.934−01	1.103+01	0.4
$7i_{11/2}$	2.336+02	2.082+03	8.838+01	4.696+01	1.101+01	1.912+01	7.313−01	0.6
$8i_{11/2}$	1.789+02	1.639+03	4.727+01	5.690+02	1.540+01	1.265+01	1.084+00	0.1
$9i_{11/2}$	1.413+02	1.601+03	3.901+01	5.950+02	1.680+01	1.288+01	1.201+00	0.1
$10i_{11/2}$	1.145+02	1.575+03	2.575+01	5.774+02	1.835+01	1.588+01	1.699+00	0.2
$11i_{11/2}$	9.460+01	1.248+03	2.770+01	2.957+02	1.756+01	1.846+01	1.343+00	0.4
$12i_{11/2}$	7.949+01	1.233+03	1.363+01	2.186+02	1.891+01	3.082+01	2.534+00	0.3
$7i_{13/2}$	2.336+02	2.082+03	8.796+01	4.793+01	1.102+01	1.909+01	7.315−01	0.6
$8i_{13/2}$	1.788+02	1.639+03	4.443+01	6.560+02	1.561+01	1.290+01	1.134+00	0.1
$9i_{13/2}$	1.413+02	1.601+03	5.002+01	3.253+02	1.565+01	1.273+01	9.431−01	0.3
$10i_{13/2}$	1.145+02	1.575+03	3.875+01	4.266+02	1.726+01	1.264+01	1.174+00	0.3
$11i_{13/2}$	9.460+01	1.248+03	2.769+01	2.976+02	1.758+01	1.839+01	1.347+00	0.4
$12i_{13/2}$	7.949+01	1.233+03	6.246+00	1.499+02	1.947+01	6.189+01	5.256+00	0.3
Mo^{5+}								
$5s_{1/2}$	5.297+01	3.144+04	3.250+00	7.456+00	4.286+00	6.001+03	0.000+00	1.2
$6s_{1/2}$	2.951+01	1.961+04	1.225+00	2.731+01	3.914+00	3.758+04	0.000+00	2.7
$7s_{1/2}$	1.893+01	1.548+04	3.026−01	2.053+02	3.739+00	2.945+05	0.000+00	4.1
$8s_{1/2}$	1.319+01	1.223+04	1.135−01	9.228+02	3.610+00	1.725+06	0.000+00	4.9
$9s_{1/2}$	9.726+00	9.656+03	5.267−02	3.075+03	3.513+00	1.083+07	0.000+00	5.3
$10s_{1/2}$	7.467+00	7.626+03	1.751−01	3.267+02	3.438+00	1.083+07	0.000+00	5.3
$11s_{1/2}$	5.914+00	6.023+03	1.654−01	2.861+02	3.410+00	1.083+07	0.000+00	5.9
$12s_{1/2}$	4.800+00	6.022+03	1.470−01	2.827+02	3.389+00	1.083+07	0.000+00	7.1
$5p_{1/2}$	4.534+01	1.963+04	3.555+01	2.188−01	7.798+00	1.215+02	1.477+00	0.5
$6p_{1/2}$	2.621+01	1.224+04	2.044+01	1.150−01	7.906+00	2.045+02	2.613+00	0.5
$7p_{1/2}$	1.719+01	9.663+03	1.289+01	7.385−02	7.923+00	3.283+02	4.136+00	0.8
$8p_{1/2}$	1.216+01	7.630+03	8.238+00	5.319−02	7.940+00	5.177+02	6.483+00	0.9
$9p_{1/2}$	9.067+00	6.026+03	4.990+00	4.297−02	7.946+00	8.677+02	1.071+01	0.9
$10p_{1/2}$	7.020+00	4.759+03	4.567+00	2.799−02	8.040+00	8.675+02	1.202+01	0.8
$11p_{1/2}$	5.597+00	4.757+03	4.330+00	1.949−02	8.093+00	8.683+02	1.287+01	1.1
$12p_{1/2}$	4.567+00	3.758+03	4.177+00	1.411−02	8.131+00	8.684+02	1.348+01	1.3
$5p_{3/2}$	4.475+01	1.963+04	2.863+01	2.826−01	7.803+00	1.354+02	1.645+00	0.3
$6p_{3/2}$	2.595+01	1.224+04	1.417+01	1.614−01	7.901+00	2.671+02	3.335+00	0.5
$7p_{3/2}$	1.706+01	9.663+03	7.119+00	1.193−01	7.905+00	5.434+02	6.554+00	0.8
$8p_{3/2}$	1.208+01	7.630+03	2.483+00	1.221−01	7.903+00	1.596+03	1.857+01	1.0
$9p_{3/2}$	9.015+00	6.026+03	2.130+00	6.948−02	8.068+00	1.594+03	2.271+01	1.3
$10p_{3/2}$	6.985+00	4.759+03	3.175−01	1.094−01	8.083+00	1.063+04	1.527+02	1.3
$11p_{3/2}$	5.572+00	4.757+03	2.988−01	6.912−02	8.150+00	1.063+04	1.658+02	1.8
$12p_{3/2}$	4.548+00	3.757+03	2.855−01	4.705−02	8.197+00	1.063+04	1.760+02	2.0
$4d_{3/2}$	6.816+01	1.228+04	8.710+01	7.320+00	9.643+00	1.755+01	1.945−01	3.9
$5d_{3/2}$	3.313+01	7.651+03	6.119+01	2.239+00	1.086+01	1.683+01	3.169−01	3.6
$6d_{3/2}$	2.061+01	4.772+03	5.263+01	1.073+00	1.113+01	1.803+01	3.877−01	2.6
$7d_{3/2}$	1.413+01	3.767+03	4.817+01	5.746−01	1.119+01	1.959+01	4.331−01	2.0
$8d_{3/2}$	1.031+01	3.763+03	4.545+01	3.338−01	1.118+01	2.125+01	4.648−01	1.8
$9d_{3/2}$	7.851+00	2.972+03	4.369+01	2.146−01	1.117+01	2.230+01	4.867−01	1.3
$10d_{3/2}$	6.182+00	2.347+03	4.245+01	1.448−01	1.116+01	2.331+01	5.034−01	1.0
$11d_{3/2}$	4.994+00	2.346+03	4.158+01	1.026−01	1.114+01	2.405+01	5.157−01	0.9
$12d_{3/2}$	4.119+00	2.345+03	4.085+01	7.396−02	1.112+01	2.505+01	5.271−01	1.0
$4d_{5/2}$	6.783+01	1.228+04	8.573+01	7.564+00	9.640+00	1.741+01	1.944−01	3.6
$5d_{5/2}$	3.303+01	7.651+03	5.998+01	2.305+00	1.085+01	1.690+01	3.217−01	3.4
$6d_{5/2}$	2.057+01	4.772+03	5.144+01	1.099+00	1.112+01	1.822+01	3.965−01	2.5
$7d_{5/2}$	1.411+01	3.767+03	4.702+01	5.885−01	1.118+01	1.983+01	4.446−01	1.9

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$8d_{5/2}$	1.029+01	3.763+03	4.433+01	3.434−01	1.117+01	2.146+01	4.785−01	1.7
$9d_{5/2}$	7.841+00	2.972+03	4.256+01	2.201−01	1.116+01	2.260+01	5.018−01	1.3
$10d_{5/2}$	6.174+00	2.347+03	4.136+01	1.500−01	1.116+01	2.345+01	5.187−01	1.0
$11d_{5/2}$	4.989+00	2.346+03	4.041+01	1.039−01	1.112+01	2.467+01	5.340−01	1.0
$12d_{5/2}$	4.115+00	2.345+03	3.971+01	7.527−02	1.110+01	2.562+01	5.453−01	1.0
$4f_{5/2}$	3.350+01	1.494+03	4.260+02	1.839−06	1.230+01	1.968+01	6.227+01	2.8
$5f_{5/2}$	2.148+01	1.175+03	5.715+00	6.356−04	1.340+01	5.466+02	3.158+02	0.8
$6f_{5/2}$	1.478+01	1.168+03	3.840+00	5.884−04	1.392+01	5.464+02	3.155+02	2.5
$7f_{5/2}$	1.076+01	9.215+02	3.112+00	5.212−04	1.418+01	5.553+02	2.937+02	3.4
$8f_{5/2}$	8.173+00	9.190+02	2.898+00	3.629−04	1.428+01	5.554+02	2.938+02	3.9
$9f_{5/2}$	6.415+00	9.172+02	2.958+00	2.387−04	1.428+01	5.554+02	2.941+02	3.8
$10f_{5/2}$	5.168+00	7.245+02	2.751+00	2.163−04	1.430+01	5.829+02	2.754+02	3.5
$11f_{5/2}$	4.252+00	7.236+02	2.807+00	1.562−04	1.429+01	5.831+02	2.753+02	3.1
$12f_{5/2}$	3.559+00	7.229+02	3.280+00	1.323−04	1.424+01	5.346+02	2.346+02	2.7
$4f_{7/2}$	3.351+01	1.494+03	4.387+02	1.772−06	1.231+01	1.896+01	6.149+01	2.8
$5f_{7/2}$	2.148+01	1.175+03	1.091+01	7.374−04	1.340+01	2.840+02	1.640+02	0.8
$6f_{7/2}$	1.478+01	1.168+03	7.356+00	7.970−04	1.392+01	2.844+02	1.645+02	2.6
$7f_{7/2}$	1.076+01	9.215+02	5.837+00	7.589−04	1.418+01	2.953+02	1.562+02	3.4
$8f_{7/2}$	8.173+00	9.190+02	5.372+00	5.723−04	1.429+01	2.959+02	1.541+02	4.2
$9f_{7/2}$	6.415+00	9.172+02	5.534+00	3.699−04	1.428+01	2.960+02	1.546+02	4.0
$10f_{7/2}$	5.168+00	7.245+02	5.274+00	3.357−04	1.431+01	3.027+02	1.428+02	3.6
$11f_{7/2}$	4.251+00	7.236+02	5.318+00	2.546−04	1.430+01	3.031+02	1.404+02	3.6
$12f_{7/2}$	3.558+00	7.229+02	6.383+00	2.086−04	1.424+01	2.721+02	1.182+02	2.5
$5g_{7/2}$	1.965+01	3.740+02	4.478+00	3.631+00	1.540+01	2.680+01	1.979+01	0.5
$6g_{7/2}$	1.366+01	2.935+02	2.914+00	1.312+00	1.677+01	3.494+01	3.200+01	0.5
$7g_{7/2}$	1.004+01	2.899+02	4.090+00	2.525−01	1.606+01	4.255+01	3.169+01	1.7
$8g_{7/2}$	7.685+00	2.876+02	4.565+00	1.223−01	1.607+01	4.271+01	3.111+01	1.9
$9g_{7/2}$	6.071+00	2.271+02	4.312+00	9.382−02	1.631+01	4.254+01	3.141+01	1.1
$10g_{7/2}$	4.917+00	2.259+02	4.553+00	4.861−02	1.613+01	4.654+01	3.269+01	1.0
$11g_{7/2}$	4.063+00	2.251+02	4.440+00	3.899−02	1.625+01	4.598+01	3.261+01	1.1
$12g_{7/2}$	3.413+00	2.244+02	4.572+00	2.665−02	1.619+01	4.713+01	3.274+01	1.1
$5g_{9/2}$	1.965+01	3.740+02	4.491+00	3.585+00	1.540+01	2.680+01	1.980+01	0.5
$6g_{9/2}$	1.366+01	2.935+02	2.048+00	9.533−01	1.673+01	5.024+01	4.568+01	0.4
$7g_{9/2}$	1.004+01	2.899+02	7.452−01	1.154−01	1.633+01	2.004+02	1.594+02	1.4
$8g_{9/2}$	7.685+00	2.876+02	9.125−01	5.439−02	1.614+01	2.040+02	1.518+02	1.7
$9g_{9/2}$	6.071+00	2.271+02	8.897−01	3.399−02	1.631+01	2.039+02	1.519+02	1.0
$10g_{9/2}$	4.917+00	2.259+02	1.008+00	2.135−02	1.617+01	2.040+02	1.459+02	0.9
$11g_{9/2}$	4.063+00	2.251+02	9.784−01	1.564−02	1.628+01	2.031+02	1.464+02	1.0
$12g_{9/2}$	3.413+00	2.244+02	1.036+00	1.137−02	1.622+01	2.026+02	1.427+02	0.9
$6h_{9/2}$	1.361+01	1.882+02	2.724+01	2.891−01	1.600+01	4.760+00	4.703+00	0.1
$7h_{9/2}$	9.998+00	1.479+02	1.870+01	2.528+00	1.810+01	4.278+00	6.397+00	0.1
$8h_{9/2}$	7.655+00	1.455+02	1.942+01	3.453+00	1.885+01	3.793+00	6.154+00	0.2
$9h_{9/2}$	6.048+00	1.439+02	1.967+01	2.417+00	1.902+01	3.876+00	6.204+00	0.4
$10h_{9/2}$	4.899+00	1.138+02	2.084+01	1.462+00	1.904+01	3.881+00	6.175+00	0.1
$11h_{9/2}$	4.049+00	1.129+02	2.142+01	9.439−01	1.904+01	3.944+00	6.222+00	0.1
$12h_{9/2}$	3.402+00	1.123+02	2.101+01	7.874−01	1.913+01	4.003+00	6.264+00	0.1
$6h_{11/2}$	1.361+01	1.882+02	2.722+01	2.898−01	1.600+01	4.764+00	4.702+00	0.1
$7h_{11/2}$	9.998+00	1.479+02	1.953+01	2.441+00	1.807+01	4.150+00	6.145+00	0.1
$8h_{11/2}$	7.655+00	1.455+02	1.679+01	3.496+00	1.893+01	4.248+00	7.053+00	0.1
$9h_{11/2}$	6.048+00	1.439+02	1.826+01	2.098+00	1.900+01	4.195+00	6.835+00	0.1
$10h_{11/2}$	4.899+00	1.138+02	1.881+01	1.370+00	1.906+01	4.248+00	6.868+00	0.1
$11h_{11/2}$	4.049+00	1.129+02	1.902+01	8.893−01	1.907+01	4.372+00	7.009+00	0.1
$12h_{11/2}$	3.402+00	1.123+02	1.894+01	6.588−01	1.911+01	4.464+00	7.095+00	0.1
$7i_{11/2}$	9.996+00	9.599+01	1.758+01	2.311−01	1.813+01	4.395+00	9.627+00	0.1
$8i_{11/2}$	7.653+00	9.365+01	1.620+01	2.071+00	2.012+01	3.385+00	9.438+00	0.2
$9i_{11/2}$	6.047+00	9.204+01	1.484+01	3.140+00	2.094+01	3.399+00	1.039+01	0.1
$10i_{11/2}$	4.898+00	9.089+01	1.479+01	3.224+00	2.138+01	3.319+00	1.068+01	0.1
$11i_{11/2}$	4.048+00	9.004+01	1.516+01	2.801+00	2.159+01	3.249+00	1.060+01	0.1
$12i_{11/2}$	3.402+00	8.940+01	1.485+01	2.044+00	2.170+01	3.357+00	1.122+01	0.1
$7i_{13/2}$	9.996+00	9.599+01	7.660+01	9.162−03	1.695+01	1.712+00	1.997+00	0.3
$8i_{13/2}$	7.653+00	9.365+01	4.384+01	1.693+00	1.970+01	1.478+00	3.098+00	0.3
$9i_{13/2}$	6.047+00	9.204+01	5.332+01	1.653+00	2.012+01	1.250+00	2.879+00	0.4
$10i_{13/2}$	4.898+00	9.089+01	6.616+01	2.620+00	2.041+01	1.067+00	1.791+00	0.4
$11i_{13/2}$	4.048+00	9.004+01	7.095+01	2.275+00	2.051+01	1.053+00	1.543+00	0.6
$12i_{13/2}$	3.402+00	8.940+01	5.778+01	5.626+00	2.116+01	1.076+00	2.033+00	0.6

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
Mo^{13+}								
$4s_{1/2}$	3.017+02	5.063+04	3.019+00	5.098+01	4.264+00	7.000+03	0.000+00	1.1
$5s_{1/2}$	1.670+02	5.049+04	4.096−03	2.376+06	3.802+00	1.083+07	0.000+00	3.1
$6s_{1/2}$	1.065+02	3.985+04	7.630−03	1.684+06	3.553+00	1.083+07	0.000+00	4.2
$7s_{1/2}$	7.388+01	2.487+04	1.614−02	5.997+05	3.385+00	1.083+07	0.000+00	4.1
$8s_{1/2}$	5.426+01	1.963+04	3.361−02	1.620+05	3.277+00	1.083+07	0.000+00	4.2
$9s_{1/2}$	4.154+01	1.551+04	9.220−02	2.291+04	3.193+00	1.083+07	0.000+00	4.1
$10s_{1/2}$	3.283+01	1.550+04	2.089−01	4.156+03	3.136+00	1.083+07	0.000+00	4.5
$11s_{1/2}$	2.660+01	1.224+04	3.538−01	1.255+03	3.098+00	1.083+07	0.000+00	4.0
$12s_{1/2}$	2.198+01	9.668+03	3.242−01	1.217+03	3.078+00	1.083+07	0.000+00	4.6
$4p_{1/2}$	2.724+02	4.002+04	1.626+01	2.098+00	7.874+00	2.686+02	1.858−02	1.5
$5p_{1/2}$	1.544+02	3.155+04	1.721−01	7.119+01	7.311+00	3.567+04	2.095+02	1.1
$6p_{1/2}$	9.988+01	2.489+04	2.340−01	1.139+02	6.877+00	3.563+04	1.620+02	2.1
$7p_{1/2}$	6.999+01	1.965+04	3.111−01	1.288+02	6.559+00	3.560+04	1.047+02	3.1
$8p_{1/2}$	5.179+01	1.552+04	4.136−01	1.174+02	6.309+00	3.556+04	6.572+01	3.9
$9p_{1/2}$	3.987+01	1.225+04	5.585−01	9.129+01	6.100+00	3.559+04	4.060+01	4.4
$10p_{1/2}$	3.165+01	9.678+03	7.771−01	6.130+01	5.920+00	3.559+04	2.465+01	4.8
$11p_{1/2}$	2.573+01	9.672+03	9.783−01	4.159+01	5.802+00	3.560+04	1.727+01	5.4
$12p_{1/2}$	2.133+01	7.640+03	1.406+00	2.319+01	5.666+00	3.560+04	1.058+01	5.3
$4p_{3/2}$	2.685+02	4.002+04	1.501+01	2.872+00	7.764+00	2.740+02	9.495−01	0.8
$5p_{3/2}$	1.527+02	2.495+04	2.200+00	1.138+01	7.227+00	2.596+03	1.968+01	1.4
$6p_{3/2}$	9.902+01	1.968+04	3.170+00	1.059+01	6.738+00	2.584+03	1.238+01	2.5
$7p_{3/2}$	6.949+01	1.553+04	4.467+00	7.683+00	6.378+00	2.581+03	7.459+00	3.4
$8p_{3/2}$	5.147+01	1.552+04	5.752+00	5.160+00	6.138+00	2.580+03	5.092+00	4.3
$9p_{3/2}$	3.966+01	1.225+04	8.002−03	6.125+04	6.049+00	2.257+06	2.562+03	4.5
$10p_{3/2}$	3.150+01	9.677+03	1.094−02	5.776+04	5.881+00	2.256+06	1.552+03	4.7
$11p_{3/2}$	2.562+01	9.672+03	1.052−02	5.034+04	5.865+00	2.256+06	1.552+03	4.5
$12p_{3/2}$	2.125+01	7.639+03	1.009−02	4.326+04	5.859+00	2.256+06	1.552+03	4.4
$4d_{3/2}$	2.211+02	1.243+04	5.674+01	1.201+01	9.034+00	4.252+01	1.457−03	0.5
$5d_{3/2}$	1.320+02	1.235+04	2.457+01	7.389+00	9.440+00	9.226+01	3.951−05	0.7
$6d_{3/2}$	8.806+01	9.734+03	9.400+00	6.491+00	9.561+00	2.418+02	5.152−01	0.9
$7d_{3/2}$	6.298+01	7.681+03	6.897−01	2.096+01	9.611+00	3.338+03	5.450+00	1.0
$8d_{3/2}$	4.729+01	7.665+03	7.617−01	1.846+01	9.428+00	3.338+03	1.892+01	1.3
$9d_{3/2}$	3.681+01	6.054+03	8.574−01	1.679+01	9.234+00	3.340+03	1.816+01	1.5
$10d_{3/2}$	2.947+01	6.046+03	9.468−01	1.482+01	9.079+00	3.341+03	1.630+01	1.8
$11d_{3/2}$	2.413+01	4.776+03	1.085+00	1.312+01	8.901+00	3.336+03	1.333+01	1.8
$12d_{3/2}$	2.012+01	4.772+03	1.188+00	1.129+01	8.780+00	3.334+03	1.151+01	2.4
$4d_{5/2}$	2.205+02	1.243+04	5.379+01	1.278+01	9.149+00	4.144+01	3.526−05	0.5
$5d_{5/2}$	1.317+02	9.778+03	2.297+01	7.777+00	9.498+00	9.373+01	1.316−02	0.8
$6d_{5/2}$	8.789+01	9.734+03	8.413+00	7.016+00	9.593+00	2.597+02	6.239−01	1.0
$7d_{5/2}$	6.288+01	7.681+03	1.013+01	4.863+00	9.252+00	2.586+02	2.096+00	1.5
$8d_{5/2}$	4.722+01	7.665+03	1.976+00	1.017+01	9.358+00	1.295+03	8.149+00	1.6
$9d_{5/2}$	3.677+01	6.053+03	2.263+00	8.568+00	9.141+00	1.296+03	7.386+00	1.8
$10d_{5/2}$	2.944+01	6.046+03	2.534+00	7.082+00	8.968+00	1.293+03	6.441+00	2.2
$11d_{5/2}$	2.410+01	4.776+03	2.975+00	5.793+00	8.764+00	1.287+03	5.132+00	2.3
$12d_{5/2}$	2.010+01	4.772+03	3.444+00	4.655+00	8.587+00	1.285+03	4.151+00	2.6
$4f_{5/2}$	1.736+02	3.927+03	1.808+01	7.879+00	1.868+01	1.214+01	1.943+01	0.3
$5f_{5/2}$	1.113+02	3.864+03	9.904+00	5.911−01	2.018+01	1.874+01	3.281+01	1.0
$6f_{5/2}$	7.697+01	3.041+03	3.826+00	2.050−02	1.983+01	4.934+01	7.103+01	2.0
$7f_{5/2}$	5.632+01	2.397+03	2.525+01	5.504−04	1.375+01	1.822+02	1.254+02	2.4
$8f_{5/2}$	4.297+01	2.384+03	2.514+01	3.930−04	1.382+01	1.781+02	1.203+02	2.5
$9f_{5/2}$	3.385+01	1.883+03	2.373+01	3.857−04	1.386+01	1.838+02	1.065+02	1.8
$10f_{5/2}$	2.735+01	1.876+03	2.546+01	2.425−04	1.380+01	1.838+02	1.064+02	1.6
$11f_{5/2}$	2.256+01	1.871+03	2.746+01	1.551−04	1.373+01	1.838+02	1.065+02	1.4
$12f_{5/2}$	1.892+01	1.479+03	2.975+01	1.269−04	1.368+01	1.794+02	9.535+01	0.7
$4f_{7/2}$	1.736+02	3.927+03	7.983+00	8.340−01	1.832+01	2.915+01	4.351+01	0.3
$5f_{7/2}$	1.112+02	3.864+03	8.308+00	3.217−01	2.019+01	2.219+01	3.902+01	1.0
$6f_{7/2}$	7.696+01	3.041+03	1.629+00	1.151−03	1.980+01	1.161+02	1.667+02	2.0
$7f_{7/2}$	5.632+01	2.397+03	2.487+01	5.682−04	1.376+01	1.822+02	1.254+02	2.4
$8f_{7/2}$	4.297+01	2.384+03	2.457+01	3.734−04	1.382+01	1.821+02	1.258+02	2.4
$9f_{7/2}$	3.385+01	1.883+03	3.413+01	4.480−04	1.385+01	1.273+02	7.432+01	1.8
$10f_{7/2}$	2.735+01	1.876+03	3.665+01	2.763−04	1.379+01	1.274+02	7.455+01	1.6
$11f_{7/2}$	2.255+01	1.871+03	3.951+01	1.730−04	1.373+01	1.272+02	7.500+01	1.4
$12f_{7/2}$	1.892+01	1.479+03	4.115+01	1.383−04	1.368+01	1.294+02	6.983+01	0.7

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$5g_{7/2}$	1.069+02	1.567+03	1.286−01	3.168−02	1.642+01	3.137+03	3.906+03	0.6
$6g_{7/2}$	7.425+01	1.227+03	1.589−01	2.354−03	1.689+01	3.138+03	3.906+03	1.0
$7g_{7/2}$	5.456+01	1.208+03	2.609−01	2.154−03	1.634+01	2.928+03	3.171+03	0.7
$8g_{7/2}$	4.177+01	9.525+02	2.650−01	8.565−04	1.652+01	2.928+03	3.171+03	0.5
$9g_{7/2}$	3.300+01	9.438+02	2.999−01	5.366−04	1.641+01	2.928+03	3.171+03	0.9
$10g_{7/2}$	2.673+01	9.375+02	3.361−01	3.748−04	1.628+01	2.928+03	3.171+03	1.2
$11g_{7/2}$	2.209+01	7.414+02	3.672−01	2.747−04	1.617+01	2.928+03	3.171+03	1.0
$12g_{7/2}$	1.856+01	7.379+02	3.964−01	2.073−04	1.608+01	2.928+03	3.172+03	1.0
$5g_{9/2}$	1.069+02	1.567+03	1.663+00	1.844−01	1.659+01	2.288+02	2.949+02	0.6
$6g_{9/2}$	7.425+01	1.227+03	2.034+00	2.550−02	1.707+01	2.289+02	2.947+02	1.1
$7g_{9/2}$	5.456+01	1.208+03	2.851+00	1.059−02	1.633+01	2.695+02	2.915+02	0.7
$8g_{9/2}$	4.177+01	9.525+02	2.898+00	5.235−03	1.651+01	2.696+02	2.914+02	0.5
$9g_{9/2}$	3.300+01	9.438+02	3.154+00	3.173−03	1.643+01	2.730+02	2.839+02	0.4
$10g_{9/2}$	2.673+01	9.375+02	3.502+00	1.932−03	1.632+01	2.732+02	2.834+02	0.5
$11g_{9/2}$	2.209+01	7.414+02	3.615+00	1.337−03	1.622+01	2.864+02	2.859+02	0.3
$12g_{9/2}$	1.856+01	7.379+02	3.940+00	8.982−04	1.612+01	2.864+02	2.860+02	0.5
$6h_{9/2}$	7.409+01	7.934+02	1.510+02	2.952−02	1.593+01	4.740+00	5.970+00	0.1
$7h_{9/2}$	5.444+01	6.225+02	1.101+02	3.664−01	1.816+01	3.866+00	7.104+00	0.2
$8h_{9/2}$	4.168+01	6.098+02	1.313+02	5.011−01	1.881+01	3.095+00	5.929+00	0.2
$9h_{9/2}$	3.293+01	6.010+02	1.343+02	3.573−01	1.900+01	3.112+00	6.050+00	0.2
$10h_{9/2}$	2.667+01	4.754+02	1.545+02	1.904−01	1.897+01	2.917+00	5.923+00	0.3
$11h_{9/2}$	2.204+01	4.707+02	1.353+02	1.464−01	1.902+01	3.383+00	6.269+00	0.3
$12h_{9/2}$	1.852+01	4.672+02	1.576+02	4.802−02	1.884+01	3.215+00	7.313+00	0.5
$6h_{11/2}$	7.409+01	7.934+02	1.740+02	3.263−02	1.601+01	4.020+00	4.975+00	0.2
$7h_{11/2}$	5.443+01	6.225+02	1.196+02	3.722−01	1.814+01	3.594+00	6.521+00	0.2
$8h_{11/2}$	4.168+01	6.098+02	1.233+02	4.625−01	1.880+01	3.292+00	6.398+00	0.2
$9h_{11/2}$	3.293+01	6.010+02	1.325+02	2.933−01	1.895+01	3.216+00	6.427+00	0.2
$10h_{11/2}$	2.667+01	4.754+02	1.376+02	1.566−01	1.898+01	3.252+00	7.018+00	0.5
$11h_{11/2}$	2.204+01	4.707+02	1.213+02	1.025−01	1.898+01	3.818+00	7.705+00	0.2
$12h_{11/2}$	1.852+01	4.672+02	1.567+02	4.715−02	1.884+01	3.235+00	7.396+00	0.5
$7i_{11/2}$	5.443+01	5.031+02	1.314+02	4.111−02	1.824+01	3.140+00	7.048+00	0.1
$8i_{11/2}$	4.167+01	3.960+02	1.344+02	6.760−01	2.025+01	2.179+00	5.638+00	0.2
$9i_{11/2}$	3.293+01	3.873+02	1.268+02	1.320+00	2.109+01	2.112+00	5.979+00	0.2
$10i_{11/2}$	2.667+01	3.810+02	1.162+02	1.596+00	2.150+01	2.244+00	6.109+00	0.5
$11i_{11/2}$	2.204+01	3.764+02	1.393+02	7.284−01	2.147+01	2.011+00	6.529+00	0.1
$12i_{11/2}$	1.852+01	2.984+02	1.355+02	5.301−01	2.149+01	2.142+00	6.531+00	0.3
$7i_{13/2}$	5.443+01	5.031+02	8.609+01	5.167−02	1.830+01	4.637+00	1.105+01	0.1
$8i_{13/2}$	4.167+01	3.960+02	2.843+01	2.884−01	2.045+01	9.487+00	2.883+01	0.1
$9i_{13/2}$	3.293+01	3.873+02	2.446+01	4.112−01	2.142+01	9.730+00	2.877+01	0.6
$10i_{13/2}$	2.667+01	3.810+02	2.632+01	1.678−01	2.152+01	9.700+00	3.415+01	0.1
$11i_{13/2}$	2.204+01	3.764+02	2.654+01	1.165−01	2.162+01	9.929+00	3.417+01	0.3
$12i_{13/2}$	1.852+01	2.984+02	2.766+01	7.409−02	2.158+01	1.007+01	3.414+01	0.5
Mo^{23+}								
$4s_{1/2}$	6.462+02	5.097+04	4.602−01	3.219+03	4.020+00	5.389+04	1.787+02	0.4
$5s_{1/2}$	3.881+02	5.071+04	7.445−01	2.222+03	3.682+00	5.399+04	1.040+02	1.0
$6s_{1/2}$	2.592+02	5.059+04	1.098+00	1.218+03	3.472+00	5.404+04	5.267+01	1.7
$7s_{1/2}$	1.855+02	5.051+04	1.520+00	6.258+02	3.332+00	5.404+04	2.914+01	2.3
$8s_{1/2}$	1.392+02	3.989+04	2.313+00	2.603+02	3.207+00	5.404+04	1.477+01	2.5
$9s_{1/2}$	1.084+02	3.150+04	3.661+00	9.470+01	3.105+00	5.404+04	8.028+00	2.6
$10s_{1/2}$	8.678+01	2.488+04	5.491+00	3.639+01	3.030+00	5.404+04	5.176+00	2.5
$11s_{1/2}$	7.103+01	1.965+04	6.055+00	2.412+01	2.998+00	5.404+04	4.493+00	2.6
$12s_{1/2}$	5.922+01	1.552+04	5.644+00	2.212+01	2.985+00	5.404+04	4.386+00	3.3
$4p_{1/2}$	6.131+02	5.094+04	3.147+01	9.260+00	6.633+00	2.697+02	5.339−02	1.1
$5p_{1/2}$	3.722+02	4.012+04	4.199+01	4.395+00	6.229+00	2.689+02	2.702+00	0.5
$6p_{1/2}$	2.504+02	3.164+04	3.033+00	8.364+01	6.233+00	3.912+03	2.151+01	0.7
$7p_{1/2}$	1.801+02	2.497+04	3.726+00	6.090+01	6.001+00	3.951+03	1.499+01	1.2
$8p_{1/2}$	1.357+02	1.972+04	4.657+00	4.135+01	5.798+00	3.970+03	1.003+01	1.7
$9p_{1/2}$	1.060+02	1.969+04	5.565+00	2.780+01	5.653+00	3.965+03	7.306+00	2.2
$10p_{1/2}$	8.502+01	1.555+04	7.161+00	1.689+01	5.491+00	3.964+03	4.978+00	2.5
$11p_{1/2}$	6.973+01	1.228+04	9.253+00	9.873+00	5.347+00	3.966+03	3.545+00	2.5
$12p_{1/2}$	5.823+01	1.227+04	9.741+00	7.572+00	5.294+00	3.965+03	3.129+00	3.1
$4p_{3/2}$	6.054+02	5.093+04	2.627+01	1.219+01	6.692+00	2.707+02	1.687+00	0.6
$5p_{3/2}$	3.685+02	4.012+04	3.524+01	5.742+00	6.311+00	2.618+02	3.334+00	0.5
$6p_{3/2}$	2.484+02	3.164+04	1.075+01	1.788+01	6.176+00	9.913+02	7.472+00	1.0

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$7p_{3/2}$	1.788+02	2.497+04	1.401+01	1.106+01	5.884+00	9.956+02	4.858+00	1.6
$8p_{3/2}$	1.349+02	1.972+04	1.862+01	6.349+00	5.624+00	9.949+02	3.213+00	2.1
$9p_{3/2}$	1.054+02	1.557+04	2.229+01	3.982+00	5.459+00	9.897+02	2.459+00	2.4
$10p_{3/2}$	8.463+01	1.555+04	3.370+00	6.491+01	5.511+00	7.014+03	9.440+00	2.5
$11p_{3/2}$	6.944+01	1.228+04	4.333+00	3.928+01	5.375+00	7.014+03	6.387+00	2.6
$12p_{3/2}$	5.800+01	1.227+04	5.097+00	2.606+01	5.285+00	7.012+03	4.940+00	2.9
$3d_{3/2}$	1.084+03	2.588+04	3.533+02	8.054+00	4.628+00	8.573+01	8.687−01	0.1
$4d_{3/2}$	5.554+02	2.014+04	1.186+02	1.480+01	7.495+00	4.383+01	1.053+00	0.6
$5d_{3/2}$	3.451+02	1.581+04	2.958+01	2.309+01	8.624+00	1.193+02	2.330+00	0.4
$6d_{3/2}$	2.355+02	1.245+04	3.483+01	1.152+01	8.364+00	1.198+02	2.225+00	0.5
$7d_{3/2}$	1.710+02	1.238+04	1.016+00	3.048+02	8.672+00	3.787+03	4.290+01	0.6
$8d_{3/2}$	1.298+02	9.776+03	1.153+00	2.575+02	8.476+00	3.798+03	3.360+01	0.9
$9d_{3/2}$	1.019+02	9.748+03	1.288+00	2.137+02	8.315+00	3.797+03	2.657+01	1.2
$10d_{3/2}$	8.207+01	7.700+03	1.478+00	1.783+02	8.139+00	3.800+03	1.971+01	1.4
$11d_{3/2}$	6.754+01	7.686+03	1.620+00	1.450+02	8.023+00	3.805+03	1.605+01	1.8
$12d_{3/2}$	5.655+01	6.073+03	1.895+00	1.149+02	7.863+00	3.806+03	1.173+01	1.8
$3d_{5/2}$	1.079+03	2.587+04	1.802+02	4.122+01	5.549+00	7.007+01	7.919−01	0.3
$4d_{5/2}$	5.538+02	2.013+04	5.258+01	3.739+01	8.281+00	6.740+01	2.410−01	0.7
$5d_{5/2}$	3.444+02	1.581+04	5.457+01	1.367+01	8.409+00	6.688+01	1.812+00	0.3
$6d_{5/2}$	2.351+02	1.245+04	4.624+00	6.849+01	8.881+00	7.026+02	1.151+01	0.4
$7d_{5/2}$	1.707+02	1.238+04	5.312+00	4.817+01	8.652+00	7.033+02	9.447+00	0.7
$8d_{5/2}$	1.296+02	9.776+03	6.230+00	3.516+01	8.410+00	7.005+02	7.101+00	1.1
$9d_{5/2}$	1.017+02	7.720+03	7.455+00	2.541+01	8.165+00	6.976+02	5.171+00	1.3
$10d_{5/2}$	8.198+01	7.700+03	8.531+00	1.850+01	7.983+00	6.982+02	4.067+00	1.7
$11d_{5/2}$	6.747+01	7.686+03	9.745+00	1.347+01	7.815+00	6.986+02	3.245+00	2.1
$12d_{5/2}$	5.650+01	6.073+03	1.171+01	9.339+00	7.612+00	6.983+02	2.483+00	2.2
$4f_{5/2}$	5.095+02	8.128+03	5.644+01	1.689+02	8.774+00	4.220+01	2.536+00	0.3
$5f_{5/2}$	3.245+02	7.943+03	5.667+01	5.851+01	9.392+00	4.057+01	1.508+00	0.3
$6f_{5/2}$	2.242+02	6.241+03	2.054+01	8.348+01	1.029+01	9.224+01	2.210+00	0.3
$7f_{5/2}$	1.641+02	6.181+03	2.228+01	4.268+01	1.024+01	9.256+01	2.071+00	0.5
$8f_{5/2}$	1.253+02	4.877+03	2.595+01	2.386+01	9.993+00	9.237+01	1.738+00	0.6
$9f_{5/2}$	9.875+01	4.851+03	1.081+01	3.916+01	1.035+01	2.023+02	3.071+00	0.6
$10f_{5/2}$	7.983+01	3.833+03	1.232+01	2.692+01	1.012+01	2.030+02	2.508+00	0.7
$11f_{5/2}$	6.587+01	3.819+03	1.141+00	2.901+02	1.046+01	1.963+03	1.898+01	0.6
$12f_{5/2}$	5.527+01	3.019+03	1.249+00	2.452+02	1.032+01	1.963+03	1.544+01	0.7
$4f_{7/2}$	5.091+02	8.127+03	5.550+01	1.765+02	8.783+00	4.220+01	2.542+00	0.3
$5f_{7/2}$	3.242+02	7.942+03	4.555+01	7.839+01	9.666+00	4.519+01	1.755+00	0.3
$6f_{7/2}$	2.241+02	6.241+03	4.390+01	3.794+01	9.777+00	5.062+01	1.496+00	0.5
$7f_{7/2}$	1.640+02	6.181+03	9.658+00	9.297+01	1.058+01	1.889+02	3.556+00	0.4
$8f_{7/2}$	1.252+02	4.877+03	1.055+01	5.597+01	1.047+01	1.891+02	3.299+00	0.5
$9f_{7/2}$	9.871+01	4.851+03	1.150+01	3.693+01	1.034+01	1.892+02	2.942+00	0.7
$10f_{7/2}$	7.980+01	3.833+03	1.322+01	2.513+01	1.009+01	1.895+02	2.381+00	0.8
$11f_{7/2}$	6.585+01	3.819+03	4.533+00	6.082+01	1.032+01	5.172+02	5.334+00	0.8
$12f_{7/2}$	5.526+01	3.019+03	5.080+00	4.697+01	1.014+01	5.172+02	4.318+00	0.9
$5g_{7/2}$	3.147+02	4.068+03	5.979+02	9.197−05	1.278+01	1.747+01	1.967+01	0.6
$6g_{7/2}$	2.188+02	3.972+03	1.603+02	2.727−03	1.497+01	2.485+01	3.566+01	1.2
$7g_{7/2}$	1.607+02	3.125+03	1.206+02	5.078−03	1.600+01	2.352+01	3.433+01	1.0
$8g_{7/2}$	1.230+02	3.087+03	1.209+02	3.510−03	1.626+01	2.284+01	3.412+01	1.0
$9g_{7/2}$	9.719+01	2.438+03	1.165+02	2.732−03	1.635+01	2.379+01	3.290+01	0.5
$10g_{7/2}$	7.870+01	2.420+03	1.239+02	1.633−03	1.630+01	2.386+01	3.287+01	0.4
$11g_{7/2}$	6.502+01	1.914+03	1.342+02	9.298−04	1.621+01	2.382+01	3.334+01	0.2
$12g_{7/2}$	5.462+01	1.903+03	1.604+02	4.652−04	1.611+01	2.160+01	3.396+01	0.4
$5g_{9/2}$	3.147+02	4.068+03	1.902+03	2.792−05	1.272+01	5.913+00	5.460+00	0.6
$6g_{9/2}$	2.187+02	3.972+03	6.759+02	2.315−03	1.488+01	6.313+00	8.331+00	1.3
$7g_{9/2}$	1.607+02	3.125+03	2.567+02	7.081−03	1.597+01	1.128+01	1.611+01	1.0
$8g_{9/2}$	1.230+02	3.087+03	2.563+02	5.472−03	1.623+01	1.095+01	1.601+01	1.0
$9g_{9/2}$	9.717+01	2.438+03	2.403+02	4.434−03	1.634+01	1.168+01	1.576+01	0.6
$10g_{9/2}$	7.869+01	2.420+03	2.563+02	2.596−03	1.628+01	1.169+01	1.572+01	0.5
$11g_{9/2}$	6.501+01	1.914+03	2.774+02	1.408−03	1.620+01	1.166+01	1.612+01	0.3
$12g_{9/2}$	5.462+01	1.903+03	3.412+02	7.464−04	1.610+01	1.024+01	1.540+01	0.4
$6h_{9/2}$	2.178+02	2.067+03	4.187+02	3.827−03	1.545+01	6.533+00	7.166+00	0.4
$7h_{9/2}$	1.601+02	2.009+03	2.893+02	7.554−02	1.790+01	4.860+00	8.040+00	0.5
$8h_{9/2}$	1.225+02	1.583+03	2.818+02	9.001−02	1.861+01	4.607+00	8.343+00	0.3
$9h_{9/2}$	9.683+01	1.557+03	2.628+02	9.136−02	1.897+01	4.761+00	8.390+00	0.3

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$10h_{9/2}$	7.843+01	1.539+03	2.803+02	4.728−02	1.894+01	4.814+00	8.696+00	0.1
$11h_{9/2}$	6.482+01	1.218+03	2.927+02	2.805−02	1.888+01	4.922+00	8.675+00	0.2
$12h_{9/2}$	5.446+01	1.208+03	4.218+02	1.405−02	1.873+01	3.763+00	7.474+00	0.4
$6h_{11/2}$	2.178+02	2.067+03	4.983+02	5.865−03	1.567+01	5.000+00	5.278+00	0.4
$7h_{11/2}$	1.600+02	2.009+03	3.133+02	7.561−02	1.788+01	4.528+00	7.430+00	0.5
$8h_{11/2}$	1.225+02	1.583+03	2.781+02	1.270−01	1.874+01	4.446+00	7.803+00	0.3
$9h_{11/2}$	9.682+01	1.557+03	2.897+02	8.802−02	1.893+01	4.402+00	7.827+00	0.2
$10h_{11/2}$	7.842+01	1.539+03	3.208+02	5.282−02	1.892+01	4.242+00	7.545+00	0.2
$11h_{11/2}$	6.481+01	1.218+03	3.066+02	3.046−02	1.889+01	4.686+00	8.164+00	0.2
$12h_{11/2}$	5.446+01	1.208+03	4.938+02	1.611−02	1.872+01	3.244+00	6.259+00	0.4
$7i_{11/2}$	1.600+02	1.313+03	4.787+02	3.904−03	1.774+01	3.084+00	6.683+00	0.7
$8i_{11/2}$	1.225+02	1.276+03	3.012+02	2.590−01	2.029+01	2.826+00	6.640+00	0.2
$9i_{11/2}$	9.678+01	1.008+03	2.336+02	7.053−01	2.127+01	3.174+00	6.983+00	0.9
$10i_{11/2}$	7.839+01	9.892+02	3.268+02	4.498−01	2.139+01	2.439+00	6.143+00	0.1
$11i_{11/2}$	6.479+01	9.756+02	3.625+02	2.654−01	2.142+01	2.324+00	6.243+00	0.1
$12i_{11/2}$	5.444+01	9.652+02	3.651+02	1.112−01	2.137+01	2.435+00	7.704+00	0.2
$7i_{13/2}$	1.600+02	1.313+03	3.399+02	2.307−02	1.827+01	3.554+00	6.507+00	0.1
$8i_{13/2}$	1.225+02	1.276+03	2.473+02	2.445−01	2.034+01	3.373+00	8.177+00	0.2
$9i_{13/2}$	9.677+01	1.008+03	2.174+02	4.659−01	2.124+01	3.446+00	8.650+00	0.2
$10i_{13/2}$	7.839+01	9.892+02	2.340+02	3.321−01	2.146+01	3.310+00	8.764+00	0.1
$11i_{13/2}$	6.478+01	9.756+02	2.791+02	1.893−01	2.145+01	2.972+00	8.506+00	0.1
$12i_{13/2}$	5.444+01	9.652+02	2.779+02	1.356−01	2.145+01	3.106+00	8.385+00	0.3
Mo^{31+}								
$3s_{1/2}$	1.792+03	5.212+04	3.527−01	6.408+03	4.280+00	5.389+04	1.789+02	0.2
$4s_{1/2}$	9.690+02	5.130+04	6.226−01	7.416+03	3.755+00	5.389+04	1.788+02	0.5
$5s_{1/2}$	6.066+02	5.093+04	7.506−01	4.977+03	3.588+00	5.389+04	1.788+02	0.7
$6s_{1/2}$	4.152+02	5.074+04	1.283+00	2.584+03	3.316+00	5.376+04	4.592+01	1.1
$7s_{1/2}$	3.019+02	5.063+04	1.627+00	1.424+03	3.210+00	5.374+04	3.105+01	1.4
$8s_{1/2}$	2.294+02	5.056+04	2.005+00	7.990+02	3.131+00	5.375+04	2.157+01	1.6
$9s_{1/2}$	1.802+02	3.993+04	2.763+00	3.708+02	3.047+00	5.374+04	1.304+01	1.6
$10s_{1/2}$	1.453+02	3.154+04	3.954+00	1.567+02	2.974+00	5.374+04	8.223+00	1.5
$11s_{1/2}$	1.196+02	2.491+04	5.853+00	6.122+01	2.908+00	5.373+04	5.463+00	1.4
$12s_{1/2}$	1.002+02	2.489+04	6.476+00	4.081+01	2.881+00	5.373+04	4.828+00	1.6
$3p_{1/2}$	1.721+03	5.205+04	3.257+01	4.008+01	6.508+00	2.699+02	2.490−02	1.0
$4p_{1/2}$	9.401+02	5.127+04	4.823+01	1.437+01	6.005+00	2.692+02	5.685−01	0.5
$5p_{1/2}$	5.921+02	5.092+04	6.029+01	6.247+00	5.747+00	2.688+02	2.373+00	0.3
$6p_{1/2}$	4.069+02	4.015+04	7.488+01	3.059+00	5.498+00	2.690+02	2.029+00	0.5
$7p_{1/2}$	2.968+02	3.169+04	6.866−01	2.596+03	5.779+00	2.473+04	9.311+01	0.4
$8p_{1/2}$	2.260+02	2.502+04	7.902−01	1.984+03	5.649+00	2.475+04	6.977+01	0.7
$9p_{1/2}$	1.778+02	2.497+04	8.837−01	1.504+03	5.552+00	2.475+04	5.458+01	1.0
$10p_{1/2}$	1.436+02	1.972+04	1.027+00	1.107+03	5.447+00	2.476+04	3.949+01	1.1
$11p_{1/2}$	1.183+02	1.558+04	1.204+00	7.908+02	5.351+00	2.477+04	2.824+01	1.2
$12p_{1/2}$	9.920+01	1.556+04	1.324+00	5.923+02	5.291+00	2.477+04	2.289+01	1.5
$3p_{3/2}$	1.694+03	5.202+04	2.616+01	5.297+01	6.626+00	2.686+02	7.429−02	0.7
$4p_{3/2}$	9.292+02	5.126+04	3.888+01	2.014+01	6.092+00	2.688+02	7.747−01	0.2
$5p_{3/2}$	5.866+02	5.091+04	4.591+01	9.166+00	5.899+00	2.676+02	3.209+00	0.3
$6p_{3/2}$	4.038+02	4.015+04	5.810+01	4.580+00	5.618+00	2.675+02	2.493+00	0.7
$7p_{3/2}$	2.948+02	3.169+04	1.663+01	1.965+01	5.684+00	9.394+02	5.455+00	0.8
$8p_{3/2}$	2.247+02	2.502+04	2.054+01	1.171+01	5.489+00	9.381+02	3.915+00	1.1
$9p_{3/2}$	1.769+02	1.976+04	2.589+01	6.751+00	5.301+00	9.357+02	2.846+00	1.3
$10p_{3/2}$	1.429+02	1.972+04	2.824+01	4.704+00	5.211+00	9.358+02	2.425+00	1.7
$11p_{3/2}$	1.178+02	1.558+04	2.658+00	2.165+02	5.317+00	9.940+03	1.372+01	1.4
$12p_{3/2}$	9.882+01	1.556+04	2.985+00	1.550+02	5.246+00	9.941+03	1.084+01	1.6
$3d_{3/2}$	1.602+03	3.299+04	3.842+02	8.013+00	4.609+00	8.578+01	1.055+00	0.3
$4d_{3/2}$	8.944+02	2.569+04	2.147+02	8.533+00	6.299+00	5.192+01	9.917−01	0.1
$5d_{3/2}$	5.696+02	2.015+04	1.641+02	5.736+00	6.940+00	5.132+01	1.152+00	0.3
$6d_{3/2}$	3.942+02	1.997+04	6.589+01	1.034+01	7.674+00	9.677+01	1.736+00	0.2
$7d_{3/2}$	2.889+02	1.575+04	7.458+01	5.549+00	7.495+00	9.688+01	1.546+00	0.4
$8d_{3/2}$	2.208+02	1.243+04	5.688+00	8.747+01	8.170+00	9.561+02	1.054+01	0.2
$9d_{3/2}$	1.742+02	1.239+04	6.249+00	6.342+01	8.040+00	9.561+02	8.726+00	0.4
$10d_{3/2}$	1.409+02	9.787+03	6.934+00	4.706+01	7.901+00	9.580+02	7.048+00	0.6
$11d_{3/2}$	1.163+02	9.762+03	7.654+00	3.534+01	7.776+00	9.576+02	5.738+00	0.9
$12d_{3/2}$	9.769+01	7.716+03	8.737+00	2.603+01	7.624+00	9.608+02	4.503+00	1.1
$3d_{5/2}$	1.596+03	3.299+04	1.511+02	7.763+01	5.613+00	8.691+01	1.344+00	0.1

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$4d_{5/2}$	8.919+02	2.568+04	6.162+01	5.790+01	7.562+00	8.824+01	9.855−01	0.5
$5d_{5/2}$	5.683+02	2.015+04	6.858+01	2.008+01	7.575+00	8.855+01	1.129+00	0.2
$6d_{5/2}$	3.935+02	1.997+04	7.526+01	9.150+00	7.521+00	8.865+01	1.524+00	0.4
$7d_{5/2}$	2.884+02	1.575+04	1.165+01	4.727+01	8.246+00	4.193+02	6.021+00	0.1
$8d_{5/2}$	2.205+02	1.243+04	1.232+01	3.086+01	8.174+00	4.189+02	5.772+00	0.2
$9d_{5/2}$	1.740+02	1.239+04	1.428+01	2.146+01	7.959+00	4.189+02	4.352+00	0.5
$10d_{5/2}$	1.408+02	9.787+03	1.646+01	1.489+01	7.767+00	4.189+02	3.413+00	0.8
$11d_{5/2}$	1.162+02	9.762+03	1.868+01	1.053+01	7.601+00	4.190+02	2.758+00	1.2
$12d_{5/2}$	9.759+01	7.716+03	2.166+01	7.326+00	7.420+00	4.187+02	2.208+00	1.4
$4f_{5/2}$	8.741+02	1.309+04	2.795+02	7.172+00	5.157+00	1.085+02	8.334−01	0.0
$5f_{5/2}$	5.595+02	1.021+04	2.985+02	2.646+00	5.522+00	1.081+02	6.201−01	0.9
$6f_{5/2}$	3.885+02	1.003+04	1.525+02	8.598+00	7.881+00	4.028+01	8.429−01	0.3
$7f_{5/2}$	2.853+02	7.904+03	8.550+01	1.386+01	9.253+00	4.099+01	1.161+00	0.3
$8f_{5/2}$	2.184+02	7.837+03	3.390+01	2.428+01	1.019+01	7.800+01	2.025+00	0.4
$9f_{5/2}$	1.725+02	6.189+03	3.714+01	1.513+01	1.004+01	7.777+01	1.818+00	0.3
$10f_{5/2}$	1.397+02	6.156+03	8.849+00	4.027+01	1.064+01	2.719+02	5.720+00	0.3
$11f_{5/2}$	1.154+02	4.867+03	9.982+00	3.076+01	1.043+01	2.704+02	4.514+00	0.5
$12f_{5/2}$	9.699+01	4.849+03	1.092+01	2.380+01	1.025+01	2.719+02	3.776+00	0.8
$4f_{7/2}$	8.731+02	1.309+04	2.149+02	1.679+01	5.674+00	8.102+01	9.060−01	0.2
$5f_{7/2}$	5.590+02	1.020+04	2.033+02	8.739+00	6.939+00	4.279+01	7.901−01	0.2
$6f_{7/2}$	3.882+02	1.003+04	1.303+02	1.225+01	8.321+00	3.684+01	9.244−01	0.3
$7f_{7/2}$	2.852+02	7.903+03	7.621+01	1.635+01	9.410+00	4.291+01	1.232+00	0.3
$8f_{7/2}$	2.183+02	7.836+03	3.073+01	2.658+01	1.030+01	8.181+01	2.196+00	0.4
$9f_{7/2}$	1.724+02	6.189+03	3.229+01	1.708+01	1.024+01	8.171+01	2.083+00	0.3
$10f_{7/2}$	1.396+02	6.156+03	1.819+01	2.157+01	1.039+01	1.437+02	2.993+00	0.4
$11f_{7/2}$	1.154+02	4.867+03	2.087+01	1.523+01	1.013+01	1.430+02	2.404+00	0.7
$12f_{7/2}$	9.695+01	4.849+03	8.324−01	3.775+02	1.059+01	3.096+03	4.386+01	0.6
$5g_{7/2}$	5.579+02	6.575+03	3.085+02	1.963−03	1.382+01	2.159+01	3.707+01	0.4
$6g_{7/2}$	3.875+02	5.139+03	1.566+02	6.078−03	1.604+01	2.231+01	5.075+01	0.3
$7g_{7/2}$	2.847+02	5.037+03	1.555+02	3.790−03	1.661+01	2.113+01	5.117+01	0.3
$8g_{7/2}$	2.179+02	3.971+03	1.639+02	2.082−03	1.670+01	2.106+01	5.107+01	0.1
$9g_{7/2}$	1.722+02	3.925+03	1.765+02	1.147−03	1.666+01	2.099+01	5.112+01	0.1
$10g_{7/2}$	1.395+02	3.892+03	2.239+02	4.610−04	1.652+01	1.837+01	5.368+01	0.3
$11g_{7/2}$	1.153+02	3.079+03	2.308+02	4.406−05	1.639+01	1.955+01	1.345+02	0.4
$12g_{7/2}$	9.685+01	3.061+03	1.131+03	4.141−06	1.630+01	4.256+00	1.234+02	0.7
$5g_{9/2}$	5.576+02	6.574+03	3.059+02	2.908−03	1.398+01	1.975+01	3.305+01	0.3
$6g_{9/2}$	3.873+02	5.139+03	1.944+02	6.736−03	1.604+01	1.796+01	4.103+01	0.3
$7g_{9/2}$	2.846+02	5.036+03	1.942+02	4.404−03	1.660+01	1.696+01	4.139+01	0.3
$8g_{9/2}$	2.179+02	3.971+03	2.017+02	2.526−03	1.671+01	1.702+01	4.132+01	0.1
$9g_{9/2}$	1.721+02	3.925+03	2.158+02	1.395−03	1.666+01	1.709+01	4.134+01	0.2
$10g_{9/2}$	1.394+02	3.892+03	2.326+02	7.829−04	1.657+01	1.713+01	4.143+01	0.4
$11g_{9/2}$	1.152+02	3.079+03	9.135+02	1.472−04	1.639+01	4.931+00	2.998+01	0.4
$12g_{9/2}$	9.682+01	3.061+03	5.750+03	3.097−05	1.630+01	8.361−01	1.500+01	0.7
$6h_{9/2}$	3.873+02	4.140+03	4.363+00	2.766−02	1.617+01	7.561+02	1.764+03	0.2
$7h_{9/2}$	2.845+02	3.249+03	3.740+00	1.636−03	1.825+01	5.663+02	1.618+03	0.2
$8h_{9/2}$	2.179+02	3.182+03	3.357+00	3.767−04	1.904+01	5.669+02	1.617+03	0.6
$9h_{9/2}$	1.721+02	2.513+03	3.495+00	1.716−04	1.920+01	5.669+02	1.617+03	0.3
$10h_{9/2}$	1.394+02	2.480+03	3.731+00	1.038−04	1.917+01	5.669+02	1.617+03	0.5
$11h_{9/2}$	1.152+02	2.456+03	4.006+00	7.158−05	1.908+01	5.670+02	1.617+03	0.7
$12h_{9/2}$	9.682+01	1.946+03	4.344+00	5.294−05	1.895+01	5.670+02	1.617+03	0.8
$6h_{11/2}$	3.872+02	4.140+03	2.050+01	1.622−02	1.624+01	1.556+02	3.525+02	0.3
$7h_{11/2}$	2.845+02	3.248+03	1.722+01	4.235−03	1.825+01	1.231+02	3.527+02	0.2
$8h_{11/2}$	2.178+02	3.182+03	1.557+01	1.755−03	1.903+01	1.226+02	3.539+02	0.5
$9h_{11/2}$	1.721+02	2.513+03	1.617+01	9.008−04	1.919+01	1.227+02	3.540+02	0.3
$10h_{11/2}$	1.394+02	2.480+03	1.724+01	5.350−04	1.917+01	1.228+02	3.540+02	0.4
$11h_{11/2}$	1.152+02	2.456+03	1.846+01	3.455−04	1.908+01	1.230+02	3.540+02	0.7
$12h_{11/2}$	9.680+01	1.946+03	2.002+01	2.309−04	1.895+01	1.230+02	3.537+02	0.8
$7i_{11/2}$	2.845+02	2.133+03	3.740+02	1.074−02	1.832+01	5.593+00	1.322+01	0.1
$8i_{11/2}$	2.178+02	2.067+03	4.070+02	1.550−01	2.049+01	3.484+00	9.083+00	0.4
$9i_{11/2}$	1.721+02	2.021+03	4.134+02	1.535−01	2.114+01	3.327+00	1.011+01	0.2
$10i_{11/2}$	1.394+02	1.988+03	4.013+02	1.573−01	2.149+01	3.395+00	9.957+00	0.4
$11i_{11/2}$	1.152+02	1.575+03	4.474+02	5.797−02	2.144+01	3.292+00	1.204+01	0.1
$12i_{11/2}$	9.680+01	1.557+03	4.499+02	3.891−02	2.143+01	3.423+00	1.206+01	0.3
$7i_{13/2}$	2.844+02	2.133+03	1.331+02	1.567−02	1.839+01	1.522+01	3.805+01	0.1

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$8i_{13/2}$	2.178+02	2.067+03	1.326+02	3.374−02	2.029+01	1.126+01	3.635+01	0.2
$9i_{13/2}$	1.721+02	2.021+03	1.165+02	4.415−02	2.125+01	1.131+01	3.633+01	0.2
$10i_{13/2}$	1.394+02	1.988+03	1.135+02	3.429−02	2.157+01	1.161+01	3.626+01	0.5
$11i_{13/2}$	1.152+02	1.575+03	1.186+02	2.129−02	2.159+01	1.174+01	3.630+01	0.4
$12i_{13/2}$	9.679+01	1.557+03	3.225+02	5.857−03	2.138+01	4.863+00	3.395+01	0.2
Mo^{39+}								
$2s_{1/2}$	5.718+03	5.605+04	1.474−01	1.015+03	5.416+00	5.389+04	1.782+02	0.1
$3s_{1/2}$	2.508+03	5.283+04	3.834−01	1.793+04	4.084+00	5.389+04	1.769+02	0.1
$4s_{1/2}$	1.400+03	5.173+04	6.314−01	1.793+04	3.632+00	5.389+04	1.769+02	0.2
$5s_{1/2}$	8.912+02	5.122+04	8.056−01	1.158+04	3.447+00	5.389+04	1.770+02	0.3
$6s_{1/2}$	6.167+02	5.094+04	1.120+00	6.700+03	3.264+00	5.374+04	8.282+01	0.6
$7s_{1/2}$	4.519+02	5.078+04	1.384+00	3.914+03	3.161+00	5.374+04	5.533+01	0.8
$8s_{1/2}$	3.453+02	5.067+04	1.655+00	2.332+03	3.086+00	5.373+04	3.931+01	1.0
$9s_{1/2}$	2.724+02	5.060+04	1.959+00	1.407+03	3.024+00	5.372+04	2.785+01	1.2
$10s_{1/2}$	2.204+02	3.997+04	2.534+00	7.337+02	2.956+00	5.372+04	1.778+01	1.2
$11s_{1/2}$	1.819+02	3.993+04	2.931+00	4.562+02	2.915+00	5.372+04	1.389+01	1.4
$12s_{1/2}$	1.527+02	3.154+04	3.961+00	2.160+02	2.858+00	5.371+04	9.174+00	1.3
$2p_{1/2}$	5.632+03	5.596+04	1.896+02	1.760+02	3.855+00	2.675+02	1.908+00	0.4
$3p_{1/2}$	2.484+03	5.281+04	4.557+01	6.415+01	6.023+00	2.570+02	8.187−02	1.0
$4p_{1/2}$	1.390+03	5.172+04	5.742+01	2.016+01	5.815+00	2.574+02	1.853−02	0.7
$5p_{1/2}$	8.862+02	5.121+04	6.895+01	8.577+00	5.631+00	2.566+02	2.596+00	0.5
$6p_{1/2}$	6.138+02	5.094+04	8.173+01	4.253+00	5.448+00	2.565+02	2.400+00	0.4
$7p_{1/2}$	4.501+02	4.020+04	1.621+01	3.228+01	5.629+00	1.165+03	7.261+00	0.3
$8p_{1/2}$	3.441+02	3.174+04	1.854+01	2.069+01	5.497+00	1.166+03	5.735+00	0.6
$9p_{1/2}$	2.716+02	3.166+04	2.137+01	1.341+01	5.370+00	1.165+03	4.451+00	0.9
$10p_{1/2}$	2.198+02	2.501+04	2.575+01	8.303+00	5.225+00	1.165+03	3.352+00	1.1
$11p_{1/2}$	1.815+02	2.497+04	2.864+01	5.733+00	5.135+00	1.165+03	2.804+00	1.5
$12p_{1/2}$	1.524+02	1.973+04	1.030−01	1.451+05	5.227+00	3.239+05	3.700+02	1.4
$2p_{3/2}$	5.503+03	5.583+04	1.046+02	6.464+02	4.114+00	2.697+02	1.402+00	0.3
$3p_{3/2}$	2.446+03	5.277+04	3.211+01	9.501+01	6.247+00	2.676+02	9.318−03	0.7
$4p_{3/2}$	1.374+03	5.170+04	4.170+01	3.115+01	5.982+00	2.677+02	5.122−01	0.4
$5p_{3/2}$	8.780+02	5.120+04	4.739+01	1.393+01	5.860+00	2.665+02	4.043+00	0.3
$6p_{3/2}$	6.091+02	5.094+04	5.619+01	7.279+00	5.656+00	2.667+02	3.369+00	0.3
$7p_{3/2}$	4.472+02	4.019+04	1.203+01	5.037+01	5.717+00	1.242+03	1.041+01	0.4
$8p_{3/2}$	3.421+02	3.173+04	1.402+01	3.298+01	5.560+00	1.243+03	7.665+00	0.7
$9p_{3/2}$	2.702+02	2.506+04	1.703+01	2.064+01	5.397+00	1.229+03	5.419+00	1.0
$10p_{3/2}$	2.187+02	2.501+04	1.962+01	1.366+01	5.277+00	1.228+03	4.211+00	1.3
$11p_{3/2}$	1.807+02	1.976+04	2.412+01	8.323+00	5.129+00	1.227+03	3.130+00	1.4
$12p_{3/2}$	1.518+02	1.973+04	2.641+01	5.953+00	5.052+00	1.227+03	2.665+00	1.6
$3d_{3/2}$	2.437+03	5.276+04	6.038+02	5.141+00	4.090+00	8.546+01	9.811−01	0.9
$4d_{3/2}$	1.370+03	4.112+04	6.890+02	1.139+00	4.362+00	8.566+01	6.767−01	0.8
$5d_{3/2}$	8.761+02	3.227+04	1.346+02	1.111+01	7.565+00	5.151+01	1.341+00	0.6
$6d_{3/2}$	6.080+02	2.540+04	1.311+02	5.782+00	7.717+00	5.193+01	1.593+00	0.3
$7d_{3/2}$	4.465+02	2.003+04	1.877+01	2.694+01	8.497+00	2.768+02	6.776+00	0.2
$8d_{3/2}$	3.417+02	1.992+04	2.094+01	1.801+01	8.320+00	2.772+02	5.592+00	0.4
$9d_{3/2}$	2.699+02	1.573+04	2.402+01	1.257+01	8.098+00	2.779+02	4.316+00	0.7
$10d_{3/2}$	2.185+02	1.568+04	2.753+01	8.859+00	7.890+00	2.777+02	3.368+00	1.0
$11d_{3/2}$	1.805+02	1.239+04	1.632+01	1.471+01	7.845+00	5.023+02	4.576+00	1.1
$12d_{3/2}$	1.517+02	1.237+04	1.836+01	1.096+01	7.686+00	5.029+02	3.658+00	1.4
$3d_{5/2}$	2.425+03	5.275+04	5.018+02	9.199+00	4.165+00	8.605+01	7.734−01	0.6
$4d_{5/2}$	1.365+03	4.111+04	4.881+02	2.968+00	5.514+00	3.456+01	8.496−01	0.4
$5d_{5/2}$	8.736+02	3.227+04	1.779+02	7.880+00	7.500+00	3.692+01	1.355+00	0.4
$6d_{5/2}$	6.066+02	2.540+04	4.959+01	1.550+01	8.474+00	9.560+01	3.298+00	0.3
$7d_{5/2}$	4.455+02	2.003+04	5.624+01	8.728+00	8.273+00	9.566+01	2.817+00	0.3
$8d_{5/2}$	3.410+02	1.992+04	1.182+01	3.196+01	8.480+00	4.391+02	9.624+00	0.4
$9d_{5/2}$	2.694+02	1.573+04	1.336+01	2.369+01	8.276+00	4.402+02	7.452+00	0.7
$10d_{5/2}$	2.182+02	1.243+04	1.549+01	1.776+01	8.041+00	4.442+02	5.528+00	0.9
$11d_{5/2}$	1.803+02	1.239+04	1.733+01	1.335+01	7.868+00	4.478+02	4.395+00	1.2
$12d_{5/2}$	1.515+02	1.236+04	1.950+01	9.974+00	7.702+00	4.495+02	3.513+00	1.5
$4f_{5/2}$	1.365+03	2.095+04	6.603+02	1.314+00	4.338+00	1.088+02	6.825−01	0.6
$5f_{5/2}$	8.735+02	1.634+04	2.560+02	1.350+01	8.183+00	2.128+01	9.631−01	0.2
$6f_{5/2}$	6.065+02	1.282+04	2.021+02	1.090+01	9.095+00	2.140+01	1.042+00	0.2
$7f_{5/2}$	4.455+02	1.266+04	9.324+01	1.605+01	1.061+01	3.021+01	1.769+00	0.4
$8f_{5/2}$	3.410+02	9.987+03	6.376+01	1.334+01	1.061+01	4.828+01	2.033+00	0.3

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$9f_{5/2}$	2.694+02	9.915+03	2.975+01	1.559+01	1.094+01	9.798+01	3.543+00	0.4
$10f_{5/2}$	2.182+02	7.836+03	3.472+01	1.102+01	1.058+01	9.897+01	2.706+00	0.7
$11f_{5/2}$	1.803+02	7.798+03	9.082+00	2.626+01	1.085+01	3.583+02	8.229+00	0.8
$12f_{5/2}$	1.515+02	7.770+03	1.005+01	2.175+01	1.065+01	3.575+02	6.618+00	1.0
$4f_{7/2}$	1.362+03	2.094+04	6.737+02	1.225+00	4.273+00	1.095+02	6.725−01	0.7
$5f_{7/2}$	8.723+02	1.634+04	2.197+02	1.917+01	8.504+00	2.144+01	1.008+00	0.2
$6f_{7/2}$	6.058+02	1.282+04	1.728+02	1.461+01	9.490+00	2.134+01	1.161+00	0.1
$7f_{7/2}$	4.450+02	1.266+04	3.396+01	3.143+01	1.125+01	6.989+01	3.714+00	0.1
$8f_{7/2}$	3.407+02	9.987+03	3.439+01	1.837+01	1.131+01	7.011+01	3.769+00	0.3
$9f_{7/2}$	2.692+02	9.915+03	4.288+01	1.230+01	1.076+01	7.059+01	2.587+00	0.5
$10f_{7/2}$	2.180+02	7.836+03	1.537+01	1.968+01	1.096+01	1.944+02	5.714+00	0.6
$11f_{7/2}$	1.802+02	7.798+03	1.717+01	1.545+01	1.072+01	1.951+02	4.568+00	0.9
$12f_{7/2}$	1.514+02	7.770+03	1.904+01	1.227+01	1.049+01	1.971+02	3.689+00	1.2
$5g_{7/2}$	8.723+02	1.052+04	2.650+02	1.704+01	8.132+00	2.148+01	9.734−01	0.2
$6g_{7/2}$	6.058+02	8.224+03	2.711+02	8.693+00	8.580+00	2.297+01	7.126−01	0.5
$7g_{7/2}$	4.450+02	8.063+03	1.055+02	5.043+01	1.212+01	1.967+01	1.277+00	0.1
$8g_{7/2}$	3.407+02	6.357+03	1.016+02	3.154+01	1.248+01	1.971+01	1.298+00	0.3
$9g_{7/2}$	2.692+02	6.286+03	1.943+01	4.049+01	1.396+01	7.894+01	4.756+00	0.2
$10g_{7/2}$	2.180+02	6.235+03	2.193+01	2.823+01	1.373+01	7.696+01	3.931+00	0.4
$11g_{7/2}$	1.802+02	4.932+03	2.503+01	2.114+01	1.338+01	7.697+01	3.110+00	0.6
$12g_{7/2}$	1.514+02	4.903+03	1.984+01	1.877+01	1.329+01	1.031+02	3.477+00	0.8
$5g_{9/2}$	8.715+02	1.052+04	4.306+02	2.028−03	1.404+01	2.114+01	3.712+01	0.8
$6g_{9/2}$	6.053+02	8.224+03	3.507+02	3.358−03	1.598+01	1.604+01	4.053+01	0.3
$7g_{9/2}$	4.448+02	8.063+03	3.409+02	2.477−03	1.658+01	1.526+01	4.067+01	0.3
$8g_{9/2}$	3.405+02	6.357+03	3.500+02	1.472−03	1.670+01	1.538+01	4.058+01	0.1
$9g_{9/2}$	2.691+02	6.286+03	3.746+02	8.221−04	1.666+01	1.538+01	4.047+01	0.2
$10g_{9/2}$	2.179+02	6.235+03	5.033+02	2.913−04	1.652+01	1.271+01	4.316+01	0.3
$11g_{9/2}$	1.801+02	4.932+03	1.332+03	4.411−05	1.640+01	5.232+00	4.634+01	0.4
$12g_{9/2}$	1.513+02	4.903+03	1.184+03	3.221−05	1.632+01	6.243+00	4.729+01	0.7
$6h_{9/2}$	6.053+02	5.357+03	7.225+00	1.698−02	1.606+01	7.562+02	1.764+03	0.2
$7h_{9/2}$	4.448+02	5.197+03	5.861+00	1.092−03	1.821+01	5.775+02	1.608+03	0.2
$8h_{9/2}$	3.405+02	5.092+03	5.241+00	2.505−04	1.901+01	5.771+02	1.607+03	0.6
$9h_{9/2}$	2.691+02	4.022+03	5.451+00	1.140−04	1.916+01	5.772+02	1.607+03	0.3
$10h_{9/2}$	2.179+02	3.971+03	5.799+00	6.836−05	1.915+01	5.771+02	1.607+03	0.4
$11h_{9/2}$	1.801+02	3.933+03	6.223+00	4.711−05	1.906+01	5.771+02	1.608+03	0.6
$12h_{9/2}$	1.513+02	3.115+03	6.746+00	3.484−05	1.893+01	5.771+02	1.607+03	0.8
$6h_{11/2}$	6.051+02	5.357+03	6.792+00	1.695−02	1.620+01	7.562+02	1.764+03	0.3
$7h_{11/2}$	4.446+02	5.196+03	6.133+00	1.112−03	1.821+01	5.502+02	1.544+03	0.2
$8h_{11/2}$	3.404+02	5.092+03	5.488+00	2.599−04	1.901+01	5.500+02	1.544+03	0.6
$9h_{11/2}$	2.690+02	4.022+03	5.703+00	1.184−04	1.917+01	5.500+02	1.544+03	0.3
$10h_{11/2}$	2.179+02	3.971+03	6.069+00	7.116−05	1.915+01	5.500+02	1.544+03	0.4
$11h_{11/2}$	1.801+02	3.933+03	6.512+00	4.894−05	1.906+01	5.499+02	1.544+03	0.6
$12h_{11/2}$	1.513+02	3.115+03	7.051+00	3.607−05	1.893+01	5.501+02	1.544+03	0.8
$7i_{11/2}$	4.446+02	3.409+03	5.614+02	9.358−03	1.844+01	5.643+00	1.270+01	0.2
$8i_{11/2}$	3.404+02	3.304+03	3.240+02	4.136−02	2.036+01	7.087+00	2.010+01	0.2
$9i_{11/2}$	2.690+02	3.233+03	3.598+02	5.375−02	2.115+01	5.948+00	1.815+01	0.2
$10i_{11/2}$	2.179+02	2.559+03	3.412+02	4.757−02	2.148+01	6.238+00	1.828+01	0.2
$11i_{11/2}$	1.801+02	2.521+03	4.640+02	2.342−02	2.143+01	4.984+00	1.764+01	0.1
$12i_{11/2}$	1.513+02	2.492+03	4.744+02	1.530−02	2.142+01	5.112+00	1.770+01	0.3
$7i_{13/2}$	4.445+02	3.408+03	5.569+02	9.755−03	1.846+01	5.638+00	1.273+01	0.2
$8i_{13/2}$	3.403+02	3.304+03	4.187+02	4.818−02	2.034+01	5.519+00	1.550+01	0.2
$9i_{13/2}$	2.689+02	3.233+03	6.291+02	9.473−02	2.110+01	3.461+00	1.012+01	0.2
$10i_{13/2}$	2.178+02	2.559+03	6.133+02	9.100−02	2.143+01	3.542+00	1.007+01	0.1
$11i_{13/2}$	1.800+02	2.521+03	7.644+02	4.551−02	2.141+01	3.054+00	1.015+01	0.1
$12i_{13/2}$	1.513+02	2.492+03	7.632+02	3.155−02	2.141+01	3.191+00	1.009+01	0.3
Mo^{40+}								
$1s_{1/2}$	2.386+04	7.418+04	7.155−02	1.798+03	6.138+00	5.389+04	1.787+02	0.1
$2s_{1/2}$	5.950+03	5.628+04	1.527−01	1.348+03	5.351+00	5.389+04	1.787+02	0.1
$3s_{1/2}$	2.619+03	5.295+04	3.944−01	2.039+04	4.052+00	5.389+04	1.693+02	0.0
$4s_{1/2}$	1.464+03	5.179+04	6.496−01	1.973+04	3.606+00	5.389+04	1.691+02	0.2
$5s_{1/2}$	9.331+02	5.126+04	8.364−01	1.254+04	3.420+00	5.389+04	1.692+02	0.3
$6s_{1/2}$	6.461+02	5.097+04	8.899−01	8.318+03	3.354+00	5.389+04	1.692+02	0.5
$7s_{1/2}$	4.737+02	5.080+04	1.391+00	4.275+03	3.150+00	5.395+04	5.799+01	0.7

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$8s_{1/2}$	3.620+02	5.069+04	1.664+00	2.544+03	3.074+00	5.393+04	4.081+01	0.9
$9s_{1/2}$	2.857+02	5.061+04	1.965+00	1.540+03	3.013+00	5.392+04	2.907+01	1.1
$10s_{1/2}$	2.311+02	3.998+04	2.543+00	8.013+02	2.945+00	5.392+04	1.836+01	1.1
$11s_{1/2}$	1.909+02	3.994+04	2.936+00	4.994+02	2.905+00	5.393+04	1.435+01	1.3
$12s_{1/2}$	1.603+02	3.155+04	3.958+00	2.372+02	2.848+00	5.393+04	9.447+00	1.3
$2p_{1/2}$	5.906+03	5.623+04	1.819+02	2.077+02	3.887+00	2.675+02	1.614+00	0.4
$3p_{1/2}$	2.607+03	5.293+04	4.341+01	6.790+01	6.075+00	2.671+02	8.793−03	0.9
$4p_{1/2}$	1.459+03	5.179+04	5.482+01	2.149+01	5.864+00	2.673+02	3.928−01	0.6
$5p_{1/2}$	9.306+02	5.126+04	6.591+01	9.238+00	5.675+00	2.666+02	2.781+00	0.4
$6p_{1/2}$	6.446+02	5.097+04	7.957+01	4.547+00	5.469+00	2.671+02	2.490+00	0.4
$7p_{1/2}$	4.727+02	4.022+04	9.261+01	2.518+00	5.300+00	2.664+02	2.079+00	0.6
$8p_{1/2}$	3.614+02	4.011+04	1.390+01	3.313+01	5.541+00	1.538+03	7.672+00	0.5
$9p_{1/2}$	2.852+02	3.168+04	1.607+01	2.175+01	5.414+00	1.533+03	5.844+00	0.8
$10p_{1/2}$	2.308+02	2.502+04	1.918+01	1.383+01	5.278+00	1.532+03	4.346+00	1.1
$11p_{1/2}$	1.906+02	2.498+04	2.164+01	9.427+00	5.183+00	1.532+03	3.544+00	1.4
$12p_{1/2}$	1.601+02	1.974+04	2.582+01	5.996+00	5.065+00	1.531+03	2.774+00	1.5
$2p_{3/2}$	5.767+03	5.609+04	1.007+02	7.349+02	4.164+00	2.663+02	2.460+00	0.3
$3p_{3/2}$	2.565+03	5.289+04	3.322+01	9.044+01	6.288+00	2.575+02	1.120−01	0.6
$4p_{3/2}$	1.442+03	5.177+04	4.374+01	2.965+01	6.001+00	2.575+02	6.268−01	0.3
$5p_{3/2}$	9.217+02	5.125+04	4.937+01	1.327+01	5.887+00	2.567+02	4.166+00	0.3
$6p_{3/2}$	6.395+02	5.097+04	5.891+01	6.929+00	5.673+00	2.569+02	3.403+00	0.3
$7p_{3/2}$	4.695+02	4.022+04	7.252+01	3.758+00	5.429+00	2.581+02	2.532+00	0.7
$8p_{3/2}$	3.593+02	3.175+04	2.576+00	5.148+02	5.639+00	6.528+03	3.886+01	0.7
$9p_{3/2}$	2.837+02	3.168+04	2.902+00	3.822+02	5.525+00	6.529+03	2.889+01	0.9
$10p_{3/2}$	2.297+02	2.502+04	3.359+00	2.771+02	5.406+00	6.534+03	2.062+01	1.1
$11p_{3/2}$	1.898+02	1.977+04	3.937+00	1.942+02	5.295+00	6.536+03	1.476+01	1.2
$12p_{3/2}$	1.594+02	1.974+04	4.390+00	1.412+02	5.220+00	6.537+03	1.159+01	1.4
$3d_{3/2}$	2.561+03	5.289+04	6.463+02	4.655+00	4.067+00	8.557+01	9.727−01	0.8
$4d_{3/2}$	1.440+03	4.119+04	7.252+02	1.079+00	4.356+00	8.625+01	6.758−01	0.8
$5d_{3/2}$	9.207+02	3.231+04	1.358+02	1.109+01	7.626+00	5.203+01	1.384+00	0.5
$6d_{3/2}$	6.389+02	2.543+04	1.476+02	5.091+00	7.581+00	5.206+01	1.481+00	0.3
$7d_{3/2}$	4.692+02	2.005+04	4.659+00	1.174+02	8.639+00	1.107+03	2.636+01	0.2
$8d_{3/2}$	3.590+02	1.994+04	5.177+00	8.723+01	8.477+00	1.104+03	2.142+01	0.3
$9d_{3/2}$	2.836+02	1.575+04	5.825+00	6.814+01	8.300+00	1.098+03	1.656+01	0.5
$10d_{3/2}$	2.296+02	1.569+04	6.493+00	5.391+01	8.140+00	1.095+03	1.288+01	0.8
$11d_{3/2}$	1.897+02	1.240+04	7.473+00	4.222+01	7.959+00	1.087+03	9.605+00	1.0
$12d_{3/2}$	1.594+02	1.237+04	8.259+00	3.323+01	7.827+00	1.087+03	7.676+00	1.3
$3d_{5/2}$	2.548+03	5.287+04	7.591+02	2.985+00	3.803+00	8.539+01	8.986−01	0.4
$4d_{5/2}$	1.434+03	4.118+04	5.020+02	2.988+00	5.581+00	3.348+01	8.605−01	0.4
$5d_{5/2}$	9.179+02	3.231+04	1.674+02	8.663+00	7.645+00	3.857+01	1.442+00	0.4
$6d_{5/2}$	6.373+02	2.543+04	6.597+01	1.181+01	8.380+00	7.790+01	2.767+00	0.2
$7d_{5/2}$	4.681+02	2.005+04	7.665+01	6.445+00	8.125+00	7.817+01	2.290+00	0.4
$8d_{5/2}$	3.583+02	1.994+04	7.593+00	5.082+01	8.544+00	6.973+02	1.553+01	0.4
$9d_{5/2}$	2.831+02	1.575+04	8.645+00	3.966+01	8.332+00	6.973+02	1.168+01	0.6
$10d_{5/2}$	2.293+02	1.569+04	9.696+00	3.078+01	8.156+00	6.958+02	9.060+00	0.9
$11d_{5/2}$	1.894+02	1.240+04	1.120+01	2.382+01	7.950+00	6.986+02	6.736+00	1.1
$12d_{5/2}$	1.592+02	1.237+04	1.250+01	1.832+01	7.803+00	6.977+02	5.366+00	1.4
$4f_{5/2}$	1.434+03	2.101+04	6.858+02	1.296+00	4.363+00	1.089+02	6.867−01	0.5
$5f_{5/2}$	9.179+02	1.638+04	2.187+02	1.952+01	8.526+00	2.324+01	1.010+00	0.2
$6f_{5/2}$	6.373+02	1.610+04	2.016+02	1.086+01	9.058+00	2.342+01	1.041+00	0.2
$7f_{5/2}$	4.681+02	1.268+04	4.108+01	2.831+01	1.106+01	6.553+01	3.151+00	0.1
$8f_{5/2}$	3.583+02	1.257+04	4.357+01	1.656+01	1.101+01	6.564+01	3.000+00	0.2
$9f_{5/2}$	2.831+02	9.929+03	5.143+01	1.064+01	1.061+01	6.627+01	2.285+00	0.5
$10f_{5/2}$	2.292+02	9.875+03	1.169+01	2.364+01	1.103+01	2.664+02	7.743+00	0.6
$11f_{5/2}$	1.894+02	7.808+03	1.327+01	1.934+01	1.076+01	2.673+02	5.963+00	0.8
$12f_{5/2}$	1.592+02	7.777+03	1.489+01	1.538+01	1.055+01	2.646+02	4.768+00	1.0
$4f_{7/2}$	1.431+03	2.101+04	7.001+02	1.207+00	4.298+00	1.091+02	6.768−01	0.6
$5f_{7/2}$	9.165+02	1.638+04	2.191+02	1.980+01	8.471+00	2.323+01	9.507−01	0.2
$6f_{7/2}$	6.365+02	1.610+04	1.606+02	1.634+01	9.657+00	2.310+01	1.236+00	0.2
$7f_{7/2}$	4.676+02	1.268+04	2.409+01	3.731+01	1.137+01	1.008+02	5.106+00	0.1
$8f_{7/2}$	3.580+02	1.257+04	2.473+01	2.137+01	1.141+01	1.008+02	5.233+00	0.2
$9f_{7/2}$	2.828+02	9.929+03	2.944+01	1.541+01	1.099+01	1.012+02	3.750+00	0.4
$10f_{7/2}$	2.291+02	9.875+03	3.368+01	1.098+01	1.069+01	1.010+02	2.959+00	0.7
$11f_{7/2}$	1.893+02	7.808+03	1.172+01	2.105+01	1.082+01	2.919+02	6.781+00	0.8
$12f_{7/2}$	1.591+02	7.777+03	1.317+01	1.698+01	1.060+01	2.884+02	5.380+00	1.1

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$5g_{7/2}$	9.165+02	1.056+04	2.534+02	2.204+01	8.368+00	2.151+01	1.028+00	0.2
$6g_{7/2}$	6.365+02	8.255+03	2.621+02	1.334+01	9.366+00	1.699+01	8.096−01	0.2
$7g_{7/2}$	4.676+02	8.086+03	1.632+02	2.840+01	1.148+01	1.543+01	1.039+00	0.4
$8g_{7/2}$	3.580+02	7.976+03	6.980+01	4.141+01	1.305+01	2.680+01	1.753+00	0.1
$9g_{7/2}$	2.828+02	6.300+03	7.807+01	2.309+01	1.264+01	2.839+01	1.450+00	0.4
$10g_{7/2}$	2.291+02	6.246+03	3.634+01	2.364+01	1.339+01	5.311+01	2.574+00	0.4
$11g_{7/2}$	1.893+02	4.941+03	1.376+01	2.537+01	1.366+01	1.377+02	5.656+00	0.5
$12g_{7/2}$	1.591+02	4.911+03	1.478+01	2.080+01	1.342+01	1.409+02	4.777+00	0.7
$5g_{9/2}$	9.157+02	1.056+04	2.761+02	1.666+01	8.135+00	2.150+01	9.708−01	0.2
$6g_{9/2}$	6.360+02	8.254+03	1.578+02	4.925+01	1.078+01	1.776+01	1.048+00	0.1
$7g_{9/2}$	4.673+02	8.086+03	1.318+02	3.854+01	1.182+01	1.766+01	1.157+00	0.1
$8g_{9/2}$	3.578+02	7.976+03	9.545+01	3.468+01	1.283+01	1.997+01	1.460+00	0.4
$9g_{9/2}$	2.827+02	6.299+03	6.077+00	4.569+01	1.431+01	2.448+02	1.535+01	0.1
$10g_{9/2}$	2.290+02	6.246+03	6.601+00	3.572+01	1.411+01	2.455+02	1.297+01	0.3
$11g_{9/2}$	1.892+02	4.941+03	7.347+00	3.079+01	1.385+01	2.444+02	1.045+01	0.4
$12g_{9/2}$	1.590+02	4.911+03	8.088+00	2.653+01	1.362+01	2.428+02	8.573+00	0.6
$6h_{9/2}$	6.360+02	6.653+03	2.032+02	2.502+01	9.727+00	2.096+01	8.599−01	0.2
$7h_{9/2}$	4.673+02	5.219+03	2.263+02	1.222+01	1.012+01	2.046+01	6.654−01	0.6
$8h_{9/2}$	3.578+02	5.110+03	9.841+01	9.914+01	1.409+01	1.609+01	1.143+00	0.1
$9h_{9/2}$	2.827+02	4.036+03	9.711+01	6.605+01	1.447+01	1.591+01	1.127+00	0.3
$10h_{9/2}$	2.290+02	3.982+03	4.196+01	7.012+01	1.591+01	2.944+01	2.082+00	0.2
$11h_{9/2}$	1.892+02	3.942+03	2.089+01	4.899+01	1.634+01	5.743+01	3.587+00	0.3
$12h_{9/2}$	1.590+02	3.912+03	2.294+01	3.658+01	1.609+01	5.701+01	3.060+00	0.5
$6h_{11/2}$	6.357+02	6.652+03	1.785+02	3.928+01	1.002+01	2.151+01	8.827−01	0.2
$7h_{11/2}$	4.671+02	5.219+03	2.157+02	1.496+01	1.035+01	1.951+01	6.853−01	0.6
$8h_{11/2}$	3.577+02	5.110+03	8.779+01	1.104+02	1.411+01	1.815+01	1.125+00	0.2
$9h_{11/2}$	2.826+02	4.036+03	9.004+01	6.516+01	1.435+01	1.807+01	1.130+00	0.3
$10h_{11/2}$	2.289+02	3.982+03	4.309+01	7.033+01	1.592+01	2.843+01	2.054+00	0.2
$11h_{11/2}$	1.892+02	3.942+03	1.394+01	4.595+01	1.661+01	8.120+01	5.351+00	0.3
$12h_{11/2}$	1.590+02	3.912+03	1.519+01	3.600+01	1.637+01	8.103+01	4.542+00	0.5
$7i_{11/2}$	4.671+02	4.220+03	2.160+02	8.688+00	1.019+01	2.189+01	6.784−01	0.4
$8i_{11/2}$	3.577+02	3.322+03	9.965+01	2.056+02	1.489+01	1.392+01	1.000+00	0.1
$9i_{11/2}$	2.826+02	3.247+03	1.037+02	1.288+02	1.531+01	1.363+01	9.037−01	0.2
$10i_{11/2}$	2.289+02	3.193+03	8.098+01	1.698+02	1.683+01	1.348+01	1.097+00	0.3
$11i_{11/2}$	1.892+02	2.530+03	3.683+01	1.625+02	1.835+01	2.452+01	1.940+00	0.2
$12i_{11/2}$	1.590+02	2.500+03	3.579+01	1.067+02	1.810+01	2.791+01	1.806+00	0.4
$7i_{13/2}$	4.670+02	4.220+03	1.389+02	7.217+01	1.235+01	1.597+01	9.475−01	0.0
$8i_{13/2}$	3.576+02	3.322+03	8.645+01	2.838+02	1.529+01	1.470+01	1.083+00	0.0
$9i_{13/2}$	2.825+02	3.247+03	1.034+02	1.231+02	1.519+01	1.408+01	8.858−01	0.3
$10i_{13/2}$	2.289+02	3.193+03	8.446+01	1.572+02	1.665+01	1.336+01	1.051+00	0.4
$11i_{13/2}$	1.891+02	2.530+03	5.302+01	1.428+02	1.754+01	1.968+01	1.377+00	0.3
$12i_{13/2}$	1.589+02	2.500+03	1.907+01	9.157+01	1.920+01	4.257+01	3.565+00	0.2
Mo^{41+}								
$1s_{1/2}$	2.459+04	7.492+04	7.002−02	1.905+03	6.145+00	5.389+04	1.780+02	0.1
$2s_{1/2}$	6.185+03	5.651+04	1.525−01	1.490+03	5.340+00	5.389+04	1.779+02	0.1
$3s_{1/2}$	2.732+03	5.306+04	4.045−01	2.300+04	4.023+00	5.389+04	1.714+02	0.1
$4s_{1/2}$	1.530+03	5.186+04	6.642−01	2.157+04	3.586+00	5.389+04	1.712+02	0.2
$5s_{1/2}$	9.760+02	5.130+04	8.537−01	1.356+04	3.402+00	5.389+04	1.715+02	0.3
$6s_{1/2}$	6.762+02	5.100+04	9.083−01	8.949+03	3.337+00	5.389+04	1.715+02	0.5
$7s_{1/2}$	4.959+02	5.082+04	1.406+00	4.607+03	3.139+00	5.387+04	6.035+01	0.7
$8s_{1/2}$	3.791+02	5.071+04	1.441+00	3.257+03	3.111+00	5.387+04	6.047+01	0.8
$9s_{1/2}$	2.992+02	5.063+04	1.978+00	1.664+03	3.003+00	5.386+04	3.021+01	1.1
$10s_{1/2}$	2.422+02	3.999+04	2.564+00	8.639+02	2.935+00	5.385+04	1.888+01	1.1
$11s_{1/2}$	2.000+02	3.995+04	2.960+00	5.382+02	2.895+00	5.386+04	1.470+01	1.3
$12s_{1/2}$	1.679+02	3.156+04	3.963+00	2.584+02	2.840+00	5.386+04	9.718+00	1.2
$2p_{1/2}$	6.186+03	5.651+04	1.780+02	2.340+02	3.906+00	2.675+02	1.622+00	0.4
$3p_{1/2}$	2.732+03	5.306+04	4.301+01	6.845+01	6.117+00	2.685+02	7.043−03	0.8
$4p_{1/2}$	1.530+03	5.186+04	5.476+01	2.172+01	5.894+00	2.686+02	4.347−01	0.6
$5p_{1/2}$	9.760+02	5.130+04	6.591+01	9.340+00	5.705+00	2.672+02	2.917+00	0.4
$6p_{1/2}$	6.762+02	5.100+04	8.060+01	4.565+00	5.486+00	2.671+02	2.544+00	0.4
$7p_{1/2}$	4.959+02	4.024+04	3.806+00	3.153+02	5.730+00	4.839+03	3.084+01	0.3
$8p_{1/2}$	3.791+02	4.013+04	4.313+00	2.247+02	5.603+00	4.847+03	2.314+01	0.5
$9p_{1/2}$	2.992+02	3.169+04	4.872+00	1.601+02	5.492+00	4.850+03	1.754+01	0.7

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$10p_{1/2}$	2.422+02	2.503+04	5.665+00	1.110+02	5.379+00	4.831+03	1.270+01	0.9
$11p_{1/2}$	2.000+02	2.499+04	6.259+00	8.043+01	5.302+00	4.834+03	1.017+01	1.2
$12p_{1/2}$	1.679+02	1.975+04	7.426+00	5.366+01	5.198+00	4.835+03	7.452+00	1.3
$2p_{3/2}$	6.036+03	5.636+04	9.949+01	8.171+02	4.171+00	2.671+02	1.246+00	0.3
$3p_{3/2}$	2.688+03	5.301+04	3.227+01	9.248+01	6.337+00	2.628+02	4.487−02	0.6
$4p_{3/2}$	1.511+03	5.184+04	4.289+01	3.064+01	6.034+00	2.629+02	5.088−01	0.3
$5p_{3/2}$	9.664+02	5.129+04	4.831+01	1.373+01	5.924+00	2.617+02	4.476+00	0.2
$6p_{3/2}$	6.706+02	5.100+04	5.778+01	7.218+00	5.705+00	2.619+02	3.605+00	0.3
$7p_{3/2}$	4.924+02	4.024+04	7.109+01	3.950+00	5.458+00	2.638+02	2.664+00	0.7
$8p_{3/2}$	3.768+02	3.177+04	4.135+00	2.438+02	5.637+00	4.180+03	2.586+01	0.7
$9p_{3/2}$	2.976+02	3.169+04	4.662+00	1.774+02	5.519+00	4.190+03	1.930+01	0.9
$10p_{3/2}$	2.410+02	2.503+04	5.450+00	1.248+02	5.392+00	4.191+03	1.370+01	1.1
$11p_{3/2}$	1.991+02	2.499+04	6.105+00	8.983+01	5.304+00	4.192+03	1.065+01	1.3
$12p_{3/2}$	1.673+02	1.975+04	7.255+00	6.015+01	5.196+00	4.186+03	7.738+00	1.4
$3d_{3/2}$	2.688+03	5.301+04	6.544+02	4.938+00	4.100+00	8.561+01	9.641−01	0.7
$4d_{3/2}$	1.511+03	4.126+04	7.670+01	6.291+01	7.759+00	8.237+01	2.555−01	1.2
$5d_{3/2}$	9.664+02	3.236+04	7.742+01	2.156+01	8.035+00	8.080+01	1.460+00	0.6
$6d_{3/2}$	6.706+02	2.546+04	8.718+01	9.654+00	7.931+00	8.097+01	1.929+00	0.4
$7d_{3/2}$	4.924+02	2.528+04	8.830+01	5.579+00	7.961+00	8.093+01	2.074+00	0.3
$8d_{3/2}$	3.768+02	1.996+04	3.584+00	1.265+02	8.532+00	1.627+03	3.329+01	0.3
$9d_{3/2}$	2.976+02	1.576+04	4.127+00	1.061+02	8.318+00	1.615+03	2.414+01	0.5
$10d_{3/2}$	2.410+02	1.571+04	4.569+00	8.720+01	8.159+00	1.621+03	1.875+01	0.8
$11d_{3/2}$	1.991+02	1.566+04	5.022+00	7.117+01	8.021+00	1.625+03	1.488+01	1.0
$12d_{3/2}$	1.673+02	1.238+04	5.709+00	5.751+01	7.858+00	1.626+03	1.121+01	1.2
$3d_{5/2}$	2.674+03	5.300+04	6.620+02	4.958+00	3.981+00	8.562+01	8.571−01	0.4
$4d_{5/2}$	1.505+03	4.125+04	2.188+02	1.578+01	7.064+00	3.556+01	1.010+00	0.7
$5d_{5/2}$	9.634+02	3.235+04	2.396+02	5.380+00	7.152+00	3.565+01	1.179+00	0.4
$6d_{5/2}$	6.689+02	2.546+04	4.042+01	1.815+01	8.615+00	1.219+02	4.285+00	0.2
$7d_{5/2}$	4.913+02	2.528+04	4.577+01	1.054+01	8.412+00	1.223+02	3.613+00	0.3
$8d_{5/2}$	3.761+02	1.996+04	5.361+01	6.581+00	8.129+00	1.229+02	2.796+00	0.6
$9d_{5/2}$	2.971+02	1.576+04	1.664+01	1.876+01	8.251+00	3.942+02	6.635+00	0.7
$10d_{5/2}$	2.406+02	1.570+04	1.887+01	1.390+01	8.053+00	3.948+02	5.132+00	1.0
$11d_{5/2}$	1.988+02	1.241+04	2.243+01	9.983+00	7.812+00	3.954+02	3.783+00	1.2
$12d_{5/2}$	1.670+02	1.238+04	2.546+01	7.306+00	7.639+00	3.957+02	3.021+00	1.5
$4f_{5/2}$	1.505+03	2.109+04	3.455+02	1.499+01	6.215+00	3.967+01	9.435−01	0.2
$5f_{5/2}$	9.634+02	1.643+04	2.542+02	1.498+01	8.342+00	2.261+01	9.941−01	0.2
$6f_{5/2}$	6.689+02	1.613+04	2.232+02	9.513+00	9.004+00	2.252+01	1.026+00	0.2
$7f_{5/2}$	4.913+02	1.270+04	3.345+01	3.140+01	1.117+01	8.236+01	3.865+00	0.1
$8f_{5/2}$	3.761+02	1.259+04	3.560+01	1.844+01	1.111+01	8.237+01	3.673+00	0.2
$9f_{5/2}$	2.971+02	9.943+03	4.140+01	1.224+01	1.077+01	8.255+01	2.852+00	0.4
$10f_{5/2}$	2.406+02	9.887+03	4.349+00	5.172+01	1.113+01	7.318+02	2.077+01	0.5
$11f_{5/2}$	1.988+02	7.817+03	4.884+00	4.669+01	1.089+01	7.311+02	1.606+01	0.7
$12f_{5/2}$	1.670+02	7.785+03	5.356+00	4.041+01	1.072+01	7.283+02	1.302+01	0.9
$4f_{7/2}$	1.502+03	2.108+04	3.227+02	1.874+01	6.361+00	3.730+01	9.495−01	0.2
$5f_{7/2}$	9.618+02	1.643+04	4.642+02	2.738+00	6.326+00	3.618+01	6.844−01	0.7
$6f_{7/2}$	6.680+02	1.613+04	1.492+02	1.810+01	9.784+00	2.532+01	1.294+00	0.2
$7f_{7/2}$	4.908+02	1.270+04	8.178+01	1.757+01	1.071+01	3.722+01	1.999+00	0.1
$8f_{7/2}$	3.757+02	1.259+04	6.886+00	4.735+01	1.151+01	3.758+02	1.680+01	0.2
$9f_{7/2}$	2.968+02	9.943+03	7.565+00	3.624+01	1.132+01	3.763+02	1.394+01	0.3
$10f_{7/2}$	2.404+02	9.886+03	8.374+00	2.955+01	1.111+01	3.753+02	1.121+01	0.6
$11f_{7/2}$	1.987+02	7.817+03	9.464+00	2.540+01	1.085+01	3.774+02	8.603+00	0.7
$12f_{7/2}$	1.669+02	7.785+03	1.053+01	2.100+01	1.064+01	3.748+02	6.872+00	1.0
$5g_{7/2}$	9.618+02	1.061+04	2.624+02	2.185+01	8.410+00	2.151+01	1.042+00	0.2
$6g_{7/2}$	6.680+02	1.031+04	2.989+02	7.876+00	8.593+00	2.296+01	7.150−01	0.5
$7g_{7/2}$	4.908+02	8.109+03	9.067+01	5.919+01	1.247+01	2.337+01	1.468+00	0.1
$8g_{7/2}$	3.757+02	7.994+03	9.636+01	3.112+01	1.251+01	2.342+01	1.385+00	0.2
$9g_{7/2}$	2.968+02	6.314+03	3.900+01	3.245+01	1.351+01	4.846+01	2.701+00	0.2
$10g_{7/2}$	2.404+02	6.257+03	4.321+01	2.147+01	1.325+01	4.870+01	2.288+00	0.4
$11g_{7/2}$	1.987+02	6.215+03	1.518+01	2.326+01	1.368+01	1.298+02	5.467+00	0.5
$12g_{7/2}$	1.669+02	4.919+03	1.736+01	1.910+01	1.335+01	1.289+02	4.260+00	0.7
$5g_{9/2}$	9.609+02	1.061+04	2.603+02	2.249+01	8.404+00	2.150+01	1.032+00	0.2
$6g_{9/2}$	6.675+02	1.031+04	2.978+02	8.082+00	8.620+00	2.242+01	7.165−01	0.5
$7g_{9/2}$	4.904+02	8.109+03	9.619+01	5.682+01	1.243+01	2.196+01	1.433+00	0.1
$8g_{9/2}$	3.755+02	7.994+03	9.922+01	3.135+01	1.259+01	2.192+01	1.391+00	0.2
$9g_{9/2}$	2.967+02	6.313+03	2.284+01	3.655+01	1.392+01	7.461+01	4.467+00	0.2

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$10g_{9/2}$	2.403+02	6.257+03	2.335+01	2.393+01	1.394+01	7.462+01	4.360+00	0.3
$11g_{9/2}$	1.986+02	6.215+03	2.782+01	1.905+01	1.340+01	7.538+01	3.109+00	0.6
$12g_{9/2}$	1.669+02	4.919+03	3.259+01	1.435+01	1.297+01	7.559+01	2.378+00	0.8
$6h_{9/2}$	6.675+02	6.684+03	2.126+02	2.393+01	9.736+00	2.104+01	8.643−01	0.1
$7h_{9/2}$	4.904+02	5.242+03	2.349+02	1.189+01	1.013+01	2.080+01	6.676−01	0.5
$8h_{9/2}$	3.755+02	5.127+03	9.582+01	1.038+02	1.424+01	1.684+01	1.198+00	0.1
$9h_{9/2}$	2.967+02	5.049+03	1.004+02	6.061+01	1.437+01	1.674+01	1.116+00	0.3
$10h_{9/2}$	2.403+02	3.993+03	4.306+01	6.676+01	1.593+01	3.010+01	2.122+00	0.2
$11h_{9/2}$	1.986+02	3.952+03	3.933+01	4.574+01	1.589+01	3.471+01	2.146+00	0.3
$12h_{9/2}$	1.669+02	3.920+03	1.853+01	3.516+01	1.622+01	7.256+01	3.866+00	0.5
$6h_{11/2}$	6.671+02	6.684+03	2.121+02	2.421+01	9.733+00	2.098+01	8.606−01	0.2
$7h_{11/2}$	4.902+02	5.242+03	2.287+02	1.344+01	1.028+01	2.001+01	6.798−01	0.5
$8h_{11/2}$	3.753+02	5.127+03	8.096+01	1.291+02	1.462+01	1.831+01	1.340+00	0.1
$9h_{11/2}$	2.966+02	5.048+03	8.286+01	7.662+01	1.485+01	1.822+01	1.299+00	0.2
$10h_{11/2}$	2.402+02	3.993+03	3.671+01	6.829+01	1.611+01	3.395+01	2.443+00	0.2
$11h_{11/2}$	1.985+02	3.951+03	4.309+01	4.499+01	1.567+01	3.331+01	1.924+00	0.4
$12h_{11/2}$	1.668+02	3.920+03	3.001+00	2.878+01	1.682+01	3.951+02	2.373+01	0.3
$7i_{11/2}$	4.902+02	4.243+03	2.148+02	1.048+01	1.038+01	2.171+01	6.959−01	0.4
$8i_{11/2}$	3.753+02	3.339+03	1.986+02	1.257+01	1.129+01	2.168+01	5.999−01	0.7
$9i_{11/2}$	2.966+02	3.261+03	7.156+01	2.710+02	1.669+01	1.569+01	1.235+00	0.1
$10i_{11/2}$	2.402+02	3.204+03	7.491+01	1.647+02	1.685+01	1.561+01	1.152+00	0.2
$11i_{11/2}$	1.985+02	3.163+03	4.959+01	1.581+02	1.820+01	1.925+01	1.648+00	0.3
$12i_{11/2}$	1.668+02	2.508+03	4.755+01	9.279+01	1.755+01	2.460+01	1.429+00	0.5
$7i_{13/2}$	4.900+02	4.243+03	2.248+02	8.544+00	1.021+01	2.191+01	6.812−01	0.4
$8i_{13/2}$	3.752+02	3.339+03	9.506+01	2.424+02	1.515+01	1.448+01	1.055+00	0.0
$9i_{13/2}$	2.965+02	3.260+03	1.110+02	1.155+02	1.521+01	1.365+01	8.891−01	0.2
$10i_{13/2}$	2.402+02	3.204+03	4.936+01	2.384+02	1.800+01	1.914+01	1.679+00	0.1
$11i_{13/2}$	1.985+02	3.162+03	5.021+01	1.585+02	1.819+01	1.903+01	1.630+00	0.3
$12i_{13/2}$	1.668+02	2.508+03	4.361+01	9.868+01	1.784+01	2.516+01	1.581+00	0.4
W^{5+}								
$6s_{1/2}$	5.377+01	5.038+04	1.032+01	7.239−01	4.315+00	5.870+03	0.000+00	1.3
$7s_{1/2}$	2.974+01	3.978+04	1.889+00	4.413+00	4.119+00	5.585+04	0.000+00	3.8
$8s_{1/2}$	1.903+01	2.481+04	7.564−01	1.475+01	3.913+00	3.666+05	0.000+00	6.0
$9s_{1/2}$	1.325+01	1.959+04	4.693−01	2.696+01	3.773+00	2.047+06	0.000+00	7.4
$10s_{1/2}$	9.758+00	1.547+04	3.845−01	3.201+01	3.667+00	4.314+07	0.000+00	8.2
$11s_{1/2}$	7.489+00	1.222+04	7.308−02	3.949+02	3.632+00	1.866+21	0.000+00	7.7
$12s_{1/2}$	5.929+00	9.652+03	6.582−06	2.280+09	3.607+00	1.866+21	0.000+00	7.9
$6p_{1/2}$	4.550+01	2.484+04	7.186+01	2.392−02	7.627+00	2.735+02	1.980+00	0.9
$7p_{1/2}$	2.622+01	1.549+04	5.101+01	1.163−02	7.713+00	3.718+02	2.819+00	1.2
$8p_{1/2}$	1.718+01	9.663+03	4.519+01	6.253−03	7.830+00	3.721+02	3.253+00	1.0
$9p_{1/2}$	1.215+01	7.630+03	3.554+01	3.950−03	7.833+00	5.032+02	4.220+00	1.0
$10p_{1/2}$	9.058+00	6.026+03	3.393+01	2.508−03	7.887+00	5.021+02	4.499+00	0.8
$11p_{1/2}$	7.014+00	4.759+03	3.296+01	1.678−03	7.925+00	5.020+02	4.703+00	0.6
$12p_{1/2}$	5.592+00	3.759+03	3.243+01	1.175−03	7.952+00	5.019+02	4.835+00	0.6
$6p_{3/2}$	4.345+01	2.484+04	3.191+01	8.470−02	7.379+00	5.063+02	2.563+00	0.7
$7p_{3/2}$	2.533+01	1.549+04	1.456+01	6.069−02	7.458+00	1.075+03	5.408+00	0.9
$8p_{3/2}$	1.671+01	1.223+04	4.659+00	6.759−02	7.520+00	3.263+03	1.669+01	1.0
$9p_{3/2}$	1.187+01	9.658+03	1.613−01	3.503−01	7.620+00	8.523+04	4.907+02	0.8
$10p_{3/2}$	8.877+00	7.627+03	2.026+00	2.956−02	7.802+00	5.371+03	4.143+01	2.0
$11p_{3/2}$	6.890+00	6.024+03	1.841+00	1.886−02	7.879+00	5.370+03	4.655+01	2.4
$12p_{3/2}$	5.503+00	4.757+03	1.719+00	1.294−02	7.930+00	5.365+03	5.043+01	2.5
$5d_{3/2}$	6.399+01	1.553+04	1.808+02	4.650−01	1.070+01	2.491+01	3.918−01	1.7
$6d_{3/2}$	3.177+01	9.678+03	1.548+02	1.053−01	1.087+01	2.838+01	4.569−01	1.6
$7d_{3/2}$	1.991+01	6.037+03	1.460+02	4.874−02	1.092+01	3.013+01	4.852−01	1.7
$8d_{3/2}$	1.372+01	4.766+03	1.416+02	2.743−02	1.094+01	3.082+01	4.984−01	1.7
$9d_{3/2}$	1.004+01	4.762+03	1.391+02	1.754−02	1.097+01	3.062+01	5.026−01	1.8
$10d_{3/2}$	7.674+00	3.761+03	1.373+02	1.152−02	1.097+01	3.128+01	5.090−01	1.8
$11d_{3/2}$	6.057+00	2.970+03	1.359+02	7.600−03	1.094+01	3.298+01	5.198−01	1.7
$12d_{3/2}$	4.903+00	2.969+03	1.351+02	5.595−03	1.095+01	3.286+01	5.205−01	1.9
$5d_{5/2}$	6.293+01	1.553+04	1.701+02	4.951−01	1.067+01	2.515+01	3.910−01	1.5
$6d_{5/2}$	3.144+01	9.677+03	1.448+02	1.135−01	1.083+01	2.912+01	4.666−01	1.7
$7d_{5/2}$	1.975+01	6.036+03	1.360+02	5.207−02	1.087+01	3.135+01	5.019−01	1.9
$8d_{5/2}$	1.363+01	4.766+03	1.317+02	2.906−02	1.089+01	3.239+01	5.201−01	1.9

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$9d_{5/2}$	9.985+00	3.763+03	1.292+02	1.782−02	1.089+01	3.331+01	5.317−01	1.8
$10d_{5/2}$	7.636+00	3.761+03	1.274+02	1.181−02	1.090+01	3.382+01	5.395−01	1.8
$11d_{5/2}$	6.030+00	2.970+03	1.263+02	8.347−03	1.091+01	3.385+01	5.418−01	1.8
$12d_{5/2}$	4.884+00	2.969+03	1.255+02	5.975−03	1.090+01	3.449+01	5.471−01	1.8
$5f_{5/2}$	3.112+01	6.048+03	8.205+01	1.732+00	1.372+01	1.695+01	4.231−02	7.2
$6f_{5/2}$	1.987+01	3.773+03	7.761+01	7.183−01	1.348+01	2.129+01	5.235−02	10.2
$7f_{5/2}$	1.377+01	3.767+03	7.509+01	3.757−01	1.341+01	2.351+01	4.261−02	11.1
$8f_{5/2}$	1.010+01	2.974+03	7.338+01	2.138−01	1.335+01	2.566+01	4.219−02	11.3
$9f_{5/2}$	7.721+00	2.349+03	7.230+01	1.354−01	1.332+01	2.706+01	4.639−02	10.7
$10f_{5/2}$	6.095+00	2.347+03	7.153+01	9.430−02	1.332+01	2.745+01	4.992−02	10.5
$11f_{5/2}$	4.933+00	2.346+03	7.098+01	6.739−02	1.331+01	2.797+01	5.294−02	10.7
$12f_{5/2}$	4.074+00	1.853+03	7.069+01	4.760−02	1.328+01	2.938+01	5.583−02	9.9
$5f_{7/2}$	3.109+01	6.048+03	7.988+01	1.898+00	1.375+01	1.676+01	4.264−02	6.6
$6f_{7/2}$	1.985+01	3.773+03	7.502+01	7.593−01	1.347+01	2.155+01	5.855−02	9.8
$7f_{7/2}$	1.375+01	3.767+03	7.269+01	3.905−01	1.339+01	2.391+01	5.775−02	11.1
$8f_{7/2}$	1.009+01	2.974+03	7.118+01	2.202−01	1.333+01	2.615+01	5.360−02	11.4
$9f_{7/2}$	7.713+00	2.349+03	7.016+01	1.401−01	1.331+01	2.748+01	5.208−02	10.6
$10f_{7/2}$	6.089+00	2.347+03	6.939+01	9.492−02	1.329+01	2.836+01	5.304−02	10.9
$11f_{7/2}$	4.928+00	2.346+03	6.884+01	6.844−02	1.329+01	2.876+01	5.408−02	10.9
$12f_{7/2}$	4.071+00	1.853+03	6.850+01	4.937−02	1.327+01	2.984+01	5.606−02	9.9
$5g_{7/2}$	1.966+01	4.683+02	2.456+01	1.755−01	1.320+01	2.109+01	4.142+00	0.1
$6g_{7/2}$	1.368+01	3.680+02	2.819+01	4.075−01	1.490+01	1.067+01	3.551+00	0.4
$7g_{7/2}$	1.005+01	3.644+02	2.740+01	5.160−01	1.566+01	9.042+00	3.606+00	0.6
$8g_{7/2}$	7.696+00	3.621+02	2.572+01	3.835−01	1.590+01	9.457+00	3.893+00	0.5
$9g_{7/2}$	6.080+00	2.859+02	2.303+01	2.952−01	1.606+01	1.021+01	4.333+00	0.4
$10g_{7/2}$	4.923+00	2.848+02	2.046+01	2.624−01	1.625+01	1.068+01	4.725+00	0.6
$11g_{7/2}$	4.068+00	2.839+02	2.329+01	1.182−01	1.602+01	1.133+01	4.543+00	0.4
$12g_{7/2}$	3.417+00	2.244+02	2.441+01	7.903−02	1.597+01	1.149+01	4.444+00	0.6
$5g_{9/2}$	1.967+01	4.683+02	2.396+01	1.874−01	1.322+01	2.124+01	4.217+00	0.2
$6g_{9/2}$	1.368+01	3.680+02	2.701+01	3.860−01	1.487+01	1.136+01	3.743+00	0.3
$7g_{9/2}$	1.005+01	3.644+02	2.717+01	5.599−01	1.571+01	8.910+00	3.603+00	0.6
$8g_{9/2}$	7.698+00	3.621+02	2.510+01	3.808−01	1.590+01	9.694+00	3.993+00	0.5
$9g_{9/2}$	6.081+00	2.859+02	2.199+01	3.570−01	1.618+01	1.004+01	4.408+00	0.5
$10g_{9/2}$	4.924+00	2.848+02	2.019+01	2.567−01	1.625+01	1.089+01	4.805+00	0.6
$11g_{9/2}$	4.068+00	2.839+02	2.264+01	1.217−01	1.604+01	1.152+01	4.644+00	0.5
$12g_{9/2}$	3.418+00	2.833+02	1.846+01	8.448−02	1.605+01	1.406+01	5.731+00	0.2
$6h_{9/2}$	1.361+01	1.882+02	3.329+01	2.367−01	1.583+01	4.375+00	3.379+00	0.1
$7h_{9/2}$	9.998+00	1.479+02	2.771+01	2.457+00	1.787+01	3.259+00	3.826+00	0.1
$8h_{9/2}$	7.655+00	1.455+02	2.951+01	2.263+00	1.833+01	3.090+00	3.735+00	0.1
$9h_{9/2}$	6.049+00	1.439+02	3.470+01	1.897+00	1.855+01	2.735+00	3.211+00	0.3
$10h_{9/2}$	4.899+00	1.428+02	3.406+01	1.568+00	1.872+01	2.783+00	3.307+00	0.3
$11h_{9/2}$	4.049+00	1.129+02	3.280+01	1.207+00	1.881+01	2.909+00	3.457+00	0.2
$12h_{9/2}$	3.402+00	1.123+02	2.531+01	1.073+00	1.905+01	3.499+00	4.465+00	0.1
$6h_{11/2}$	1.361+01	1.882+02	3.308+01	2.421−01	1.583+01	4.396+00	3.383+00	0.1
$7h_{11/2}$	9.998+00	1.479+02	2.960+01	2.122+00	1.778+01	3.176+00	3.594+00	0.2
$8h_{11/2}$	7.655+00	1.455+02	2.935+01	2.382+00	1.835+01	3.084+00	3.719+00	0.2
$9h_{11/2}$	6.049+00	1.439+02	2.960+01	2.349+00	1.870+01	2.991+00	3.709+00	0.2
$10h_{11/2}$	4.899+00	1.428+02	2.902+01	1.719+00	1.883+01	3.104+00	3.865+00	0.2
$11h_{11/2}$	4.049+00	1.129+02	2.907+01	1.242+00	1.888+01	3.177+00	3.902+00	0.1
$12h_{11/2}$	3.402+00	1.123+02	2.987+01	9.820−01	1.893+01	3.140+00	3.802+00	0.2
$7i_{11/2}$	9.996+00	9.599+01	1.378+01	3.882−01	1.831+01	5.257+00	1.127+01	0.1
$8i_{11/2}$	7.653+00	9.365+01	1.524+01	1.148+00	1.983+01	3.901+00	1.088+01	0.3
$9i_{11/2}$	6.047+00	9.204+01	1.453+01	3.547+00	2.097+01	3.441+00	1.012+01	0.1
$10i_{11/2}$	4.898+00	9.089+01	1.445+01	3.618+00	2.141+01	3.371+00	1.041+01	0.1
$11i_{11/2}$	4.048+00	9.004+01	1.534+01	3.066+00	2.159+01	3.215+00	1.005+01	0.1
$12i_{11/2}$	3.402+00	8.940+01	1.490+01	2.828+00	2.178+01	3.274+00	1.010+01	0.2
$7i_{13/2}$	9.996+00	9.599+01	1.379+01	4.058−01	1.833+01	5.220+00	1.114+01	0.1
$8i_{13/2}$	7.653+00	9.365+01	1.635+01	7.710−01	1.966+01	3.836+00	1.104+01	0.6
$9i_{13/2}$	6.047+00	9.204+01	1.125+01	2.951+00	2.102+01	4.370+00	1.310+01	0.1
$10i_{13/2}$	4.898+00	9.089+01	1.118+01	2.806+00	2.144+01	4.302+00	1.347+01	0.1
$11i_{13/2}$	4.048+00	9.004+01	1.124+01	2.267+00	2.165+01	4.298+00	1.369+01	0.1
$12i_{13/2}$	3.402+00	8.940+01	1.125+01	1.768+00	2.177+01	4.334+00	1.393+01	0.1
W^{27+}								
$5s_{1/2}$	7.400+02	5.107+04	7.756−04	1.095+07	4.129+00	9.372+07	0.000+00	0.4
$6s_{1/2}$	4.591+02	5.079+04	1.925−03	2.110+07	3.711+00	9.372+07	0.000+00	1.1

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$7s_{1/2}$	3.139+02	5.064+04	4.188−03	1.320+07	3.484+00	9.372+07	0.000+00	2.2
$8s_{1/2}$	2.283+02	5.056+04	8.576−03	5.205+06	3.343+00	9.372+07	0.000+00	3.1
$9s_{1/2}$	1.736+02	5.050+04	1.743−02	1.577+06	3.248+00	9.372+07	0.000+00	3.8
$10s_{1/2}$	1.365+02	5.046+04	3.837−02	3.560+05	3.176+00	9.372+07	0.000+00	4.4
$11s_{1/2}$	1.101+02	3.986+04	2.354−01	1.032+04	3.112+00	9.372+07	0.000+00	4.2
$12s_{1/2}$	9.075+01	3.148+04	4.390−01	2.622+03	3.080+00	9.372+07	0.000+00	3.9
$5p_{1/2}$	6.961+02	5.102+04	5.779+01	7.740−01	7.002+00	5.325+02	2.065+00	0.7
$6p_{1/2}$	4.368+02	5.076+04	8.531+01	4.177−01	6.518+00	5.326+02	2.408+00	0.8
$7p_{1/2}$	3.010+02	5.063+04	1.366+01	2.272+00	6.479+00	3.699+03	1.019+01	1.3
$8p_{1/2}$	2.203+02	5.055+04	1.856+01	1.529+00	6.207+00	3.698+03	6.495+00	2.3
$9p_{1/2}$	1.682+02	5.050+04	4.884−01	2.260+02	6.104+00	1.671+05	1.832+02	3.1
$10p_{1/2}$	1.327+02	3.988+04	6.734−01	1.762+02	5.924+00	1.671+05	1.086+02	3.9
$11p_{1/2}$	1.074+02	3.985+04	8.645−01	1.297+02	5.796+00	1.671+05	7.124+01	4.7
$12p_{1/2}$	8.867+01	3.148+04	1.296+00	7.492+01	5.654+00	1.671+05	3.950+01	5.2
$5p_{3/2}$	6.682+02	5.100+04	4.495+01	1.910+00	6.785+00	5.327+02	3.789+00	0.3
$6p_{3/2}$	4.231+02	5.075+04	6.425+01	1.022+00	6.338+00	5.340+02	2.996+00	0.9
$7p_{3/2}$	2.932+02	5.062+04	2.031−02	3.281+04	6.277+00	1.937+06	5.510+03	1.7
$8p_{3/2}$	2.153+02	5.054+04	2.017−02	2.735+04	6.233+00	1.937+06	5.510+03	1.8
$9p_{3/2}$	1.649+02	3.991+04	3.821−01	9.738+02	5.892+00	1.671+05	1.938+02	3.1
$10p_{3/2}$	1.304+02	3.152+04	5.243−01	7.198+02	5.721+00	1.671+05	1.115+02	3.6
$11p_{3/2}$	1.057+02	3.150+04	6.498−01	5.226+02	5.611+00	1.670+05	7.448+01	4.2
$12p_{3/2}$	8.741+01	2.488+04	9.357−01	3.001+02	5.485+00	1.671+05	4.238+01	4.5
$5d_{3/2}$	5.975+02	5.092+04	2.339+02	1.588+00	8.237+00	6.760+01	8.219−01	1.2
$6d_{3/2}$	3.867+02	4.013+04	6.240+01	1.750+00	9.208+00	1.704+02	1.715+00	1.1
$7d_{3/2}$	2.719+02	3.166+04	1.826+01	2.455+00	9.306+00	5.760+02	4.675+00	0.7
$8d_{3/2}$	2.018+02	2.499+04	2.167+01	1.882+00	9.012+00	5.753+02	3.992+00	1.1
$9d_{3/2}$	1.558+02	2.495+04	2.585+01	1.435+00	8.734+00	5.755+02	3.124+00	1.8
$10d_{3/2}$	1.240+02	1.970+04	1.979−03	5.476+04	8.683+00	8.475+06	2.475+04	2.8
$11d_{3/2}$	1.010+02	1.968+04	2.031−03	5.281+04	8.633+00	8.475+06	2.475+04	2.6
$12d_{3/2}$	8.384+01	1.555+04	2.022−03	4.621+04	8.613+00	8.475+06	2.475+04	2.4
$5d_{5/2}$	5.918+02	4.034+04	1.791+02	2.086+00	8.732+00	6.146+01	9.660−01	0.7
$6d_{5/2}$	3.838+02	3.178+04	9.300+00	4.573+00	9.690+00	8.495+02	5.853+00	0.6
$7d_{5/2}$	2.702+02	3.166+04	1.095+01	3.709+00	9.377+00	8.502+02	7.879+00	0.7
$8d_{5/2}$	2.007+02	2.499+04	1.303+01	3.060+00	9.075+00	8.493+02	6.408+00	1.3
$9d_{5/2}$	1.551+02	2.495+04	1.539+01	2.460+00	8.812+00	8.484+02	4.959+00	2.0
$10d_{5/2}$	1.234+02	1.970+04	3.106−01	1.293+02	8.781+00	4.448+04	1.908+02	2.2
$11d_{5/2}$	1.006+02	1.556+04	3.739−01	1.453+02	8.566+00	4.437+04	1.340+02	2.7
$12d_{5/2}$	8.355+01	1.555+04	4.235−01	1.425+02	8.426+00	4.439+04	1.049+02	3.1
$4f_{5/2}$	8.812+02	2.046+04	3.698+02	8.539+00	6.545+00	1.030+02	6.950−01	0.4
$5f_{5/2}$	5.089+02	1.597+04	4.337+01	3.180+01	1.110+01	9.714+01	3.805−02	1.5
$6f_{5/2}$	3.416+02	1.581+04	5.018+01	1.343+01	1.095+01	9.702+01	1.189+00	0.9
$7f_{5/2}$	2.455+02	1.246+04	7.463+00	2.141+01	1.149+01	5.717+02	2.199+00	0.6
$8f_{5/2}$	1.850+02	1.240+04	8.146+00	1.463+01	1.136+01	5.692+02	5.022+00	0.6
$9f_{5/2}$	1.444+02	9.790+03	8.911+00	1.102+01	1.119+01	5.700+02	4.974+00	0.9
$10f_{5/2}$	1.159+02	9.762+03	9.809+00	8.644+00	1.101+01	5.701+02	4.420+00	1.2
$11f_{5/2}$	9.501+01	7.713+03	1.110+01	6.916+00	1.080+01	5.706+02	3.664+00	1.6
$12f_{5/2}$	7.933+01	7.698+03	9.373−02	5.863+02	1.093+01	6.503+04	3.290+02	1.6
$4f_{7/2}$	8.773+02	2.046+04	3.171+02	1.280+01	6.988+00	7.666+01	7.412−01	0.1
$5f_{7/2}$	5.075+02	1.597+04	1.436+02	1.374+01	9.755+00	4.609+01	8.684−01	0.7
$6f_{7/2}$	3.409+02	1.581+04	5.144+01	1.341+01	1.101+01	8.952+01	1.309+00	0.8
$7f_{7/2}$	2.450+02	1.246+04	1.094+01	1.673+01	1.150+01	3.759+02	3.320+00	0.6
$8f_{7/2}$	1.847+02	1.240+04	1.205+01	1.144+01	1.134+01	3.752+02	4.042+00	0.7
$9f_{7/2}$	1.442+02	9.790+03	1.341+01	8.495+00	1.113+01	3.752+02	3.701+00	1.0
$10f_{7/2}$	1.157+02	9.762+03	1.498+01	6.528+00	1.092+01	3.754+02	3.183+00	1.4
$11f_{7/2}$	9.491+01	7.713+03	2.205−01	2.026+02	1.110+01	2.429+04	1.613+02	1.3
$12f_{7/2}$	7.925+01	7.697+03	2.437−01	2.223+02	1.094+01	2.427+04	1.294+02	1.7
$5g_{7/2}$	4.420+02	8.060+03	5.084+01	9.748+01	1.184+01	4.647+01	3.788+00	1.0
$6g_{7/2}$	3.079+02	6.325+03	5.336+01	5.351+01	1.180+01	5.220+01	2.120+00	0.8
$7g_{7/2}$	2.257+02	6.242+03	5.834+00	3.168+02	1.253+01	4.363+02	7.345+00	0.9
$8g_{7/2}$	1.723+02	4.924+03	6.382+00	1.831+02	1.247+01	4.380+02	4.161+00	1.0
$9g_{7/2}$	1.358+02	4.888+03	6.620+00	1.120+02	1.249+01	4.381+02	4.068+00	1.0
$10g_{7/2}$	1.097+02	3.863+03	7.231+00	7.665+01	1.237+01	4.379+02	3.481+00	0.9
$11g_{7/2}$	9.046+01	3.843+03	7.550+00	5.462+01	1.233+01	4.379+02	3.397+00	0.9
$12g_{7/2}$	7.586+01	3.829+03	7.933+00	4.077+01	1.226+01	4.379+02	3.175+00	1.1

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$5g_{9/2}$	4.419+02	6.459+03	4.330+01	1.080+02	1.242+01	4.473+01	4.864+00	0.5
$6g_{9/2}$	3.077+02	6.324+03	8.901+00	3.579+02	1.250+01	2.585+02	9.973+00	0.7
$7g_{9/2}$	2.256+02	6.242+03	9.925+00	1.827+02	1.246+01	2.593+02	4.827+00	0.9
$8g_{9/2}$	1.722+02	4.924+03	1.093+01	1.051+02	1.237+01	2.613+02	3.071+00	1.0
$9g_{9/2}$	1.357+02	4.888+03	1.149+01	6.514+01	1.235+01	2.614+02	2.831+00	1.1
$10g_{9/2}$	1.096+02	3.863+03	1.274+01	4.342+01	1.221+01	2.616+02	2.415+00	0.9
$11g_{9/2}$	9.042+01	3.843+03	1.352+01	3.065+01	1.213+01	2.616+02	2.249+00	1.1
$12g_{9/2}$	7.584+01	3.829+03	1.447+01	2.246+01	1.202+01	2.618+02	2.040+00	1.3
$6h_{9/2}$	2.973+02	3.261+03	7.228+01	3.177+01	9.407+00	1.217+02	1.580+00	1.3
$7h_{9/2}$	2.187+02	3.183+03	6.106+01	3.969+01	9.925+00	1.367+02	8.086−01	1.0
$8h_{9/2}$	1.675+02	3.131+03	4.111+01	6.771+01	1.090+01	1.383+02	3.170−01	0.7
$9h_{9/2}$	1.323+02	2.473+03	5.269+01	2.343+01	1.107+01	1.040+02	7.385−01	0.6
$10h_{9/2}$	1.072+02	2.448+03	4.548+01	2.207+01	1.151+01	1.039+02	7.644−01	0.4
$11h_{9/2}$	8.857+01	1.937+03	3.591+01	2.489+01	1.212+01	1.033+02	8.461−01	0.6
$12h_{9/2}$	7.441+01	1.923+03	2.818+01	2.722+01	1.253+01	1.155+02	9.294−01	0.6
$6h_{11/2}$	2.972+02	3.261+03	7.211+01	3.228+01	9.417+00	1.198+02	1.577+00	1.3
$7h_{11/2}$	2.186+02	3.183+03	6.366+01	3.523+01	1.000+01	1.205+02	8.744−01	1.0
$8h_{11/2}$	1.675+02	3.131+03	5.333+01	3.541+01	1.062+01	1.205+02	6.691−01	0.8
$9h_{11/2}$	1.323+02	2.473+03	5.948+01	1.722+01	1.064+01	1.207+02	6.795−01	0.3
$10h_{11/2}$	1.072+02	2.448+03	4.631+01	2.122+01	1.143+01	1.068+02	7.475−01	0.3
$11h_{11/2}$	8.856+01	1.937+03	3.645+01	2.416+01	1.203+01	1.066+02	8.269−01	0.5
$12h_{11/2}$	7.440+01	1.923+03	2.846+01	2.688+01	1.252+01	1.138+02	9.288−01	0.6
$7i_{11/2}$	2.178+02	2.067+03	6.749+01	3.232+01	9.441+00	1.208+02	7.255−01	2.1
$8i_{11/2}$	1.668+02	1.627+03	8.694+01	9.521+00	9.494+00	1.208+02	5.329−01	0.7
$9i_{11/2}$	1.318+02	1.592+03	8.315+01	8.063+00	9.929+00	1.212+02	4.908−01	0.7
$10i_{11/2}$	1.068+02	1.567+03	5.851+01	2.474+01	1.211+01	5.191+01	5.877−01	0.9
$11i_{11/2}$	8.823+01	1.241+03	5.011+01	2.747+01	1.273+01	5.173+01	6.020−01	0.8
$12i_{11/2}$	7.413+01	1.227+03	2.625+01	9.106+01	1.525+01	4.281+01	9.248−01	0.8
$7i_{13/2}$	2.178+02	2.067+03	1.190+02	2.187+00	7.079+00	6.307+03	5.136−01	0.2
$8i_{13/2}$	1.668+02	1.627+03	1.160+02	2.130+00	7.543+00	6.307+03	4.284−01	1.2
$9i_{13/2}$	1.318+02	1.592+03	7.468+01	1.367+01	1.069+01	7.485+01	5.374−01	0.7
$10i_{13/2}$	1.067+02	1.567+03	5.829+01	2.512+01	1.213+01	5.148+01	5.892−01	0.9
$11i_{13/2}$	8.822+01	1.241+03	4.044+01	5.630+01	1.395+01	3.876+01	7.300−01	0.7
$12i_{13/2}$	7.413+01	1.227+03	3.049+01	7.383+01	1.499+01	3.902+01	8.702−01	0.8
W^{37+}								
$5s_{1/2}$	1.117+03	5.144+04	1.442−03	3.977+07	3.851+00	7.985+07	0.000+00	0.3
$6s_{1/2}$	7.249+02	5.105+04	2.905−03	4.776+07	3.550+00	7.985+07	0.000+00	0.7
$7s_{1/2}$	5.093+02	5.084+04	5.348−03	2.968+07	3.370+00	7.985+07	0.000+00	1.3
$8s_{1/2}$	3.775+02	5.070+04	9.336−03	1.378+07	3.251+00	7.985+07	0.000+00	1.8
$9s_{1/2}$	2.911+02	5.062+04	1.611−02	5.382+06	3.166+00	7.985+07	0.000+00	2.2
$10s_{1/2}$	2.313+02	5.056+04	2.769−02	1.877+06	3.104+00	7.985+07	0.000+00	2.5
$11s_{1/2}$	1.882+02	5.052+04	5.080−02	5.423+05	3.053+00	7.985+07	0.000+00	2.9
$12s_{1/2}$	1.561+02	5.048+04	9.777−02	1.350+05	3.013+00	7.985+07	0.000+00	3.2
$5p_{1/2}$	1.069+03	5.140+04	8.297+01	1.262+00	6.520+00	5.340+02	1.867+00	0.2
$6p_{1/2}$	6.993+02	5.103+04	1.178+02	6.328−01	6.130+00	5.336+02	2.262+00	0.6
$7p_{1/2}$	4.940+02	5.082+04	4.807+01	1.384+00	6.071+00	1.469+03	3.947+00	0.9
$8p_{1/2}$	3.677+02	5.069+04	6.241+01	8.228−01	5.839+00	1.469+03	2.866+00	1.6
$9p_{1/2}$	2.844+02	5.061+04	4.120−01	1.159+03	5.897+00	2.240+05	2.574+02	1.7
$10p_{1/2}$	2.265+02	5.055+04	1.302−02	1.202+05	5.982+00	5.699+06	9.065+03	2.2
$11p_{1/2}$	1.847+02	5.051+04	3.554−01	1.815+03	5.661+00	3.855+05	2.115+02	2.9
$12p_{1/2}$	1.535+02	3.990+04	4.015−02	8.366+04	5.560+00	4.335+06	1.557+03	3.2
$5p_{3/2}$	1.031+03	5.136+04	5.879+01	3.112+00	6.406+00	5.355+02	3.833+00	0.2
$6p_{3/2}$	6.788+02	5.101+04	8.047+01	1.612+00	6.045+00	5.347+02	3.135+00	0.7
$7p_{3/2}$	4.818+02	5.081+04	2.504+01	5.714+00	5.974+00	1.932+03	6.939+00	1.0
$8p_{3/2}$	3.598+02	5.069+04	3.202+01	3.501+00	5.756+00	1.931+03	4.731+00	1.6
$9p_{3/2}$	2.790+02	5.061+04	2.942−01	4.894+03	5.740+00	2.241+05	3.385+02	1.9
$10p_{3/2}$	2.227+02	3.997+04	1.729−01	1.403+04	5.604+00	4.760+05	4.627+02	2.2
$11p_{3/2}$	1.819+02	3.993+04	1.076−01	3.479+04	5.506+00	9.076+05	6.163+02	2.7
$12p_{3/2}$	1.513+02	3.154+04	1.617+01	5.863+00	5.315+00	8.640+03	4.417+00	2.9
$4d_{3/2}$	1.620+03	5.195+04	5.712+02	2.204+00	6.643+00	6.410+01	7.493−01	0.5
$5d_{3/2}$	9.541+02	5.128+04	2.780+02	2.056+00	7.777+00	7.578+01	1.035+00	0.7
$6d_{3/2}$	6.379+02	4.039+04	6.835+01	3.756+00	8.633+00	2.145+02	2.284+00	0.5
$7d_{3/2}$	4.572+02	4.020+04	8.120+01	2.204+00	8.359+00	2.141+02	2.135+00	0.6
$8d_{3/2}$	3.439+02	3.174+04	9.944−01	1.801+02	8.649+00	1.570+04	1.002+02	0.6

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$9d_{3/2}$	2.681+02	3.166+04	1.109+00	1.668+02	8.489+00	1.572+04	8.204+01	0.9
$10d_{3/2}$	2.149+02	2.501+04	1.259+00	1.553+02	8.325+00	1.573+04	6.250+01	1.3
$11d_{3/2}$	1.761+02	2.497+04	1.386+00	1.366+02	8.207+00	1.573+04	5.096+01	1.7
$12d_{3/2}$	1.470+02	1.973+04	1.601+00	1.215+02	8.056+00	1.576+04	3.709+01	2.0
$4d_{5/2}$	1.600+03	5.193+04	4.875+02	3.036+00	7.059+00	4.869+01	8.214−01	0.5
$5d_{5/2}$	9.457+02	5.127+04	2.189+02	2.769+00	8.161+00	6.947+01	1.213+00	0.6
$6d_{5/2}$	6.333+02	4.038+04	2.481+01	8.441+00	8.975+00	4.549+02	5.309+00	0.4
$7d_{5/2}$	4.544+02	4.020+04	2.872+01	5.621+00	8.732+00	4.545+02	5.002+00	0.5
$8d_{5/2}$	3.421+02	3.173+04	3.367+01	3.943+00	8.476+00	4.547+02	3.975+00	1.0
$9d_{5/2}$	2.669+02	2.506+04	7.384+00	1.802+01	8.445+00	2.202+03	1.331+01	1.2
$10d_{5/2}$	2.140+02	2.501+04	8.367+00	1.453+01	8.276+00	2.202+03	1.034+01	1.6
$11d_{5/2}$	1.755+02	1.976+04	9.861+00	1.138+01	8.089+00	2.203+03	7.630+00	1.9
$12d_{5/2}$	1.465+02	1.973+04	1.119+01	8.858+00	7.949+00	2.202+03	5.985+00	2.3
$4f_{5/2}$	1.407+03	2.620+04	2.685+02	2.307+01	7.468+00	7.600+01	1.130+00	0.1
$5f_{5/2}$	8.651+02	2.566+04	1.339+02	2.220+01	9.264+00	7.468+01	5.751−01	0.4
$6f_{5/2}$	5.905+02	2.017+04	1.108+02	1.158+01	9.879+00	7.580+01	1.285+00	0.3
$7f_{5/2}$	4.289+02	1.589+04	4.028+01	1.631+01	1.052+01	1.737+02	2.264+00	0.2
$8f_{5/2}$	3.255+02	1.579+04	4.347+01	9.861+00	1.042+01	1.744+02	2.309+00	0.3
$9f_{5/2}$	2.555+02	1.247+04	4.053+00	7.032+01	1.073+01	1.721+03	1.545+01	0.3
$10f_{5/2}$	2.059+02	1.242+04	4.355+00	5.485+01	1.062+01	1.718+03	1.389+01	0.5
$11f_{5/2}$	1.694+02	1.238+04	4.635+00	4.383+01	1.053+01	1.718+03	1.249+01	0.7
$12f_{5/2}$	1.419+02	9.788+03	5.123+00	3.699+01	1.037+01	1.719+03	9.944+00	1.0
$4f_{7/2}$	1.402+03	2.619+04	2.274+02	3.406+01	7.664+00	7.584+01	1.147+00	0.1
$5f_{7/2}$	8.628+02	2.566+04	1.251+02	2.491+01	9.380+00	7.261+01	5.252−01	0.4
$6f_{7/2}$	5.892+02	2.017+04	1.035+02	1.272+01	9.987+00	7.462+01	1.342+00	0.3
$7f_{7/2}$	4.280+02	1.589+04	1.113+02	6.574+00	9.940+00	7.452+01	1.363+00	0.3
$8f_{7/2}$	3.250+02	1.579+04	1.981+01	1.951+01	1.071+01	3.312+02	4.151+00	0.2
$9f_{7/2}$	2.551+02	1.247+04	2.173+01	1.341+01	1.056+01	3.307+02	3.740+00	0.4
$10f_{7/2}$	2.056+02	1.242+04	4.153+00	5.642+01	1.066+01	1.718+03	1.493+01	0.5
$11f_{7/2}$	1.692+02	9.815+03	4.527+00	4.634+01	1.052+01	1.719+03	1.261+01	0.7
$12f_{7/2}$	1.417+02	9.788+03	4.894+00	3.857+01	1.040+01	1.719+03	1.058+01	1.0
$5g_{7/2}$	8.063+02	1.045+04	3.383+02	3.653+00	6.951+00	1.101+02	7.567−01	0.3
$6g_{7/2}$	5.598+02	1.021+04	1.686+02	1.572+01	9.414+00	5.652+01	8.698−01	0.4
$7g_{7/2}$	4.104+02	8.029+03	1.370+02	1.337+01	1.018+01	5.565+01	9.004−01	0.3
$8g_{7/2}$	3.136+02	7.932+03	5.692+01	2.897+01	1.158+01	8.431+01	1.275+00	0.2
$9g_{7/2}$	2.473+02	7.865+03	5.909+01	1.744+01	1.162+01	8.413+01	1.325+00	0.2
$10g_{7/2}$	2.000+02	6.217+03	1.065+01	6.608+01	1.250+01	3.602+02	3.668+00	0.1
$11g_{7/2}$	1.650+02	6.182+03	1.093+01	4.564+01	1.250+01	3.601+02	4.065+00	0.1
$12g_{7/2}$	1.385+02	4.890+03	1.157+01	3.419+01	1.242+01	3.601+02	3.723+00	0.2
$5g_{9/2}$	8.056+02	1.045+04	3.461+02	3.394+00	6.891+00	1.100+02	7.477−01	0.3
$6g_{9/2}$	5.593+02	1.021+04	3.048+02	2.993+00	7.520+00	1.099+02	6.157−01	1.3
$7g_{9/2}$	4.101+02	8.028+03	1.017+02	2.285+01	1.078+01	5.752+01	1.039+00	0.2
$8g_{9/2}$	3.133+02	7.932+03	9.796+01	1.432+01	1.105+01	5.753+01	1.072+00	0.3
$9g_{9/2}$	2.471+02	7.865+03	3.146+01	3.425+01	1.211+01	1.326+02	1.796+00	0.2
$10g_{9/2}$	1.999+02	6.217+03	3.241+01	2.238+01	1.212+01	1.326+02	1.884+00	0.2
$11g_{9/2}$	1.649+02	6.182+03	3.468+01	1.536+01	1.202+01	1.325+02	1.761+00	0.3
$12g_{9/2}$	1.384+02	4.890+03	2.341+00	1.733+02	1.265+01	1.628+03	1.531+01	0.1
$6h_{9/2}$	5.479+02	6.565+03	5.763+01	2.875+02	1.143+01	6.373+01	2.918+00	0.4
$7h_{9/2}$	4.029+02	5.155+03	6.851+01	1.130+02	1.175+01	5.815+01	7.658−01	0.3
$8h_{9/2}$	3.086+02	5.060+03	5.659+01	8.612+01	1.272+01	5.670+01	8.118−01	0.2
$9h_{9/2}$	2.438+02	3.997+03	5.080+01	5.885+01	1.328+01	5.724+01	1.043+00	0.1
$10h_{9/2}$	1.974+02	3.950+03	5.129+01	3.729+01	1.343+01	5.722+01	1.117+00	0.1
$11h_{9/2}$	1.631+02	3.916+03	5.150+01	2.578+01	1.353+01	5.716+01	1.139+00	0.2
$12h_{9/2}$	1.370+02	3.101+03	1.266+01	6.443+01	1.473+01	1.720+02	2.812+00	0.2
$6h_{11/2}$	5.476+02	6.564+03	1.274+02	3.810+01	1.029+01	4.275+01	1.379+00	0.4
$7h_{11/2}$	4.028+02	5.155+03	9.733+01	5.157+01	1.141+01	4.498+01	9.507−01	0.3
$8h_{11/2}$	3.085+02	5.060+03	7.586+01	5.179+01	1.240+01	4.611+01	9.252−01	0.2
$9h_{11/2}$	2.437+02	3.997+03	7.744+01	3.077+01	1.260+01	4.605+01	9.226−01	0.2
$10h_{11/2}$	1.974+02	3.950+03	6.358+01	2.836+01	1.321+01	4.842+01	1.043+00	0.2
$11h_{11/2}$	1.631+02	3.916+03	3.019+01	4.477+01	1.418+01	8.059+01	1.574+00	0.1
$12h_{11/2}$	1.370+02	3.101+03	3.202+01	3.073+01	1.411+01	8.044+01	1.497+00	0.2
$7i_{11/2}$	4.013+02	3.365+03	1.346+02	1.553+01	9.582+00	8.116+01	6.380−01	0.1
$8i_{11/2}$	3.073+02	3.271+03	1.721+02	4.742+00	9.642+00	8.052+01	5.352−01	0.6
$9i_{11/2}$	2.428+02	3.207+03	1.087+02	2.478+01	1.244+01	3.557+01	6.497−01	0.3

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$10i_{11/2}$	1.967+02	2.538+03	9.328+01	2.688+01	1.321+01	3.539+01	6.660−01	0.4
$11i_{11/2}$	1.626+02	2.503+03	5.316+01	6.862+01	1.534+01	3.442+01	9.355−01	0.4
$12i_{11/2}$	1.366+02	2.478+03	3.608+01	7.671+01	1.621+01	4.299+01	1.188+00	0.5
$7i_{13/2}$	4.012+02	3.365+03	1.225+02	2.597+01	1.055+01	4.798+01	8.721−01	0.8
$8i_{13/2}$	3.072+02	3.271+03	1.381+02	1.332+01	1.083+01	4.816+01	6.084−01	0.1
$9i_{13/2}$	2.428+02	3.207+03	9.610+01	3.609+01	1.282+01	3.533+01	6.607−01	0.3
$10i_{13/2}$	1.967+02	2.538+03	9.523+01	2.550+01	1.314+01	3.524+01	6.605−01	0.4
$11i_{13/2}$	1.625+02	2.503+03	4.361+01	9.049+01	1.576+01	3.770+01	1.032+00	0.5
$12i_{13/2}$	1.366+02	2.477+03	4.374+01	6.342+01	1.592+01	3.770+01	1.071+00	0.4
W^{45+}								
$4s_{1/2}$	2.417+03	5.274+04	3.098−02	1.914+05	4.125+00	2.530+06	9.777−02	0.2
$5s_{1/2}$	1.448+03	5.177+04	6.692−02	2.981+05	3.661+00	2.530+06	3.671−01	0.5
$6s_{1/2}$	9.651+02	5.129+04	1.188−01	1.896+05	3.426+00	2.530+06	1.007+00	0.7
$7s_{1/2}$	6.893+02	5.102+04	1.925−01	9.237+04	3.282+00	2.530+06	1.247+00	1.0
$8s_{1/2}$	5.169+02	5.084+04	2.996−01	4.023+04	3.182+00	2.530+06	1.251+00	1.2
$9s_{1/2}$	4.019+02	5.073+04	4.583−01	1.644+04	3.109+00	2.530+06	1.083+00	1.4
$10s_{1/2}$	3.215+02	5.065+04	7.159−01	6.160+03	3.050+00	2.530+06	1.155+00	1.7
$11s_{1/2}$	2.630+02	5.059+04	1.135+00	2.164+03	3.002+00	2.530+06	8.863−01	1.9
$12s_{1/2}$	2.191+02	5.055+04	1.272+00	1.392+03	2.987+00	2.530+06	2.408+01	1.9
$4p_{1/2}$	2.319+03	5.265+04	4.166+00	2.512+01	7.168+00	6.751+03	4.502+00	0.7
$5p_{1/2}$	1.400+03	5.173+04	6.930+00	3.556+01	6.487+00	6.750+03	3.912+00	0.2
$6p_{1/2}$	9.386+02	5.127+04	9.438+00	2.732+01	6.157+00	6.751+03	1.472+01	0.4
$7p_{1/2}$	6.731+02	5.100+04	1.181+01	1.864+01	5.952+00	6.752+03	1.290+01	0.7
$8p_{1/2}$	5.063+02	5.083+04	1.448+01	1.235+01	5.789+00	6.752+03	9.858+00	1.0
$9p_{1/2}$	3.946+02	5.072+04	1.751+01	8.078+00	5.655+00	6.752+03	7.441+00	1.4
$10p_{1/2}$	3.162+02	5.064+04	2.096+01	5.274+00	5.541+00	6.752+03	5.691+00	1.8
$11p_{1/2}$	2.591+02	5.059+04	2.479+01	3.481+00	5.442+00	6.751+03	4.434+00	2.2
$12p_{1/2}$	2.161+02	5.054+04	2.808+01	2.420+00	5.368+00	6.750+03	3.700+00	2.4
$4p_{3/2}$	2.216+03	5.254+04	3.557+00	1.110+02	6.801+00	6.750+03	4.452+00	0.2
$5p_{3/2}$	1.352+03	5.168+04	5.054+00	1.093+02	6.329+00	6.808+03	4.326+01	0.3
$6p_{3/2}$	9.122+02	5.124+04	6.567+00	8.284+01	6.039+00	6.788+03	3.093+01	0.6
$7p_{3/2}$	6.570+02	5.098+04	8.162+00	5.816+01	5.829+00	6.783+03	2.101+01	0.9
$8p_{3/2}$	4.958+02	5.082+04	9.884+00	3.928+01	5.669+00	6.754+03	1.467+01	1.2
$9p_{3/2}$	3.874+02	5.071+04	1.168+01	2.648+01	5.542+00	6.755+03	1.067+01	1.6
$10p_{3/2}$	3.110+02	5.064+04	1.362+01	1.787+01	5.437+00	6.755+03	8.018+00	1.9
$11p_{3/2}$	2.552+02	4.000+04	1.742+01	1.064+01	5.307+00	6.756+03	5.493+00	2.1
$12p_{3/2}$	2.132+02	3.996+04	1.988+01	7.251+00	5.233+00	6.756+03	4.453+00	2.3
$4d_{3/2}$	2.065+03	5.239+04	7.053+02	1.718+00	6.406+00	6.130+01	8.387−01	0.5
$5d_{3/2}$	1.280+03	5.161+04	2.638+02	2.790+00	7.683+00	8.796+01	1.224+00	0.6
$6d_{3/2}$	8.723+02	5.120+04	8.796+01	4.985+00	8.179+00	2.209+02	2.083+00	0.6
$7d_{3/2}$	6.326+02	4.038+04	9.816+01	2.877+00	8.024+00	2.209+02	2.145+00	0.5
$8d_{3/2}$	4.797+02	4.023+04	1.431+01	1.975+01	8.261+00	1.390+03	8.653+00	0.5
$9d_{3/2}$	3.763+02	3.177+04	1.586+01	1.448+01	8.123+00	1.391+03	7.385+00	0.7
$10d_{3/2}$	3.030+02	3.169+04	1.756+01	1.083+01	7.993+00	1.391+03	6.142+00	1.0
$11d_{3/2}$	2.493+02	2.504+04	2.018+01	7.994+00	7.837+00	1.392+03	4.790+00	1.3
$12d_{3/2}$	2.086+02	2.500+04	2.229+01	6.005+00	7.728+00	1.392+03	4.047+00	1.6
$4d_{5/2}$	2.043+03	5.237+04	5.745+02	2.631+00	6.915+00	4.526+01	9.406−01	0.5
$5d_{5/2}$	1.269+03	5.160+04	1.707+02	4.608+00	8.153+00	9.402+01	1.535+00	0.5
$6d_{5/2}$	8.663+02	5.119+04	2.842+01	1.583+01	8.537+00	5.111+02	4.262+00	0.5
$7d_{5/2}$	6.289+02	4.038+04	3.096+01	9.782+00	8.418+00	5.108+02	5.244+00	0.4
$8d_{5/2}$	4.773+02	4.022+04	3.495+01	6.644+00	8.236+00	5.112+02	4.462+00	0.7
$9d_{5/2}$	3.746+02	3.177+04	4.051+01	4.601+00	8.029+00	5.115+02	3.525+00	1.1
$10d_{5/2}$	3.018+02	2.509+04	4.869+01	3.114+00	7.799+00	5.108+02	2.684+00	1.3
$11d_{5/2}$	2.484+02	2.504+04	7.629+00	3.092+01	7.953+00	3.050+03	1.155+01	1.3
$12d_{5/2}$	2.079+02	1.979+04	8.749+00	2.392+01	7.815+00	3.050+03	8.899+00	1.4
$4f_{5/2}$	1.882+03	3.327+04	2.211+02	4.078+01	7.757+00	8.281+01	1.622+00	0.4
$5f_{5/2}$	1.198+03	2.599+04	1.486+02	2.538+01	8.966+00	8.381+01	8.196−01	0.2
$6f_{5/2}$	8.275+02	2.562+04	1.359+02	1.227+01	9.392+00	8.436+01	1.202+00	0.2
$7f_{5/2}$	6.054+02	2.019+04	1.408+02	6.431+00	9.450+00	8.449+01	1.308+00	0.3
$8f_{5/2}$	4.619+02	2.004+04	8.889+01	7.095+00	9.731+00	1.258+02	1.563+00	0.3
$9f_{5/2}$	3.640+02	1.583+04	3.267+01	1.427+01	1.017+01	2.954+02	3.016+00	0.2
$10f_{5/2}$	2.942+02	1.576+04	3.531+01	9.917+00	1.005+01	2.957+02	2.753+00	0.4
$11f_{5/2}$	2.427+02	1.246+04	3.945+01	7.015+00	9.885+00	2.955+02	2.348+00	0.6
$12f_{5/2}$	2.036+02	1.242+04	4.524+00	7.711+01	1.021+01	2.261+03	1.406+01	0.4

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$4f_{7/2}$	1.876+03	3.327+04	1.913+02	5.609+01	7.931+00	8.230+01	1.826+00	0.3
$5f_{7/2}$	1.195+03	2.599+04	1.383+02	2.922+01	9.026+00	8.383+01	6.053−01	0.2
$6f_{7/2}$	8.255+02	2.562+04	1.290+02	1.333+01	9.482+00	8.181+01	1.257+00	0.2
$7f_{7/2}$	6.041+02	2.018+04	1.357+02	6.843+00	9.518+00	8.154+01	1.348+00	0.3
$8f_{7/2}$	4.611+02	2.004+04	2.099+01	3.415+01	1.032+01	4.067+02	3.482+00	0.1
$9f_{7/2}$	3.634+02	1.583+04	2.335+01	2.288+01	1.016+01	4.068+02	3.127+00	0.4
$10f_{7/2}$	2.937+02	1.576+04	2.328+01	1.571+01	1.020+01	4.076+02	3.810+00	0.3
$11f_{7/2}$	2.423+02	1.246+04	2.548+01	1.149+01	1.006+01	4.075+02	3.307+00	0.5
$12f_{7/2}$	2.033+02	1.242+04	2.745+01	8.629+00	9.945+00	4.078+02	2.935+00	0.7
$5g_{7/2}$	1.158+03	1.662+04	2.799+02	1.137+01	7.474+00	1.094+02	1.132+00	0.5
$6g_{7/2}$	8.051+02	1.302+04	1.920+02	1.778+01	8.509+00	1.105+02	3.844−02	0.4
$7g_{7/2}$	5.915+02	1.280+04	1.599+02	1.370+01	9.804+00	7.038+01	7.671−01	0.4
$8g_{7/2}$	4.527+02	1.010+04	1.789+02	6.443+00	9.773+00	7.033+01	7.921−01	0.3
$9g_{7/2}$	3.576+02	1.000+04	1.238+02	8.198+00	1.069+01	6.942+01	9.718−01	0.4
$10g_{7/2}$	2.895+02	7.908+03	6.542+01	1.319+01	1.155+01	9.786+01	1.354+00	0.4
$11g_{7/2}$	2.392+02	7.857+03	3.690+01	1.762+01	1.198+01	1.531+02	1.912+00	0.5
$12g_{7/2}$	2.009+02	7.819+03	3.852+01	1.264+01	1.193+01	1.531+02	1.872+00	0.4
$5g_{9/2}$	1.157+03	1.662+04	2.762+02	1.207+01	7.453+00	1.094+02	1.100+00	0.4
$6g_{9/2}$	8.043+02	1.302+04	3.470+02	3.365+00	7.568+00	1.100+02	6.675−01	0.6
$7g_{9/2}$	5.910+02	1.280+04	1.827+02	1.048+01	9.546+00	6.850+01	7.538−01	0.2
$8g_{9/2}$	4.524+02	1.010+04	1.327+02	1.151+01	1.042+01	6.824+01	8.919−01	0.4
$9g_{9/2}$	3.574+02	1.000+04	1.202+02	8.681+00	1.076+01	6.822+01	9.896−01	0.4
$10g_{9/2}$	2.894+02	7.908+03	6.455+01	1.333+01	1.165+01	9.317+01	1.421+00	0.5
$11g_{9/2}$	2.391+02	7.857+03	7.113+01	8.671+00	1.149+01	9.302+01	1.291+00	0.4
$12g_{9/2}$	2.008+02	7.819+03	3.007+01	1.613+01	1.211+01	1.812+02	2.260+00	0.4
$6h_{9/2}$	8.010+02	8.419+03	3.035+02	4.589+00	7.599+00	1.093+02	6.484−01	0.5
$7h_{9/2}$	5.886+02	6.605+03	3.374+02	2.156+00	7.933+00	1.084+02	5.313−01	0.6
$8h_{9/2}$	4.507+02	6.467+03	1.944+02	1.194+01	1.092+01	3.553+01	6.846−01	0.5
$9h_{9/2}$	3.561+02	6.373+03	1.387+02	1.848+01	1.228+01	3.323+01	7.994−01	0.6
$10h_{9/2}$	2.884+02	5.040+03	7.487+01	3.345+01	1.393+01	3.940+01	1.167+00	0.4
$11h_{9/2}$	2.383+02	4.990+03	4.249+01	3.676+01	1.472+01	5.927+01	1.713+00	0.5
$12h_{9/2}$	2.003+02	4.952+03	4.461+01	2.543+01	1.465+01	5.930+01	1.654+00	0.4
$6h_{11/2}$	8.005+02	8.419+03	2.950+02	5.144+00	7.627+00	1.093+02	6.344−01	0.4
$7h_{11/2}$	5.883+02	6.605+03	3.393+02	2.111+00	7.909+00	1.084+02	5.296−01	0.6
$8h_{11/2}$	4.505+02	6.467+03	1.936+02	1.224+01	1.096+01	3.472+01	6.887−01	0.4
$9h_{11/2}$	3.559+02	6.373+03	1.377+02	1.900+01	1.232+01	3.267+01	8.061−01	0.6
$10h_{11/2}$	2.883+02	5.040+03	9.514+01	2.540+01	1.357+01	3.358+01	1.038+00	0.4
$11h_{11/2}$	2.383+02	4.990+03	4.909+01	3.334+01	1.460+01	5.234+01	1.572+00	0.4
$12h_{11/2}$	2.002+02	4.952+03	1.877+01	4.021+01	1.531+01	1.195+02	3.322+00	0.5
$7i_{11/2}$	5.881+02	5.340+03	1.931+02	2.143+01	1.070+01	3.018+01	6.888−01	0.3
$8i_{11/2}$	4.503+02	4.203+03	2.422+02	7.159+00	1.071+01	3.019+01	5.683−01	0.6
$9i_{11/2}$	3.558+02	4.109+03	1.043+02	1.164+02	1.533+01	1.832+01	9.253−01	0.2
$10i_{11/2}$	2.882+02	4.041+03	9.801+01	9.192+01	1.602+01	1.791+01	9.953−01	0.3
$11i_{11/2}$	2.382+02	3.202+03	6.422+01	9.859+01	1.717+01	2.299+01	1.319+00	0.2
$12i_{11/2}$	2.001+02	3.164+03	5.259+01	7.390+01	1.743+01	2.810+01	1.463+00	0.3
$7i_{13/2}$	5.879+02	5.340+03	1.942+02	2.093+01	1.067+01	3.017+01	6.855−01	0.3
$8i_{13/2}$	4.502+02	4.203+03	2.434+02	7.005+00	1.068+01	3.021+01	5.668−01	0.6
$9i_{13/2}$	3.557+02	4.109+03	1.020+02	1.227+02	1.541+01	1.833+01	9.391−01	0.2
$10i_{13/2}$	2.881+02	4.041+03	9.065+01	1.039+02	1.624+01	1.846+01	1.050+00	0.2
$11i_{13/2}$	2.381+02	3.202+03	6.483+01	9.695+01	1.709+01	2.315+01	1.291+00	0.2
$12i_{13/2}$	2.001+02	3.164+03	3.718+01	8.142+01	1.806+01	3.506+01	2.022+00	0.2
W^{55+}								
$4s_{1/2}$	3.213+03	5.354+04	1.699−01	4.391+04	3.979+00	5.080+05	1.059−01	0.1
$5s_{1/2}$	1.976+03	5.230+04	3.181−01	4.467+04	3.586+00	5.080+05	3.180−01	0.2
$6s_{1/2}$	1.338+03	5.167+04	5.163−01	2.623+04	3.370+00	5.080+05	2.045−01	0.3
$7s_{1/2}$	9.660+02	5.129+04	7.801−01	1.295+04	3.232+00	5.080+05	4.922−02	0.5
$8s_{1/2}$	7.299+02	5.106+04	1.139+00	5.948+03	3.135+00	5.080+05	2.740−01	0.7
$9s_{1/2}$	5.709+02	5.090+04	1.641+00	2.621+03	3.060+00	5.080+05	1.698−01	0.9
$10s_{1/2}$	4.587+02	5.079+04	2.387+00	1.095+03	3.000+00	5.080+05	1.759+00	1.1
$11s_{1/2}$	3.766+02	5.070+04	3.539+00	4.329+02	2.948+00	5.080+05	1.651+00	1.3
$12s_{1/2}$	3.147+02	5.064+04	3.305+00	3.835+02	2.948+00	5.080+05	1.565+01	1.2
$4p_{1/2}$	3.128+03	5.346+04	5.441+01	7.018+00	6.593+00	7.397+02	1.916+00	0.5
$5p_{1/2}$	1.934+03	5.226+04	9.045+01	3.634+00	6.004+00	7.402+02	2.000+00	0.2

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$6p_{1/2}$	1.314+03	5.164+04	1.198+02	1.793+00	5.735+00	7.393+02	2.748+00	0.2
$7p_{1/2}$	9.512+02	5.128+04	1.586+02	9.013−01	5.489+00	7.395+02	2.209+00	0.5
$8p_{1/2}$	7.202+02	5.105+04	1.676+00	8.942+02	5.666+00	6.150+04	8.175+01	0.5
$9p_{1/2}$	5.641+02	5.089+04	1.897+00	6.659+02	5.575+00	6.149+04	6.882+01	0.7
$10p_{1/2}$	4.538+02	5.078+04	2.162+00	4.935+02	5.491+00	6.149+04	5.399+01	0.9
$11p_{1/2}$	3.729+02	5.070+04	2.459+00	3.636+02	5.416+00	6.148+04	4.163+01	1.1
$12p_{1/2}$	3.119+02	5.064+04	2.746+00	2.695+02	5.356+00	6.148+04	3.362+01	1.3
$4p_{3/2}$	2.997+03	5.332+04	4.256+01	1.904+01	6.343+00	7.399+02	1.907+00	0.2
$5p_{3/2}$	1.870+03	5.220+04	6.768+01	9.342+00	5.817+00	7.408+02	1.694+00	0.3
$6p_{3/2}$	1.278+03	5.161+04	7.347+01	5.146+00	5.728+00	7.444+02	4.463+00	0.3
$7p_{3/2}$	9.290+02	5.126+04	9.458+01	2.728+00	5.497+00	7.407+02	3.255+00	0.6
$8p_{3/2}$	7.055+02	5.103+04	1.170+02	1.528+00	5.308+00	7.412+02	2.474+00	0.9
$9p_{3/2}$	5.539+02	5.088+04	1.247+00	2.398+03	5.481+00	6.146+04	1.136+02	0.8
$10p_{3/2}$	4.464+02	5.077+04	1.403+00	1.826+03	5.397+00	6.146+04	8.605+01	1.0
$11p_{3/2}$	3.674+02	5.069+04	1.565+00	1.388+03	5.325+00	6.149+04	6.618+01	1.3
$12p_{3/2}$	3.077+02	5.063+04	1.725+00	1.058+03	5.266+00	6.150+04	5.240+01	1.5
$3d_{3/2}$	5.347+03	5.567+04	2.736+02	1.081+02	5.600+00	2.514+02	1.209−02	0.6
$4d_{3/2}$	2.880+03	5.321+04	1.494+03	4.808−01	4.540+00	2.526+02	6.514−01	0.7
$5d_{3/2}$	1.814+03	5.214+04	5.418+02	1.514+00	6.757+00	7.699+01	1.030+00	0.4
$6d_{3/2}$	1.247+03	5.157+04	2.600+02	2.207+00	7.448+00	1.153+02	1.445+00	0.5
$7d_{3/2}$	9.096+02	5.124+04	1.034+02	4.230+00	7.843+00	2.459+02	2.420+00	0.5
$8d_{3/2}$	6.927+02	5.102+04	1.169+02	2.561+00	7.681+00	2.455+02	2.151+00	0.5
$9d_{3/2}$	5.450+02	4.029+04	1.296+02	1.679+00	7.531+00	2.457+02	1.854+00	0.7
$10d_{3/2}$	4.400+02	3.183+04	2.661−01	8.616+03	7.987+00	9.464+04	4.841+02	0.4
$11d_{3/2}$	3.626+02	3.175+04	2.913−01	8.181+03	7.878+00	9.475+04	3.806+02	0.7
$12d_{3/2}$	3.040+02	3.170+04	3.124−01	7.376+03	7.799+00	9.480+04	3.179+02	0.9
$3d_{5/2}$	5.268+03	5.559+04	1.680+02	3.011+02	5.964+00	2.421+02	1.349−02	0.6
$4d_{5/2}$	2.850+03	5.318+04	6.165+01	5.391+01	8.280+00	2.333+02	1.108−02	1.0
$5d_{5/2}$	1.799+03	5.213+04	6.952+01	1.859+01	8.265+00	2.333+02	1.179−01	0.7
$6d_{5/2}$	1.238+03	5.157+04	7.721+01	9.081+00	8.159+00	2.351+02	2.825+00	0.5
$7d_{5/2}$	9.042+02	5.123+04	8.319+01	5.189+00	8.080+00	2.345+02	3.135+00	0.5
$8d_{5/2}$	6.891+02	4.044+04	9.498+01	3.221+00	7.892+00	2.333+02	2.631+00	0.4
$9d_{5/2}$	5.425+02	4.029+04	2.191+01	1.528+01	8.065+00	9.553+02	7.887+00	0.5
$10d_{5/2}$	4.382+02	3.183+04	2.449+01	1.126+01	7.922+00	9.529+02	6.330+00	0.7
$11d_{5/2}$	3.613+02	3.175+04	2.716+01	8.432+00	7.791+00	9.530+02	5.129+00	1.0
$12d_{5/2}$	3.030+02	2.510+04	3.134+01	6.130+00	7.633+00	9.518+02	3.995+00	1.2
$4f_{5/2}$	2.746+03	4.249+04	9.196+02	2.187+00	5.607+00	9.050+01	8.547−01	0.5
$5f_{5/2}$	1.751+03	4.150+04	6.611+02	2.411+00	7.077+00	5.346+01	7.927−01	0.5
$6f_{5/2}$	1.212+03	3.260+04	3.365+02	4.742+00	8.716+00	4.975+01	1.013+00	0.4
$7f_{5/2}$	8.880+02	2.568+04	1.544+02	7.415+00	9.770+00	7.506+01	1.513+00	0.2
$8f_{5/2}$	6.785+02	2.547+04	1.759+02	3.993+00	9.574+00	7.526+01	1.373+00	0.3
$9f_{5/2}$	5.351+02	2.012+04	2.604+01	1.889+01	1.050+01	3.688+02	5.451+00	0.1
$10f_{5/2}$	4.329+02	2.001+04	2.780+01	1.348+01	1.040+01	3.690+02	4.978+00	0.2
$11f_{5/2}$	3.573+02	1.994+04	2.988+01	1.008+01	1.028+01	3.691+02	4.356+00	0.4
$12f_{5/2}$	2.999+02	1.576+04	3.270+01	7.715+00	1.013+01	3.698+02	3.676+00	0.6
$4f_{7/2}$	2.735+03	4.248+04	5.214+02	1.192+01	6.281+00	8.774+01	6.361−01	0.5
$5f_{7/2}$	1.745+03	4.149+04	5.280+02	4.225+00	7.564+00	4.693+01	8.413−01	0.5
$6f_{7/2}$	1.208+03	3.260+04	3.114+02	5.540+00	8.915+00	4.645+01	1.071+00	0.3
$7f_{7/2}$	8.858+02	2.568+04	2.596+02	4.031+00	9.378+00	4.847+01	1.216+00	0.3
$8f_{7/2}$	6.770+02	2.547+04	6.038+01	1.186+01	1.037+01	1.546+02	2.878+00	0.2
$9f_{7/2}$	5.341+02	2.011+04	6.339+01	7.677+00	1.032+01	1.545+02	2.816+00	0.2
$10f_{7/2}$	4.321+02	2.001+04	7.134+01	5.218+00	1.012+01	1.541+02	2.352+00	0.4
$11f_{7/2}$	3.567+02	1.582+04	8.186+01	3.596+00	9.871+00	1.540+02	1.916+00	0.7
$12f_{7/2}$	2.995+02	1.576+04	9.128+00	3.204+01	1.037+01	1.154+03	1.173+01	0.5
$5g_{7/2}$	1.717+03	2.130+04	4.832+02	6.051+00	7.308+00	7.198+01	8.920−01	0.2
$6g_{7/2}$	1.193+03	2.077+04	3.405+02	9.465+00	9.178+00	4.418+01	8.201−01	0.1
$7g_{7/2}$	8.766+02	1.634+04	2.212+02	1.287+01	1.057+01	4.325+01	9.407−01	0.2
$8g_{7/2}$	6.709+02	1.614+04	2.331+02	6.874+00	1.065+01	4.323+01	9.372−01	0.2
$9g_{7/2}$	5.299+02	1.274+04	1.741+02	7.090+00	1.147+01	4.446+01	1.148+00	0.4
$10g_{7/2}$	4.291+02	1.264+04	9.419+01	9.374+00	1.212+01	7.066+01	1.618+00	0.2
$11g_{7/2}$	3.545+02	1.000+04	1.032+02	6.255+00	1.194+01	7.056+01	1.436+00	0.4
$12g_{7/2}$	2.978+02	9.944+03	3.756+01	1.109+01	1.262+01	1.610+02	3.052+00	0.2
$5g_{9/2}$	1.714+03	2.129+04	2.803+02	3.322+01	8.158+00	7.223+01	9.489−01	0.0
$6g_{9/2}$	1.192+03	2.077+04	1.881+02	3.636+01	1.001+01	5.612+01	5.813−03	0.2
$7g_{9/2}$	8.755+02	1.634+04	1.464+02	2.653+01	1.100+01	5.540+01	3.980−01	0.3

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$8g_{9/2}$	6.702+02	1.613+04	1.261+02	1.681+01	1.168+01	5.472+01	1.269+00	0.3
$9g_{9/2}$	5.294+02	1.274+04	1.398+02	9.285+00	1.153+01	5.530+01	1.202+00	0.3
$10g_{9/2}$	4.287+02	1.264+04	5.588+01	1.464+01	1.255+01	1.029+02	2.381+00	0.2
$11g_{9/2}$	3.542+02	1.000+04	5.934+01	1.020+01	1.244+01	1.033+02	2.189+00	0.2
$12g_{9/2}$	2.976+02	9.944+03	6.475+01	7.329+00	1.226+01	1.035+02	1.915+00	0.4
$6h_{9/2}$	1.188+03	1.083+04	4.382+02	3.875+00	8.012+00	7.071+01	6.932−01	0.1
$7h_{9/2}$	8.730+02	1.052+04	3.926+02	4.789+00	9.549+00	3.963+01	6.537−01	0.2
$8h_{9/2}$	6.684+02	1.031+04	2.245+02	1.725+01	1.195+01	3.018+01	7.893−01	0.4
$9h_{9/2}$	5.281+02	8.146+03	2.402+02	9.778+00	1.209+01	2.892+01	7.684−01	0.3
$10h_{9/2}$	4.277+02	8.046+03	9.143+01	2.768+01	1.438+01	4.192+01	1.392+00	0.3
$11h_{9/2}$	3.535+02	7.972+03	9.791+01	1.768+01	1.429+01	4.191+01	1.318+00	0.3
$12h_{9/2}$	2.970+02	6.314+03	1.690+01	2.994+01	1.567+01	1.794+02	5.706+00	0.2
$6h_{11/2}$	1.187+03	1.083+04	4.388+02	3.859+00	7.985+00	7.071+01	6.844−01	0.1
$7h_{11/2}$	8.723+02	1.052+04	3.093+02	1.101+01	1.035+01	3.450+01	6.961−01	0.3
$8h_{11/2}$	6.679+02	1.031+04	3.215+02	6.169+00	1.065+01	3.421+01	6.580−01	0.4
$9h_{11/2}$	5.278+02	8.146+03	1.580+02	2.301+01	1.335+01	2.961+01	1.006+00	0.3
$10h_{11/2}$	4.275+02	8.046+03	1.620+02	1.488+01	1.347+01	2.933+01	9.856−01	0.3
$11h_{11/2}$	3.533+02	7.971+03	8.207+01	2.062+01	1.462+01	4.545+01	1.529+00	0.3
$12h_{11/2}$	2.968+02	6.314+03	2.060+01	2.743+01	1.564+01	1.467+02	4.842+00	0.2
$7i_{11/2}$	8.720+02	6.889+03	4.822+02	1.027+00	8.316+00	7.270+01	5.547−01	0.5
$8i_{11/2}$	6.677+02	6.684+03	2.730+02	1.871+01	1.249+01	2.014+01	7.197−01	0.2
$9i_{11/2}$	5.276+02	6.544+03	2.488+02	1.728+01	1.316+01	2.100+01	6.775−01	0.4
$10i_{11/2}$	4.273+02	5.179+03	1.350+02	6.257+01	1.605+01	1.972+01	1.037+00	0.1
$11i_{11/2}$	3.532+02	5.105+03	1.217+02	5.282+01	1.671+01	1.980+01	1.135+00	0.4
$12i_{11/2}$	2.967+02	5.049+03	9.883+01	3.801+01	1.661+01	2.722+01	1.147+00	0.5
$7i_{13/2}$	8.715+02	6.888+03	4.840+02	1.007+00	8.294+00	7.274+01	5.529−01	0.5
$8i_{13/2}$	6.674+02	6.684+03	2.144+02	4.168+01	1.330+01	2.027+01	7.768−01	0.2
$9i_{13/2}$	5.274+02	6.544+03	1.420+02	8.250+01	1.536+01	2.040+01	9.508−01	0.3
$10i_{13/2}$	4.272+02	5.179+03	1.521+02	4.785+01	1.549+01	1.998+01	9.167−01	0.2
$11i_{13/2}$	3.530+02	5.105+03	1.195+02	5.295+01	1.668+01	2.030+01	1.135+00	0.3
$12i_{13/2}$	2.966+02	5.049+03	2.464+01	5.125+01	1.854+01	7.393+01	4.025+00	0.1
W^{63+}								
$3s_{1/2}$	7.142+03	5.747+04	1.529+01	4.664+01	4.438+00	3.534+03	0.000+00	0.2
$4s_{1/2}$	3.883+03	5.421+04	3.151+01	3.042+01	3.768+00	3.535+03	0.000+00	0.2
$5s_{1/2}$	2.434+03	5.276+04	6.421+01	9.615+00	3.370+00	3.535+03	0.000+00	0.1
$6s_{1/2}$	1.667+03	5.199+04	9.135+01	4.161+00	3.168+00	3.534+03	0.000+00	0.9
$7s_{1/2}$	1.212+03	5.154+04	9.400−03	8.521+07	3.206+00	3.586+07	0.000+00	0.2
$8s_{1/2}$	9.209+02	5.125+04	1.273−02	5.418+07	3.116+00	3.586+07	0.000+00	0.3
$9s_{1/2}$	7.233+02	5.105+04	1.706−02	3.190+07	3.046+00	3.586+07	0.000+00	0.4
$10s_{1/2}$	5.830+02	5.091+04	2.222−02	1.842+07	2.993+00	3.586+07	0.000+00	0.5
$11s_{1/2}$	4.799+02	5.081+04	2.956−02	9.952+06	2.947+00	3.586+07	0.000+00	0.7
$12s_{1/2}$	4.019+02	5.073+04	3.761−02	5.611+06	2.912+00	3.586+07	0.000+00	0.8
$3p_{1/2}$	6.982+03	5.731+04	2.743+03	2.096−01	3.555+00	7.380+02	7.435−01	0.2
$4p_{1/2}$	3.817+03	5.414+04	1.627+03	2.044−01	3.976+00	7.380+02	8.017−01	0.5
$5p_{1/2}$	2.401+03	5.273+04	9.671+02	2.457−01	4.326+00	7.391+02	9.107−01	0.9
$6p_{1/2}$	1.648+03	5.197+04	5.250+02	3.752−01	4.702+00	7.390+02	1.129+00	1.0
$7p_{1/2}$	1.200+03	5.153+04	1.850+02	1.040+00	5.337+00	7.388+02	2.133+00	0.3
$8p_{1/2}$	9.131+02	5.124+04	1.915+02	7.093−01	5.275+00	7.388+02	2.011+00	0.8
$9p_{1/2}$	7.178+02	5.104+04	6.659+00	1.340+02	5.476+00	1.869+04	2.234+01	0.3
$10p_{1/2}$	5.790+02	5.091+04	6.855+00	1.010+02	5.444+00	1.869+04	2.237+01	0.4
$11p_{1/2}$	4.769+02	5.080+04	8.365+00	6.763+01	5.334+00	1.870+04	1.505+01	0.7
$12p_{1/2}$	3.996+02	5.073+04	9.448+00	4.807+01	5.268+00	1.870+04	1.180+01	0.9
$3p_{3/2}$	6.604+03	5.693+04	2.800+03	2.198−01	3.134+00	7.379+02	7.456−01	0.3
$4p_{3/2}$	3.662+03	5.399+04	1.682+03	2.277−01	3.574+00	7.377+02	7.802−01	0.8
$5p_{3/2}$	2.323+03	5.265+04	1.041+03	2.740−01	3.919+00	7.375+02	8.582−01	1.2
$6p_{3/2}$	1.603+03	5.193+04	6.475+02	3.621−01	4.225+00	7.368+02	9.834−01	1.6
$7p_{3/2}$	1.173+03	5.150+04	1.035+02	3.425+00	5.389+00	7.358+02	3.258+00	0.3
$8p_{3/2}$	8.947+02	5.122+04	1.269+02	1.895+00	5.218+00	7.364+02	2.555+00	0.5
$9p_{3/2}$	7.049+02	5.103+04	1.182+01	7.601+01	5.382+00	6.899+03	1.465+01	0.5
$10p_{3/2}$	5.697+02	5.090+04	1.327+01	5.292+01	5.300+00	6.900+03	1.150+01	0.7
$11p_{3/2}$	4.699+02	5.080+04	1.468+01	3.746+01	5.233+00	6.901+03	9.422+00	0.8
$12p_{3/2}$	3.943+02	5.072+04	1.641+01	2.651+01	5.164+00	6.901+03	7.513+00	1.1
$3d_{3/2}$	6.415+03	5.674+04	1.185+03	3.351+00	4.835+00	1.124+02	1.431+00	0.6

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$4d_{3/2}$	3.590+03	5.392+04	6.504+02	3.528+00	5.945+00	1.124+02	1.771−01	0.3
$5d_{3/2}$	2.288+03	5.261+04	4.380+02	2.691+00	6.702+00	1.098+02	8.800−01	0.4
$6d_{3/2}$	1.584+03	5.191+04	3.954+02	1.597+00	6.928+00	1.107+02	1.210+00	0.4
$7d_{3/2}$	1.160+03	5.149+04	2.239+02	2.140+00	7.328+00	1.605+02	1.611+00	0.5
$8d_{3/2}$	8.865+02	5.121+04	1.027+02	4.058+00	7.619+00	3.062+02	2.511+00	0.5
$9d_{3/2}$	6.992+02	5.103+04	1.137+02	2.612+00	7.494+00	3.057+02	2.244+00	0.5
$10d_{3/2}$	5.656+02	4.031+04	1.250+02	1.777+00	7.368+00	3.056+02	1.945+00	0.6
$11d_{3/2}$	4.669+02	4.021+04	1.160−01	6.909+04	7.766+00	2.658+05	1.066+03	0.5
$12d_{3/2}$	3.919+02	3.178+04	1.161−01	5.494+04	7.758+00	2.658+05	1.066+03	0.5
$3d_{5/2}$	6.328+03	5.665+04	1.178+03	3.696+00	4.613+00	1.125+02	1.202+00	0.4
$4d_{5/2}$	3.553+03	5.388+04	1.437+03	6.571−01	4.840+00	1.127+02	7.564−01	0.2
$5d_{5/2}$	2.269+03	5.260+04	5.280+02	2.052+00	6.724+00	7.249+01	1.059+00	0.3
$6d_{5/2}$	1.572+03	5.190+04	4.662+02	1.297+00	6.998+00	7.261+01	1.214+00	0.5
$7d_{5/2}$	1.153+03	5.148+04	1.691+02	3.073+00	7.618+00	1.548+02	1.992+00	0.4
$8d_{5/2}$	8.818+02	5.121+04	1.915+02	1.797+00	7.447+00	1.551+02	1.758+00	0.4
$9d_{5/2}$	6.959+02	4.044+04	6.098+00	1.295+02	8.036+00	3.631+03	2.997+01	0.3
$10d_{5/2}$	5.632+02	4.031+04	6.650+00	1.022+02	7.926+00	3.623+03	2.426+01	0.4
$11d_{5/2}$	4.650+02	3.186+04	7.136+00	8.094+01	7.839+00	3.623+03	2.056+01	0.5
$12d_{5/2}$	3.905+02	3.178+04	7.735+00	6.534+01	7.743+00	3.624+03	1.670+01	0.7
$4f_{5/2}$	3.515+03	5.384+04	1.683+02	3.942+02	6.748+00	2.598+02	2.867−02	1.4
$5f_{5/2}$	2.250+03	4.200+04	4.694+01	2.975+02	9.434+00	2.706+02	1.137−01	1.7
$6f_{5/2}$	1.562+03	4.131+04	4.017+01	8.521+01	1.012+01	2.702+02	6.310−02	1.7
$7f_{5/2}$	1.147+03	3.254+04	3.969+01	4.037+01	1.029+01	2.708+02	1.866−01	1.0
$8f_{5/2}$	8.774+02	3.227+04	4.480+01	2.401+01	1.013+01	2.709+02	1.266−01	0.7
$9f_{5/2}$	6.929+02	2.549+04	4.103+01	1.403+01	1.040+01	2.690+02	4.371+00	0.4
$10f_{5/2}$	5.609+02	2.535+04	4.371+01	9.816+00	1.031+01	2.693+02	4.031+00	0.4
$11f_{5/2}$	4.634+02	2.004+04	4.592+01	7.177+00	1.023+01	2.689+02	3.735+00	0.4
$12f_{5/2}$	3.892+02	1.997+04	5.026+01	5.442+00	1.007+01	2.699+02	3.138+00	0.6
$4f_{7/2}$	3.499+03	5.383+04	1.331+02	7.067+02	6.950+00	2.600+02	4.129−02	1.3
$5f_{7/2}$	2.242+03	4.199+04	4.340+01	3.111+02	9.576+00	2.608+02	2.592−02	1.6
$6f_{7/2}$	1.557+03	4.130+04	3.705+01	8.862+01	1.024+01	2.662+02	7.031−03	1.6
$7f_{7/2}$	1.144+03	3.254+04	3.733+01	4.177+01	1.038+01	2.661+02	3.789−01	0.8
$8f_{7/2}$	8.753+02	3.227+04	3.882+01	2.333+01	1.041+01	2.661+02	3.605+00	0.7
$9f_{7/2}$	6.914+02	2.548+04	3.808+01	1.439+01	1.051+01	2.662+02	4.918+00	0.4
$10f_{7/2}$	5.599+02	2.535+04	3.979+01	1.004+01	1.046+01	2.664+02	4.705+00	0.3
$11f_{7/2}$	4.626+02	2.004+04	4.304+01	7.499+00	1.031+01	2.667+02	4.038+00	0.4
$12f_{7/2}$	3.886+02	1.997+04	4.711+01	5.729+00	1.015+01	2.673+02	3.380+00	0.6
$5g_{7/2}$	2.239+03	2.703+04	8.341+02	1.942+00	6.490+00	7.492+01	7.399−01	0.3
$6g_{7/2}$	1.555+03	2.114+04	8.552+02	1.032+00	6.952+00	7.443+01	5.818−01	0.7
$7g_{7/2}$	1.143+03	2.072+04	3.388+02	9.048+00	1.056+01	3.051+01	9.116−01	0.4
$8g_{7/2}$	8.746+02	1.634+04	2.814+02	7.643+00	1.135+01	2.991+01	1.062+00	0.2
$9g_{7/2}$	6.909+02	1.616+04	1.412+02	1.035+01	1.244+01	4.591+01	1.640+00	0.3
$10g_{7/2}$	5.595+02	1.602+04	3.680+01	1.678+01	1.321+01	1.503+02	4.589+00	0.3
$11g_{7/2}$	4.623+02	1.268+04	3.726+01	1.160+01	1.324+01	1.503+02	4.640+00	0.2
$12g_{7/2}$	3.884+02	1.260+04	4.207+01	9.115+00	1.297+01	1.490+02	3.686+00	0.4
$5g_{9/2}$	2.234+03	2.703+04	8.653+02	1.702+00	6.386+00	7.495+01	7.252−01	0.2
$6g_{9/2}$	1.552+03	2.113+04	8.674+02	9.823−01	6.881+00	7.473+01	5.749−01	0.8
$7g_{9/2}$	1.141+03	2.072+04	2.919+02	1.223+01	1.091+01	3.065+01	9.644−01	0.4
$8g_{9/2}$	8.734+02	1.634+04	2.924+02	7.134+00	1.115+01	3.053+01	1.002+00	0.3
$9g_{9/2}$	6.900+02	1.615+04	8.920+01	1.464+01	1.287+01	6.366+01	2.281+00	0.3
$10g_{9/2}$	5.589+02	1.602+04	9.487+01	9.487+00	1.278+01	6.373+01	2.140+00	0.2
$11g_{9/2}$	4.618+02	1.268+04	1.050+02	6.477+00	1.255+01	6.374+01	1.839+00	0.4
$12g_{9/2}$	3.880+02	1.260+04	7.779+00	2.651+01	1.336+01	7.111+02	1.834+01	0.3
$6h_{9/2}$	1.552+03	1.702+04	9.983+01	6.718+02	1.149+01	7.090+01	2.425−02	0.7
$7h_{9/2}$	1.141+03	1.335+04	3.468+02	1.856+01	1.153+01	2.267+01	8.264−01	0.2
$8h_{9/2}$	8.733+02	1.309+04	2.624+02	2.294+01	1.298+01	2.191+01	9.460−01	0.2
$9h_{9/2}$	6.900+02	1.034+04	2.605+02	1.501+01	1.331+01	2.169+01	9.397−01	0.2
$10h_{9/2}$	5.588+02	1.020+04	9.799+01	2.608+01	1.521+01	3.897+01	1.850+00	0.1
$11h_{9/2}$	4.618+02	1.011+04	9.833+01	1.763+01	1.533+01	3.890+01	1.873+00	0.3
$12h_{9/2}$	3.880+02	8.006+03	5.940+01	1.495+01	1.565+01	6.272+01	2.700+00	0.2
$6h_{11/2}$	1.550+03	1.376+04	8.933+01	8.418+02	1.174+01	7.096+01	4.900−02	0.4
$7h_{11/2}$	1.139+03	1.335+04	4.591+01	3.367+02	1.467+01	7.460+01	3.804+00	0.7
$8h_{11/2}$	8.725+02	1.309+04	4.273+01	1.200+02	1.544+01	7.495+01	3.211+00	0.6
$9h_{11/2}$	6.894+02	1.034+04	4.353+01	5.978+01	1.567+01	7.517+01	3.066+00	0.2
$10h_{11/2}$	5.584+02	1.020+04	4.628+01	3.577+01	1.566+01	7.528+01	3.001+00	0.2

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$11h_{11/2}$	4.615+02	1.011+04	4.657+01	2.250+01	1.579+01	7.520+01	3.328+00	0.2
$12h_{11/2}$	3.878+02	8.006+03	4.909+01	1.614+01	1.569+01	7.522+01	3.082+00	0.3
$7i_{11/2}$	1.139+03	8.758+03	6.446+02	7.269−01	8.280+00	7.108+01	5.473−01	0.6
$8i_{11/2}$	8.725+02	8.491+03	2.518+02	4.790+01	1.391+01	1.895+01	8.592−01	0.1
$9i_{11/2}$	6.894+02	8.308+03	2.727+02	2.640+01	1.419+01	1.838+01	7.827−01	0.3
$10i_{11/2}$	5.584+02	6.575+03	1.952+02	4.522+01	1.605+01	1.749+01	1.014+00	0.2
$11i_{11/2}$	4.615+02	6.478+03	1.156+02	4.958+01	1.718+01	2.534+01	1.390+00	0.2
$12i_{11/2}$	3.878+02	6.404+03	1.166+02	3.504+01	1.731+01	2.526+01	1.374+00	0.3
$7i_{13/2}$	1.139+03	8.757+03	6.478+02	7.091−01	8.254+00	7.084+01	5.453−01	0.6
$8i_{13/2}$	8.719+02	8.490+03	2.787+02	3.712+01	1.366+01	1.802+01	8.368−01	0.1
$9i_{13/2}$	6.890+02	8.307+03	1.749+02	7.571+01	1.578+01	1.945+01	1.049+00	0.1
$10i_{13/2}$	5.581+02	6.575+03	1.858+02	4.436+01	1.591+01	1.924+01	9.955−01	0.2
$11i_{13/2}$	4.613+02	6.478+03	1.418+02	4.651+01	1.707+01	2.052+01	1.259+00	0.3
$12i_{13/2}$	3.876+02	6.404+03	4.605+01	4.034+01	1.836+01	5.323+01	2.958+00	0.1
W^{71+}								
$2s_{1/2}$	1.972+04	7.005+04	6.279−04	3.425+03	5.797+00	3.586+07	0.000+00	0.1
$3s_{1/2}$	8.548+03	5.888+04	1.560−03	1.559+07	4.335+00	3.586+07	0.000+00	0.2
$4s_{1/2}$	4.726+03	5.505+04	2.822−03	1.424+08	3.764+00	3.586+07	0.000+00	0.2
$5s_{1/2}$	2.989+03	5.332+04	4.400−03	2.456+08	3.468+00	3.586+07	0.000+00	0.2
$6s_{1/2}$	2.058+03	5.238+04	6.332−03	2.341+08	3.287+00	3.586+07	0.000+00	0.2
$7s_{1/2}$	1.502+03	5.183+04	8.692−03	1.732+08	3.165+00	3.586+07	0.000+00	0.2
$8s_{1/2}$	1.145+03	5.147+04	1.153−02	1.140+08	3.076+00	3.586+07	0.000+00	0.3
$9s_{1/2}$	9.009+02	5.123+04	1.504−02	7.027+07	3.008+00	3.586+07	0.000+00	0.4
$10s_{1/2}$	7.274+02	5.105+04	1.929−02	4.197+07	2.955+00	3.586+07	0.000+00	0.5
$11s_{1/2}$	5.996+02	5.093+04	2.404−02	2.528+07	2.914+00	3.586+07	0.000+00	0.6
$12s_{1/2}$	5.027+02	5.083+04	3.147−02	1.382+07	2.874+00	3.586+07	0.000+00	0.7
$2p_{1/2}$	1.953+04	6.985+04	3.719+02	1.179+02	4.142+00	7.400+02	1.405+00	0.2
$3p_{1/2}$	8.495+03	5.882+04	6.260+01	3.154+01	6.356+00	7.428+02	3.748+00	0.4
$4p_{1/2}$	4.704+03	5.503+04	7.817+01	1.224+01	6.126+00	7.427+02	3.512+00	0.4
$5p_{1/2}$	2.978+03	5.330+04	1.054+02	5.813+00	5.807+00	7.426+02	3.480+00	0.3
$6p_{1/2}$	2.052+03	5.238+04	1.531+02	2.583+00	5.475+00	7.435+02	2.515+00	0.1
$7p_{1/2}$	1.499+03	5.183+04	1.938+02	1.285+00	5.288+00	7.432+02	2.290+00	0.2
$8p_{1/2}$	1.142+03	5.147+04	2.162+02	7.870−01	5.186+00	7.428+02	2.058+00	0.6
$9p_{1/2}$	8.991+02	5.123+04	1.960+02	6.686−01	5.211+00	7.426+02	2.091+00	1.3
$10p_{1/2}$	7.261+02	5.105+04	6.104+00	2.063+02	5.344+00	2.430+04	2.485+01	0.4
$11p_{1/2}$	5.986+02	5.093+04	6.837+00	1.478+02	5.277+00	2.430+04	1.962+01	0.6
$12p_{1/2}$	5.020+02	5.083+04	7.449+00	1.083+02	5.230+00	2.430+04	1.719+01	0.7
$2p_{3/2}$	1.800+04	6.833+04	1.727+02	8.830+02	4.097+00	7.439+02	2.098−01	0.1
$3p_{3/2}$	8.042+03	5.837+04	4.255+01	9.189+01	6.229+00	7.471+02	8.335−01	0.3
$4p_{3/2}$	4.514+03	5.484+04	5.527+01	3.327+01	5.983+00	7.470+02	1.173+00	0.2
$5p_{3/2}$	2.882+03	5.321+04	7.742+01	1.521+01	5.634+00	7.466+02	1.472+00	0.1
$6p_{3/2}$	1.996+03	5.232+04	1.101+02	6.701+00	5.326+00	7.466+02	1.878+00	0.4
$7p_{3/2}$	1.464+03	5.179+04	1.039+02	4.417+00	5.375+00	7.424+02	3.708+00	0.2
$8p_{3/2}$	1.119+03	5.145+04	1.269+02	2.452+00	5.211+00	7.413+02	2.897+00	0.4
$9p_{3/2}$	8.829+02	5.121+04	1.477+02	1.481+00	5.084+00	7.409+02	2.374+00	0.7
$10p_{3/2}$	7.143+02	5.104+04	1.468+02	1.148+00	5.058+00	7.408+02	2.220+00	1.1
$11p_{3/2}$	5.898+02	5.092+04	9.396−02	8.399+05	5.175+00	1.196+06	1.083+03	1.0
$12p_{3/2}$	4.952+02	5.082+04	9.742−02	6.718+05	5.151+00	1.196+06	1.083+03	1.0
$3d_{3/2}$	8.025+03	5.835+04	1.376+03	3.437+00	4.699+00	1.116+02	1.411+00	0.5
$4d_{3/2}$	4.507+03	5.483+04	1.150+03	1.444+00	5.374+00	1.122+02	6.758−01	0.3
$5d_{3/2}$	2.878+03	5.320+04	1.261+03	5.016−01	5.461+00	1.116+02	7.885−01	0.3
$6d_{3/2}$	1.994+03	5.232+04	3.413+02	2.283+00	7.261+00	1.140+02	1.424+00	0.4
$7d_{3/2}$	1.463+03	5.179+04	3.753+02	1.211+00	7.158+00	1.144+02	1.406+00	0.4
$8d_{3/2}$	1.118+03	5.144+04	1.381+02	3.044+00	7.639+00	2.475+02	2.491+00	0.4
$9d_{3/2}$	8.823+02	5.121+04	1.811+01	3.758+01	7.882+00	1.706+03	1.157+01	0.4
$10d_{3/2}$	7.139+02	5.104+04	1.928+01	2.769+01	7.806+00	1.706+03	1.039+01	0.4
$11d_{3/2}$	5.894+02	4.034+04	2.061+01	2.115+01	7.723+00	1.707+03	8.875+00	0.5
$12d_{3/2}$	4.949+02	4.024+04	2.196+01	1.629+01	7.650+00	1.707+03	7.788+00	0.6
$3d_{5/2}$	7.899+03	5.823+04	1.327+03	4.110+00	4.497+00	1.119+02	1.147+00	0.3
$4d_{5/2}$	4.454+03	5.478+04	1.819+03	5.102−01	4.660+00	1.119+02	7.419−01	0.2
$5d_{5/2}$	2.851+03	5.318+04	1.333+03	4.529−01	5.214+00	1.133+02	7.407−01	0.7
$6d_{5/2}$	1.978+03	5.231+04	4.100+02	1.818+00	7.276+00	7.893+01	1.415+00	0.3
$7d_{5/2}$	1.453+03	5.178+04	1.349+02	4.180+00	7.962+00	1.764+02	3.034+00	0.4

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$8d_{5/2}$	1.111+03	5.144+04	1.636+02	2.422+00	7.682+00	1.763+02	2.310+00	0.3
$9d_{5/2}$	8.776+02	5.120+04	1.810+01	3.208+01	8.014+00	1.387+03	1.308+01	0.3
$10d_{5/2}$	7.105+02	5.104+04	1.951+01	2.408+01	7.915+00	1.387+03	1.112+01	0.4
$11d_{5/2}$	5.869+02	4.033+04	2.111+01	1.858+01	7.811+00	1.389+03	9.216+00	0.6
$12d_{5/2}$	4.929+02	4.024+04	2.280+01	1.440+01	7.717+00	1.388+03	7.771+00	0.8
$4f_{5/2}$	4.453+03	5.478+04	1.178+03	2.504+00	5.315+00	1.332+02	8.035−01	0.5
$5f_{5/2}$	2.850+03	5.318+04	1.478+03	5.322−01	5.514+00	1.311+02	6.210−01	0.5
$6f_{5/2}$	1.978+03	5.231+04	8.079+02	1.402+00	7.528+00	5.198+01	7.841−01	0.6
$7f_{5/2}$	1.452+03	4.120+04	4.033+02	2.842+00	9.048+00	5.210+01	1.111+00	0.5
$8f_{5/2}$	1.111+03	4.086+04	2.534+02	3.205+00	9.598+00	7.010+01	1.422+00	0.6
$9f_{5/2}$	8.776+02	3.227+04	8.052+01	6.925+00	1.035+01	1.707+02	3.188+00	0.4
$10f_{5/2}$	7.104+02	3.210+04	8.215+01	4.774+00	1.035+01	1.707+02	3.199+00	0.4
$11f_{5/2}$	5.869+02	2.538+04	9.445+01	3.426+00	1.008+01	1.710+02	2.499+00	0.5
$12f_{5/2}$	4.929+02	2.529+04	1.040+02	2.502+00	9.907+00	1.708+02	2.140+00	0.7
$4f_{7/2}$	4.427+03	5.475+04	8.660+02	6.925+00	5.537+00	1.326+02	1.832−01	0.4
$5f_{7/2}$	2.837+03	5.316+04	1.535+03	4.772−01	5.365+00	1.327+02	6.040−01	0.7
$6f_{7/2}$	1.971+03	5.230+04	6.406+02	2.388+00	8.067+00	4.524+01	8.518−01	0.6
$7f_{7/2}$	1.448+03	4.119+04	3.884+02	3.115+00	9.199+00	4.749+01	1.155+00	0.5
$8f_{7/2}$	1.108+03	3.250+04	1.406+02	5.906+00	1.026+01	9.197+01	2.236+00	0.3
$9f_{7/2}$	8.753+02	3.227+04	1.544+02	3.667+00	1.012+01	9.149+01	2.035+00	0.3
$10f_{7/2}$	7.088+02	3.210+04	1.736+02	2.397+00	9.903+00	9.121+01	1.729+00	0.5
$11f_{7/2}$	5.856+02	2.538+04	1.071+01	3.183+01	1.059+01	1.183+03	1.791+01	0.4
$12f_{7/2}$	4.920+02	2.528+04	1.131+01	2.603+01	1.050+01	1.185+03	1.585+01	0.5
$5g_{7/2}$	2.837+03	3.423+04	1.287+03	6.904−01	5.831+00	1.318+02	6.658−01	0.2
$6g_{7/2}$	1.971+03	2.676+04	6.119+02	5.403+00	9.054+00	3.548+01	7.588−01	0.3
$7g_{7/2}$	1.448+03	2.624+04	5.979+02	3.134+00	9.479+00	3.520+01	7.498−01	0.4
$8g_{7/2}$	1.108+03	2.590+04	3.080+02	6.958+00	1.138+01	3.590+01	1.093+00	0.4
$9g_{7/2}$	8.753+02	2.046+04	1.243+02	1.081+01	1.263+01	6.442+01	2.006+00	0.3
$10g_{7/2}$	7.088+02	2.029+04	1.302+02	6.988+00	1.259+01	6.449+01	1.956+00	0.3
$11g_{7/2}$	5.856+02	1.605+04	1.350+01	2.268+01	1.331+01	5.293+02	1.357+01	0.2
$12g_{7/2}$	4.920+02	1.596+04	1.373+01	1.649+01	1.331+01	5.292+02	1.359+01	0.2
$5g_{9/2}$	2.829+03	3.422+04	1.328+03	6.110−01	5.734+00	1.316+02	6.546−01	0.3
$6g_{9/2}$	1.966+03	2.676+04	5.138+02	8.707+00	9.467+00	3.416+01	7.472−01	0.3
$7g_{9/2}$	1.445+03	2.624+04	3.310+02	1.122+01	1.101+01	3.392+01	9.615−01	0.4
$8g_{9/2}$	1.106+03	2.069+04	3.184+02	6.824+00	1.135+01	3.416+01	1.068+00	0.3
$9g_{9/2}$	8.739+02	2.045+04	1.378+02	1.008+01	1.263+01	5.654+01	1.921+00	0.3
$10g_{9/2}$	7.078+02	2.029+04	1.386+02	6.656+00	1.271+01	5.657+01	1.965+00	0.3
$11g_{9/2}$	5.849+02	1.605+04	1.114+02	5.780+00	1.264+01	7.543+01	2.084+00	0.4
$12g_{9/2}$	4.914+02	1.596+04	4.252+01	8.387+00	1.303+01	1.822+02	4.487+00	0.4
$6h_{9/2}$	1.966+03	2.155+04	8.906+02	1.104+00	7.479+00	7.421+01	6.278−01	0.4
$7h_{9/2}$	1.445+03	1.691+04	4.245+02	1.399+01	1.132+01	2.672+01	7.758−01	0.2
$8h_{9/2}$	1.106+03	1.657+04	2.911+02	2.045+01	1.300+01	2.622+01	9.377−01	0.3
$9h_{9/2}$	8.739+02	1.309+04	2.507+02	1.660+01	1.380+01	2.616+01	1.101+00	0.2
$10h_{9/2}$	7.078+02	1.292+04	9.361+01	2.309+01	1.525+01	5.305+01	2.141+00	0.2
$11h_{9/2}$	5.849+02	1.280+04	9.651+01	1.519+01	1.527+01	5.311+01	2.133+00	0.2
$12h_{9/2}$	4.914+02	1.014+04	9.825+01	1.080+01	1.529+01	5.312+01	2.087+00	0.3
$6h_{11/2}$	1.963+03	2.154+04	9.772+02	7.564−01	7.270+00	7.432+01	6.195−01	0.4
$7h_{11/2}$	1.443+03	1.691+04	4.389+02	1.317+01	1.130+01	2.539+01	7.877−01	0.2
$8h_{11/2}$	1.105+03	1.657+04	4.639+02	6.873+00	1.155+01	2.549+01	7.366−01	0.4
$9h_{11/2}$	8.730+02	1.309+04	1.753+02	2.518+01	1.440+01	3.207+01	1.321+00	0.2
$10h_{11/2}$	7.071+02	1.292+04	1.796+02	1.563+01	1.452+01	3.204+01	1.355+00	0.2
$11h_{11/2}$	5.844+02	1.280+04	5.817+01	1.816+01	1.566+01	8.023+01	3.253+00	0.2
$12h_{11/2}$	4.910+02	1.014+04	6.124+01	1.301+01	1.556+01	8.045+01	3.027+00	0.2
$7i_{11/2}$	1.443+03	1.109+04	8.017+02	5.929−01	8.305+00	7.816+01	5.528−01	0.5
$8i_{11/2}$	1.105+03	1.075+04	3.605+02	2.276+01	1.326+01	2.089+01	7.889−01	0.1
$9i_{11/2}$	8.730+02	1.052+04	2.080+02	5.610+01	1.553+01	2.299+01	9.859−01	0.2
$10i_{11/2}$	7.071+02	8.325+03	2.215+02	3.204+01	1.566+01	2.279+01	9.653−01	0.3
$11i_{11/2}$	5.844+02	8.203+03	1.680+02	3.298+01	1.678+01	2.443+01	1.242+00	0.2
$12i_{11/2}$	4.910+02	8.109+03	3.874+01	3.162+01	1.838+01	8.238+01	4.034+00	0.1
$7i_{13/2}$	1.441+03	1.109+04	8.045+02	5.835−01	8.290+00	7.698+01	5.515−01	0.6
$8i_{13/2}$	1.104+03	1.075+04	3.556+02	2.375+01	1.328+01	2.091+01	7.833−01	0.1
$9i_{13/2}$	8.724+02	1.052+04	2.407+02	4.515+01	1.527+01	2.075+01	9.537−01	0.2
$10i_{13/2}$	7.067+02	8.325+03	2.570+02	2.637+01	1.540+01	2.040+01	9.110−01	0.2
$11i_{13/2}$	5.840+02	8.202+03	1.955+02	2.524+01	1.602+01	2.530+01	1.014+00	0.5
$12i_{13/2}$	4.907+02	8.109+03	1.527+02	2.520+01	1.704+01	2.638+01	1.296+00	0.3

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
W^{72+}								
$1s_{1/2}$	7.946+04	1.298+05	8.265+02	1.472+02	1.815+00	3.534+04	0.000+00	0.2
$2s_{1/2}$	2.018+04	7.051+04	6.711−01	7.442+01	5.705+00	3.534+04	0.000+00	0.1
$3s_{1/2}$	8.764+03	5.909+04	1.629+00	1.699+03	4.305+00	3.534+04	0.000+00	0.2
$4s_{1/2}$	4.849+03	5.518+04	2.939+00	2.067+03	3.742+00	3.534+04	0.000+00	0.2
$5s_{1/2}$	3.068+03	5.340+04	4.615+00	1.256+03	3.446+00	3.534+04	0.000+00	0.2
$6s_{1/2}$	2.113+03	5.244+04	6.785+00	6.206+02	3.260+00	3.534+04	0.000+00	0.1
$7s_{1/2}$	1.543+03	5.187+04	9.754+00	2.802+02	3.127+00	3.534+04	0.000+00	0.2
$8s_{1/2}$	1.176+03	5.150+04	1.423+01	1.163+02	3.021+00	3.534+04	0.000+00	0.3
$9s_{1/2}$	9.255+02	5.125+04	2.130+01	4.487+01	2.928+00	3.534+04	0.000+00	0.5
$10s_{1/2}$	7.473+02	5.107+04	2.370+01	2.946+01	2.882+00	3.534+04	0.000+00	0.9
$11s_{1/2}$	6.160+02	5.094+04	2.395−02	2.749+07	2.907+00	3.586+07	0.000+00	0.6
$12s_{1/2}$	5.165+02	5.084+04	3.128−02	1.508+07	2.868+00	3.586+07	0.000+00	0.7
$2p_{1/2}$	2.008+04	7.041+04	3.688+02	1.238+02	4.155+00	7.426+02	4.147−01	0.2
$3p_{1/2}$	8.737+03	5.906+04	6.359+01	3.088+01	6.366+00	7.425+02	1.799+00	0.4
$4p_{1/2}$	4.838+03	5.517+04	8.071+01	1.202+01	6.115+00	7.424+02	2.065+00	0.4
$5p_{1/2}$	3.063+03	5.339+04	1.166+02	5.473+00	5.734+00	7.426+02	2.031+00	0.2
$6p_{1/2}$	2.110+03	5.244+04	1.849+02	2.139+00	5.351+00	7.419+02	1.784+00	0.2
$7p_{1/2}$	1.541+03	5.187+04	1.987+02	1.254+00	5.289+00	7.428+02	2.283+00	0.2
$8p_{1/2}$	1.174+03	5.150+04	2.212+02	7.698−01	5.187+00	7.431+02	2.059+00	0.6
$9p_{1/2}$	9.246+02	5.125+04	1.413+01	5.298+01	5.427+00	9.333+03	1.433+01	0.3
$10p_{1/2}$	7.467+02	5.107+04	1.681+01	3.488+01	5.321+00	9.334+03	1.026+01	0.4
$11p_{1/2}$	6.155+02	5.094+04	1.906+01	2.393+01	5.247+00	9.334+03	8.188+00	0.6
$12p_{1/2}$	5.161+02	5.084+04	2.102+01	1.692+01	5.194+00	9.334+03	7.147+00	0.7
$2p_{3/2}$	1.849+04	6.882+04	1.726+02	9.115+02	4.106+00	7.428+02	1.583+00	0.2
$3p_{3/2}$	8.263+03	5.859+04	4.309+01	8.946+01	6.247+00	7.419+02	4.722+00	0.3
$4p_{3/2}$	4.640+03	5.497+04	5.540+01	3.244+01	6.011+00	7.419+02	4.292+00	0.2
$5p_{3/2}$	2.962+03	5.329+04	7.398+01	1.527+01	5.706+00	7.420+02	4.099+00	0.1
$6p_{3/2}$	2.052+03	5.238+04	9.064+01	7.813+00	5.515+00	7.419+02	4.194+00	0.1
$7p_{3/2}$	1.505+03	5.183+04	1.001+02	4.612+00	5.421+00	7.420+02	4.080+00	0.2
$8p_{3/2}$	1.150+03	5.148+04	1.293+02	2.430+00	5.209+00	7.433+02	2.898+00	0.4
$9p_{3/2}$	9.076+02	5.123+04	1.504+02	1.470+00	5.083+00	7.435+02	2.380+00	0.7
$10p_{3/2}$	7.343+02	5.106+04	1.012−01	8.089+05	5.222+00	1.048+06	1.087+03	0.8
$11p_{3/2}$	6.063+02	5.093+04	1.058−01	6.404+05	5.192+00	1.048+06	1.087+03	0.8
$12p_{3/2}$	5.090+02	5.084+04	1.085−01	5.139+05	5.172+00	1.048+06	1.087+03	0.9
$3d_{3/2}$	8.255+03	5.858+04	1.395+03	3.457+00	4.723+00	1.111+02	1.426+00	0.5
$4d_{3/2}$	4.636+03	5.496+04	1.079+03	1.707+00	5.493+00	1.111+02	6.113−01	0.3
$5d_{3/2}$	2.960+03	5.329+04	1.194+03	5.719−01	5.587+00	1.102+02	8.126−01	0.4
$6d_{3/2}$	2.051+03	5.238+04	3.580+02	2.155+00	7.242+00	1.135+02	1.411+00	0.4
$7d_{3/2}$	1.504+03	5.183+04	3.900+02	1.158+00	7.153+00	1.140+02	1.400+00	0.4
$8d_{3/2}$	1.150+03	5.148+04	7.525+01	6.916+00	7.793+00	4.336+02	3.747+00	0.4
$9d_{3/2}$	9.073+02	5.123+04	8.220+01	4.594+00	7.685+00	4.338+02	3.383+00	0.4
$10d_{3/2}$	7.341+02	5.106+04	8.979+01	3.173+00	7.574+00	4.339+02	2.966+00	0.5
$11d_{3/2}$	6.061+02	4.035+04	1.007+02	2.211+00	7.434+00	4.336+02	2.469+00	0.7
$12d_{3/2}$	5.089+02	4.026+04	1.096+02	1.609+00	7.327+00	4.340+02	2.150+00	1.0
$3d_{5/2}$	8.121+03	5.845+04	1.389+03	3.795+00	4.488+00	1.112+02	1.153+00	0.3
$4d_{5/2}$	4.579+03	5.491+04	1.852+03	5.069−01	4.678+00	1.117+02	7.442−01	0.2
$5d_{5/2}$	2.931+03	5.326+04	1.358+03	4.478−01	5.232+00	1.131+02	7.445−01	0.6
$6d_{5/2}$	2.034+03	5.236+04	2.518+02	3.451+00	7.637+00	1.106+02	1.774+00	0.3
$7d_{5/2}$	1.494+03	5.182+04	2.804+02	1.827+00	7.506+00	1.114+02	1.745+00	0.3
$8d_{5/2}$	1.143+03	5.147+04	7.529+01	6.374+00	7.940+00	3.464+02	4.183+00	0.3
$9d_{5/2}$	9.023+02	5.123+04	8.318+01	4.268+00	7.806+00	3.465+02	3.590+00	0.4
$10d_{5/2}$	7.305+02	5.106+04	9.298+01	2.925+00	7.662+00	3.446+02	2.998+00	0.5
$11d_{5/2}$	6.034+02	4.035+04	1.377+00	1.228+03	7.862+00	2.142+04	1.262+02	0.6
$12d_{5/2}$	5.068+02	4.025+04	1.446+00	1.029+03	7.803+00	2.142+04	1.118+02	0.7
$4f_{5/2}$	4.579+03	5.491+04	1.164+03	2.744+00	5.425+00	1.230+02	8.367−01	0.5
$5f_{5/2}$	2.931+03	5.326+04	1.488+03	5.496−01	5.585+00	1.248+02	6.291−01	0.5
$6f_{5/2}$	2.034+03	5.236+04	8.333+02	1.341+00	7.498+00	5.346+01	7.796−01	0.6
$7f_{5/2}$	1.493+03	4.124+04	4.033+02	2.865+00	9.055+00	5.394+01	1.112+00	0.5
$8f_{5/2}$	1.143+03	4.089+04	2.533+02	3.211+00	9.621+00	7.183+01	1.447+00	0.5
$9f_{5/2}$	9.023+02	3.229+04	9.488+01	5.976+00	1.027+01	1.544+02	2.818+00	0.4
$10f_{5/2}$	7.305+02	3.212+04	1.020+02	4.068+00	1.016+01	1.543+02	2.587+00	0.4
$11f_{5/2}$	6.034+02	2.540+04	1.123+02	2.887+00	9.985+00	1.544+02	2.213+00	0.5
$12f_{5/2}$	5.068+02	2.530+04	8.774+00	3.791+01	1.045+01	1.684+03	2.017+01	0.4

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$4f_{7/2}$	4.552+03	5.488+04	1.294+03	1.984+00	5.203+00	1.229+02	7.934−01	0.4
$5f_{7/2}$	2.917+03	5.324+04	1.540+03	4.995−01	5.457+00	1.220+02	6.144−01	0.6
$6f_{7/2}$	2.026+03	5.235+04	7.875+02	1.595+00	7.733+00	4.490+01	8.152−01	0.5
$7f_{7/2}$	1.488+03	4.124+04	4.638+02	2.432+00	9.013+00	4.392+01	1.084+00	0.4
$8f_{7/2}$	1.139+03	4.089+04	2.189+02	3.847+00	9.864+00	7.115+01	1.633+00	0.5
$9f_{7/2}$	8.999+02	3.229+04	2.293+02	2.464+00	9.805+00	7.129+01	1.552+00	0.4
$10f_{7/2}$	7.287+02	3.212+04	2.544+01	1.543+01	1.061+01	4.978+02	8.799+00	0.3
$11f_{7/2}$	6.021+02	2.539+04	2.701+01	1.191+01	1.051+01	4.993+02	7.717+00	0.4
$12f_{7/2}$	5.058+02	2.530+04	2.898+01	9.415+00	1.039+01	4.986+02	6.664+00	0.5
$5g_{7/2}$	2.917+03	3.431+04	8.132+02	4.306+00	7.580+00	4.571+01	9.684−01	0.8
$6g_{7/2}$	2.026+03	3.342+04	9.128+02	1.644+00	7.872+00	4.661+01	6.677−01	0.3
$7g_{7/2}$	1.488+03	2.628+04	4.668+02	5.921+00	1.036+01	3.198+01	8.859−01	0.4
$8g_{7/2}$	1.139+03	2.593+04	3.967+02	4.864+00	1.104+01	3.170+01	9.911−01	0.4
$9g_{7/2}$	8.999+02	2.048+04	1.220+02	1.090+01	1.264+01	6.761+01	2.050+00	0.3
$10g_{7/2}$	7.287+02	2.031+04	1.298+02	6.983+00	1.257+01	6.738+01	1.968+00	0.3
$11g_{7/2}$	6.021+02	1.607+04	2.337+01	1.595+01	1.321+01	3.243+02	8.129+00	0.2
$12g_{7/2}$	5.058+02	1.597+04	2.369+01	1.154+01	1.322+01	3.242+02	8.207+00	0.2
$5g_{9/2}$	2.908+03	3.430+04	9.659+02	2.460+00	7.255+00	4.356+01	8.974−01	0.7
$6g_{9/2}$	2.021+03	3.341+04	9.180+02	1.650+00	7.881+00	4.374+01	6.674−01	0.3
$7g_{9/2}$	1.485+03	2.628+04	4.888+02	5.603+00	1.034+01	2.969+01	8.825−01	0.3
$8g_{9/2}$	1.137+03	2.593+04	3.954+02	5.112+00	1.115+01	2.953+01	1.011+00	0.4
$9g_{9/2}$	8.984+02	2.048+04	1.072+02	1.196+01	1.281+01	7.160+01	2.310+00	0.3
$10g_{9/2}$	7.276+02	2.031+04	1.114+02	7.746+00	1.280+01	7.163+01	2.294+00	0.2
$11g_{9/2}$	6.013+02	1.607+04	1.240+02	5.320+00	1.255+01	7.173+01	1.944+00	0.4
$12g_{9/2}$	5.052+02	1.597+04	5.106+01	7.587+00	1.293+01	1.620+02	3.805+00	0.4
$6h_{9/2}$	2.021+03	2.160+04	9.561+02	9.147−01	7.475+00	6.929+01	6.398−01	0.3
$7h_{9/2}$	1.485+03	1.695+04	4.752+02	1.034+01	1.096+01	2.815+01	7.203−01	0.2
$8h_{9/2}$	1.137+03	1.660+04	5.267+02	4.744+00	1.110+01	2.795+01	6.906−01	0.5
$9h_{9/2}$	8.984+02	1.311+04	2.537+02	1.628+01	1.380+01	2.674+01	1.103+00	0.2
$10h_{9/2}$	7.276+02	1.294+04	2.461+02	1.140+01	1.408+01	2.680+01	1.129+00	0.3
$11h_{9/2}$	6.013+02	1.281+04	7.822+01	1.627+01	1.542+01	6.568+01	2.546+00	0.2
$12h_{9/2}$	5.052+02	1.272+04	7.957+01	1.144+01	1.545+01	6.568+01	2.531+00	0.3
$6h_{11/2}$	2.018+03	2.160+04	9.872+02	7.896−01	7.329+00	7.315+01	6.252−01	0.3
$7h_{11/2}$	1.483+03	1.695+04	4.836+02	1.043+01	1.110+01	2.544+01	7.764−01	0.2
$8h_{11/2}$	1.136+03	1.660+04	2.734+02	2.357+01	1.320+01	2.684+01	9.666−01	0.3
$9h_{11/2}$	8.975+02	1.311+04	2.415+02	1.780+01	1.395+01	2.663+01	1.147+00	0.2
$10h_{11/2}$	7.269+02	1.294+04	2.425+02	1.180+01	1.413+01	2.655+01	1.140+00	0.3
$11h_{11/2}$	6.008+02	1.281+04	1.094+02	1.435+01	1.515+01	4.918+01	1.939+00	0.2
$12h_{11/2}$	5.048+02	1.272+04	1.183+02	9.959+00	1.497+01	4.915+01	1.741+00	0.3
$7i_{11/2}$	1.483+03	1.370+04	8.211+02	6.071−01	8.396+00	7.132+01	5.578−01	0.6
$8i_{11/2}$	1.136+03	1.078+04	3.512+02	2.545+01	1.339+01	2.146+01	7.945−01	0.1
$9i_{11/2}$	8.975+02	1.054+04	3.824+02	1.341+01	1.357+01	2.129+01	7.230−01	0.3
$10i_{11/2}$	7.269+02	1.037+04	3.105+02	1.512+01	1.443+01	2.307+01	7.629−01	0.6
$11i_{11/2}$	6.008+02	8.219+03	1.687+02	3.193+01	1.674+01	2.540+01	1.241+00	0.2
$12i_{11/2}$	5.048+02	8.123+03	1.685+02	2.110+01	1.654+01	2.815+01	1.148+00	0.4
$7i_{13/2}$	1.482+03	1.370+04	8.253+02	5.931−01	8.374+00	7.042+01	5.558−01	0.6
$8i_{13/2}$	1.135+03	1.078+04	2.910+02	4.269+01	1.389+01	2.247+01	8.157−01	0.2
$9i_{13/2}$	8.968+02	1.054+04	3.635+02	1.550+01	1.373+01	2.136+01	7.348−01	0.4
$10i_{13/2}$	7.265+02	1.037+04	1.667+02	4.881+01	1.655+01	2.531+01	1.225+00	0.2
$11i_{13/2}$	6.004+02	8.219+03	1.731+02	3.113+01	1.664+01	2.523+01	1.199+00	0.2
$12i_{13/2}$	5.045+02	8.123+03	1.093+02	2.871+01	1.757+01	3.449+01	1.721+00	0.2
W^{73+}								
$1s_{1/2}$	8.088+04	1.312+05	4.529−01	3.672+02	6.049+00	3.502+04	0.000+00	0.1
$2s_{1/2}$	2.064+04	7.097+04	8.221−01	1.914+02	5.411+00	3.502+04	0.000+00	0.1
$3s_{1/2}$	8.983+03	5.931+04	1.694+00	1.847+03	4.274+00	3.502+04	0.000+00	0.2
$4s_{1/2}$	4.974+03	5.530+04	3.030+00	2.151+03	3.724+00	3.502+04	0.000+00	0.2
$5s_{1/2}$	3.149+03	5.348+04	4.739+00	1.291+03	3.433+00	3.502+04	0.000+00	0.2
$6s_{1/2}$	2.169+03	5.250+04	6.946+00	6.348+02	3.249+00	3.502+04	0.000+00	0.1
$7s_{1/2}$	1.584+03	5.191+04	9.956+00	2.864+02	3.118+00	3.502+04	0.000+00	0.2
$8s_{1/2}$	1.207+03	5.153+04	1.449+01	1.190+02	3.012+00	3.502+04	0.000+00	0.3
$9s_{1/2}$	9.504+02	5.128+04	2.163+01	4.596+01	2.920+00	3.502+04	0.000+00	0.5
$10s_{1/2}$	7.675+02	5.109+04	1.938−02	4.879+07	2.941+00	3.586+07	0.000+00	0.4
$11s_{1/2}$	6.327+02	5.096+04	2.399−02	2.961+07	2.901+00	3.586+07	0.000+00	0.5
$12s_{1/2}$	5.305+02	5.086+04	3.118−02	1.635+07	2.862+00	3.586+07	0.000+00	0.7

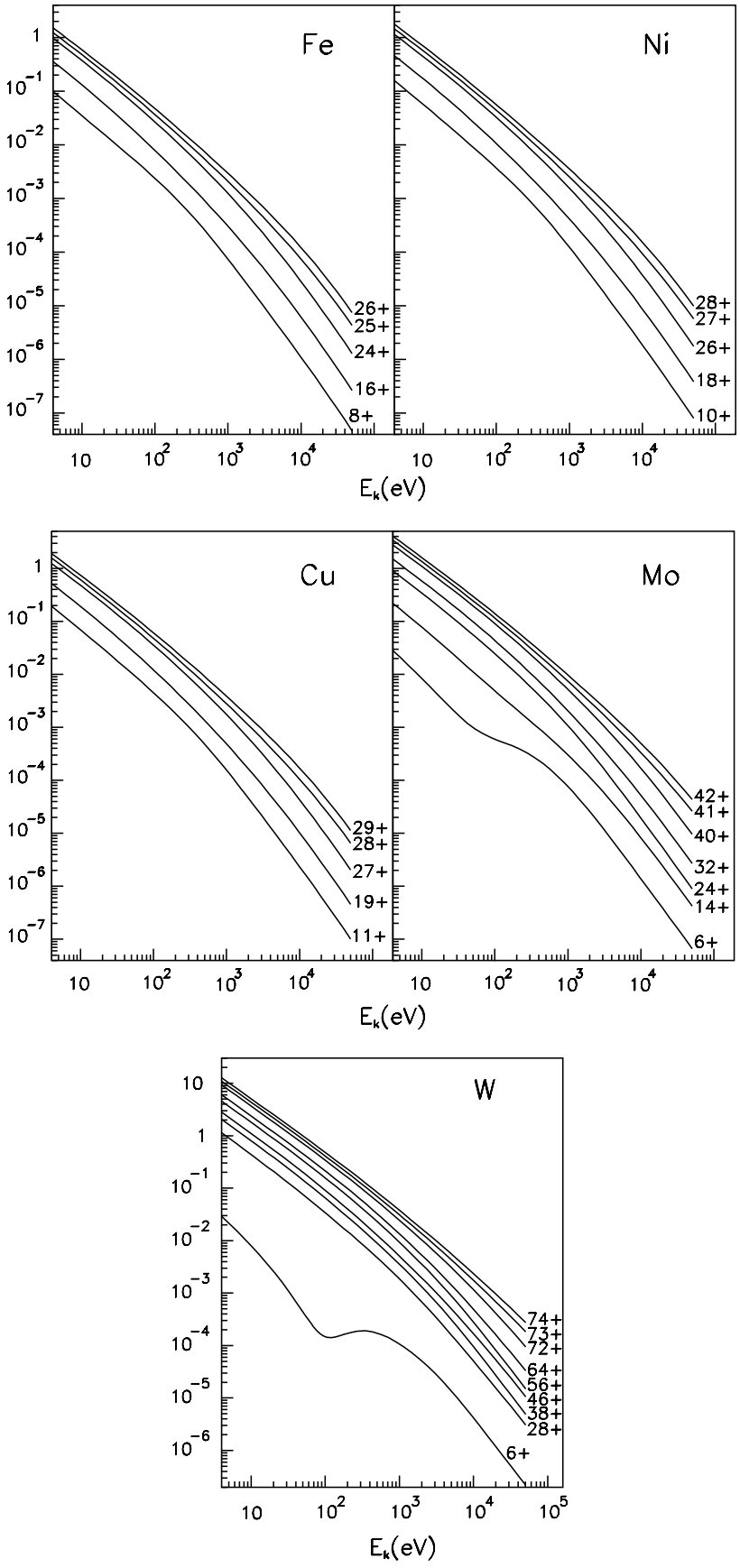
Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$2p_{1/2}$	2.064+04	7.097+04	3.867+02	1.165+02	4.142+00	7.400+02	1.224+00	0.2
$3p_{1/2}$	8.984+03	5.931+04	6.424+01	3.023+01	6.379+00	7.443+02	1.888+00	0.4
$4p_{1/2}$	4.975+03	5.530+04	8.181+01	1.182+01	6.123+00	7.444+02	2.020+00	0.4
$5p_{1/2}$	3.149+03	5.348+04	1.190+02	5.379+00	5.735+00	7.446+02	1.907+00	0.2
$6p_{1/2}$	2.169+03	5.250+04	1.592+02	2.492+00	5.481+00	7.450+02	2.503+00	0.1
$7p_{1/2}$	1.584+03	5.191+04	1.756+02	1.457+00	5.389+00	7.454+02	2.661+00	0.3
$8p_{1/2}$	1.207+03	5.153+04	2.259+02	7.552−01	5.189+00	7.456+02	2.062+00	0.6
$9p_{1/2}$	9.504+02	5.128+04	1.775+01	3.748+01	5.405+00	7.889+03	1.131+01	0.3
$10p_{1/2}$	7.675+02	5.109+04	2.054+01	2.495+01	5.315+00	7.890+03	8.854+00	0.4
$11p_{1/2}$	6.327+02	5.096+04	2.339+01	1.693+01	5.240+00	7.891+03	7.081+00	0.6
$12p_{1/2}$	5.305+02	5.086+04	2.594+01	1.185+01	5.184+00	7.891+03	6.154+00	0.7
$2p_{3/2}$	1.898+04	6.931+04	1.753+02	9.161+02	4.105+00	7.394+02	1.705+00	0.1
$3p_{3/2}$	8.488+03	5.881+04	4.382+01	8.801+01	6.253+00	7.388+02	5.363+00	0.3
$4p_{3/2}$	4.767+03	5.509+04	5.626+01	3.189+01	6.020+00	7.388+02	4.905+00	0.2
$5p_{3/2}$	3.043+03	5.337+04	7.474+01	1.505+01	5.721+00	7.375+02	4.519+00	0.1
$6p_{3/2}$	2.109+03	5.244+04	8.981+01	7.841+00	5.545+00	7.375+02	4.581+00	0.1
$7p_{3/2}$	1.546+03	5.187+04	1.092+02	4.255+00	5.371+00	7.363+02	3.690+00	0.2
$8p_{3/2}$	1.182+03	5.151+04	1.334+02	2.358+00	5.205+00	7.366+02	2.885+00	0.4
$9p_{3/2}$	9.326+02	5.126+04	1.552+02	1.424+00	5.079+00	7.367+02	2.369+00	0.7
$10p_{3/2}$	7.546+02	5.108+04	1.238+01	8.751+01	5.269+00	7.897+03	1.501+01	0.5
$11p_{3/2}$	6.230+02	5.095+04	1.383+01	6.188+01	5.197+00	7.894+03	1.173+01	0.7
$12p_{3/2}$	5.231+02	5.085+04	1.504+01	4.505+01	5.144+00	7.893+03	9.939+00	0.8
$3d_{3/2}$	8.488+03	5.881+04	1.439+03	3.316+00	4.729+00	1.108+02	1.429+00	0.5
$4d_{3/2}$	4.767+03	5.509+04	1.549+03	7.834−01	5.121+00	1.112+02	7.905−01	0.2
$5d_{3/2}$	3.043+03	5.337+04	1.245+03	5.392−01	5.570+00	1.109+02	8.108−01	0.3
$6d_{3/2}$	2.109+03	5.244+04	4.087+02	1.806+00	7.161+00	1.077+02	1.363+00	0.3
$7d_{3/2}$	1.546+03	5.187+04	2.401+02	2.221+00	7.486+00	1.595+02	1.857+00	0.4
$8d_{3/2}$	1.182+03	5.151+04	8.100+01	6.317+00	7.782+00	4.185+02	3.632+00	0.4
$9d_{3/2}$	9.326+02	5.126+04	8.833+01	4.191+00	7.676+00	4.186+02	3.289+00	0.4
$10d_{3/2}$	7.546+02	5.108+04	9.737+01	2.873+00	7.554+00	4.187+02	2.843+00	0.5
$11d_{3/2}$	6.230+02	5.095+04	1.086+02	2.009+00	7.417+00	4.192+02	2.385+00	0.7
$12d_{3/2}$	5.231+02	4.027+04	3.414−01	1.369+04	7.717+00	1.127+05	4.484+02	0.6
$3d_{5/2}$	8.347+03	5.867+04	9.603+02	1.040+01	4.885+00	1.113+02	1.274+00	0.4
$4d_{5/2}$	4.707+03	5.503+04	2.184+02	2.282+01	7.538+00	1.117+02	2.695−02	0.6
$5d_{5/2}$	3.013+03	5.334+04	2.494+02	7.215+00	7.565+00	1.115+02	3.325−01	0.4
$6d_{5/2}$	2.091+03	5.242+04	2.623+02	3.297+00	7.626+00	1.099+02	1.766+00	0.3
$7d_{5/2}$	1.535+03	5.186+04	2.785+02	1.823+00	7.581+00	1.098+02	1.839+00	0.3
$8d_{5/2}$	1.174+03	5.150+04	1.326+01	6.454+01	8.103+00	1.876+03	1.874+01	0.3
$9d_{5/2}$	9.274+02	5.125+04	1.371+01	4.516+01	8.067+00	1.876+03	1.897+01	0.3
$10d_{5/2}$	7.508+02	5.108+04	1.529+01	3.533+01	7.922+00	1.873+03	1.450+01	0.4
$11d_{5/2}$	6.202+02	4.037+04	1.655+01	2.756+01	7.820+00	1.875+03	1.195+01	0.6
$12d_{5/2}$	5.209+02	4.027+04	1.779+01	2.157+01	7.733+00	1.873+03	1.014+01	0.7
$4f_{5/2}$	4.707+03	5.503+04	1.177+03	2.797+00	5.421+00	1.291+02	8.226−01	0.5
$5f_{5/2}$	3.013+03	5.334+04	1.530+03	5.308−01	5.575+00	1.292+02	6.289−01	0.5
$6f_{5/2}$	2.091+03	5.242+04	8.397+02	1.357+00	7.549+00	5.326+01	7.896−01	0.6
$7f_{5/2}$	1.535+03	4.128+04	4.413+02	2.528+00	8.958+00	5.313+01	1.081+00	0.5
$8f_{5/2}$	1.174+03	4.092+04	2.583+02	3.144+00	9.614+00	7.309+01	1.449+00	0.5
$9f_{5/2}$	9.274+02	3.232+04	1.048+02	5.407+00	1.023+01	1.463+02	2.679+00	0.3
$10f_{5/2}$	7.508+02	3.214+04	1.098+02	3.708+00	1.017+01	1.464+02	2.557+00	0.3
$11f_{5/2}$	6.202+02	2.541+04	1.252+02	2.584+00	9.927+00	1.464+02	2.072+00	0.5
$12f_{5/2}$	5.209+02	2.531+04	6.692+00	5.408+01	1.044+01	2.287+03	2.655+01	0.4
$4f_{7/2}$	4.678+03	5.500+04	1.345+03	1.851+00	5.170+00	1.291+02	7.904−01	0.3
$5f_{7/2}$	2.998+03	5.332+04	1.126+03	1.349+00	6.526+00	6.044+01	7.140−01	0.4
$6f_{7/2}$	2.082+03	5.241+04	3.502+02	7.105+00	8.919+00	6.094+01	5.807−01	0.8
$7f_{7/2}$	1.530+03	4.128+04	2.829+02	4.761+00	9.607+00	5.956+01	1.359+00	0.5
$8f_{7/2}$	1.171+03	4.092+04	2.999+02	2.698+00	9.571+00	5.977+01	1.366+00	0.4
$9f_{7/2}$	9.248+02	3.232+04	3.878+01	1.363+01	1.062+01	3.273+02	6.278+00	0.3
$10f_{7/2}$	7.489+02	3.214+04	4.032+01	9.527+00	1.057+01	3.275+02	6.110+00	0.3
$11f_{7/2}$	6.188+02	2.541+04	4.422+01	7.266+00	1.041+01	3.264+02	5.047+00	0.4
$12f_{7/2}$	5.198+02	2.531+04	4.757+01	5.640+00	1.027+01	3.278+02	4.351+00	0.6
$5g_{7/2}$	2.998+03	3.439+04	9.598+02	2.436+00	6.805+00	7.381+01	7.618−01	0.3
$6g_{7/2}$	2.082+03	3.347+04	1.119+03	8.173−01	7.048+00	7.446+01	5.916−01	0.6
$7g_{7/2}$	1.530+03	2.632+04	3.630+02	9.521+00	1.083+01	3.634+01	9.189−01	0.4
$8g_{7/2}$	1.171+03	2.596+04	4.389+02	3.870+00	1.056+01	3.636+01	8.810−01	0.4

(*continued on next page*)

Table 2 (*continued*)

Shell	E_{th}, eV	k_{max}, eV	k_0, eV	σ_0, Mb	p	y_a	y_w	δ_{av}, %
$9g_{7/2}$	9.248+02	2.051+04	2.923+02	4.870+00	1.176+01	3.699+01	1.195+00	0.3
$10g_{7/2}$	7.489+02	2.033+04	4.475+01	1.412+01	1.311+01	1.746+02	4.695+00	0.3
$11g_{7/2}$	6.188+02	2.020+04	4.570+01	9.757+00	1.311+01	1.747+02	4.743+00	0.3
$12g_{7/2}$	5.198+02	1.598+04	4.985+01	7.594+00	1.292+01	1.747+02	3.991+00	0.3
$5g_{9/2}$	2.989+03	3.438+04	1.063+03	1.702+00	6.586+00	7.392+01	7.450−01	0.2
$6g_{9/2}$	2.077+03	3.347+04	1.140+03	7.693−01	6.964+00	7.393+01	5.831−01	0.7
$7g_{9/2}$	1.526+03	2.632+04	4.199+02	7.553+00	1.056+01	3.349+01	8.653−01	0.3
$8g_{9/2}$	1.169+03	2.596+04	4.483+02	3.886+00	1.062+01	3.344+01	8.883−01	0.4
$9g_{9/2}$	9.233+02	2.050+04	1.120+02	1.151+01	1.278+01	7.120+01	2.276+00	0.3
$10g_{9/2}$	7.478+02	2.033+04	1.187+02	7.433+00	1.271+01	7.128+01	2.179+00	0.2
$11g_{9/2}$	6.179+02	2.020+04	9.615+01	6.144+00	1.282+01	8.776+01	2.517+00	0.3
$12g_{9/2}$	5.191+02	1.598+04	1.079+02	4.492+00	1.252+01	8.877+01	2.064+00	0.5
$6h_{9/2}$	2.077+03	2.166+04	9.835+02	8.709−01	7.434+00	7.320+01	6.364−01	0.3
$7h_{9/2}$	1.526+03	1.699+04	5.417+02	7.559+00	1.080+01	2.668+01	7.553−01	0.2
$8h_{9/2}$	1.169+03	1.663+04	3.010+02	1.964+01	1.299+01	2.714+01	9.336−01	0.3
$9h_{9/2}$	9.233+02	1.639+04	3.091+02	1.151+01	1.320+01	2.708+01	9.475−01	0.3
$10h_{9/2}$	7.478+02	1.296+04	1.429+02	1.776+01	1.485+01	4.030+01	1.642+00	0.2
$11h_{9/2}$	6.179+02	1.283+04	1.419+02	1.212+01	1.500+01	4.034+01	1.692+00	0.3
$12h_{9/2}$	5.191+02	1.273+04	7.657+01	1.149+01	1.543+01	7.087+01	2.629+00	0.2
$6h_{11/2}$	2.074+03	2.165+04	1.004+03	7.976−01	7.359+00	7.319+01	6.289−01	0.3
$7h_{11/2}$	1.524+03	1.699+04	7.629+02	2.044+00	9.266+00	3.749+01	6.159−01	0.4
$8h_{11/2}$	1.167+03	1.663+04	3.270+02	1.748+01	1.290+01	2.508+01	9.311−01	0.2
$9h_{11/2}$	9.223+02	1.639+04	3.521+02	9.455+00	1.294+01	2.493+01	8.897−01	0.3
$10h_{11/2}$	7.471+02	1.296+04	1.261+02	1.937+01	1.506+01	4.291+01	1.829+00	0.2
$11h_{11/2}$	6.174+02	1.283+04	1.354+02	1.261+01	1.492+01	4.312+01	1.674+00	0.2
$12h_{11/2}$	5.187+02	1.273+04	1.713+01	1.938+01	1.590+01	2.857+02	9.738+00	0.2
$7i_{11/2}$	1.524+03	1.374+04	8.485+02	5.746−01	8.390+00	7.158+01	5.585−01	0.5
$8i_{11/2}$	1.167+03	1.081+04	3.739+02	2.205+01	1.327+01	2.150+01	7.883−01	0.1
$9i_{11/2}$	9.223+02	1.057+04	2.414+02	4.447+01	1.529+01	2.222+01	9.539−01	0.2
$10i_{11/2}$	7.471+02	1.039+04	2.560+02	2.581+01	1.542+01	2.208+01	9.225−01	0.2
$11i_{11/2}$	6.174+02	8.236+03	1.776+02	3.070+01	1.676+01	2.468+01	1.240+00	0.2
$12i_{11/2}$	5.187+02	8.137+03	1.652+02	2.245+01	1.687+01	2.712+01	1.247+00	0.3
$7i_{13/2}$	1.523+03	1.374+04	8.442+02	5.836−01	8.380+00	7.159+01	5.572−01	0.6
$8i_{13/2}$	1.166+03	1.081+04	3.666+02	2.446+01	1.344+01	2.053+01	8.217−01	0.1
$9i_{13/2}$	9.216+02	1.057+04	3.918+02	1.339+01	1.362+01	2.090+01	7.290−01	0.3
$10i_{13/2}$	7.465+02	1.039+04	1.699+02	4.739+01	1.654+01	2.564+01	1.229+00	0.2
$11i_{13/2}$	6.170+02	8.235+03	1.776+02	3.013+01	1.663+01	2.537+01	1.203+00	0.2
$12i_{13/2}$	5.184+02	8.137+03	1.366+02	2.512+01	1.712+01	3.132+01	1.420+00	0.2



Graph 1. Total radiative recombination cross sections in Mb.