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Dielectronic Recombination Rate Coefficients to Excited States of O III from O IV and Dielectronic Satellite Lines

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Dielectronic recombination rate coefficients to excited states of O III from O IV and dielectronic satellite lines

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Abstract

Energy levels, radiative transition probabilities, and autoionization rates for C-like oxygen (O^{2+}) including $1s^22s^22pnl$, $1s^22s2p^2nl$, and $1s^22p^3nl$ (n=2-8, $l \leq n-1$) states are calculated by the Hartree-Fock-Relativistic method (Cowan code). Autoionizing levels above the thresholds $1s^22s^22p\ ^2P$, $1s^22s2p^2\ ^4P$, ^2D, ^2S, ^2P, and $1s^22p^3\ ^4S$, ^2D are considered. Configuration mixing $2s^22pnl + 2p^3nl$ plays an important role for all atomic characteristics. Branching ratios relative to the first threshold and intensity factors are calculated for satellites lines, and dielectronic recombination rate coefficients are presented for the excited 218 odd-parity and 218 even-parity states. The dielectronic recombination (DR) rate coefficients are calculated including $1s^22s^22pnl$, $1s^22s2p^2nl$, and $1s^22p^3nl$ (n=2-8, $l \leq n-1$) states. Contributions from the excited states with $n \geq 8$ are estimated by extrapolation of all atomic characteristics to derive the total DR rate coefficient. It is found that the orbital angular momentum quantum number l distribution of the rate coefficients shows a peak at l=4. The total DR rate coefficient is derived as a function of electron temperature. The state-selective DR rate coefficients to excited states of C-like oxygen, which are useful for modeling O III spectral lines in a recombining plasma, are calculated as well.

Key words: carbonlike oxygen, dielectronic recombination rate coefficients,energy levels, radiative transition probabilities,autoionization rates, excited states, dielectronic satellite lines

I. INTRODUCTION

Dielectronic recombination (DR) is an important recombination process in high temperature plasmas. It is therefore not surprising that many theoretical and experimental efforts are directed towards accurate calculation or measurements of DR characteristics in various atoms and ions.

In the series of papers by Nussbaumer and Storey [1–4] the total and effective DR rate coefficients were calculated for ions of C, N, O, and Ne. Energies and radiative probabilities for transitions between these states were calculated in Ref. [1] by the SUPERSTRUCTURE code. The accuracy of the DR data is estimated to be insufficient to identify spectral features [2, 3]. As for the autoionization rates, the contributing collision strengths were obtained using the distorted wave approximation. In Ref. [2] the total DR rate coefficients were given for C^{+} , C^{2+} , C^{3+}, N^{3+}, N^{4+}, O^{2+}, O^{3+}, O^{4+}, and O^{5+} ions, and results were fitted by an analytical formula in the range of electron temperatures $T_e = (6-10) \times 10^3$ K. Effective DR rate coefficients were calculated in Ref. [2] for selected lines and to the ground and metastable states of ions C^{+} , C^{2+} , C^{3+}, N^{3+}, N^{4+}, O^{2+}, O^{3+}, O^{4+}, and O^{5+}, and the fits were obtained for the same range of T_e. The same method was used in Ref. [3] for calculation of effective DR rate coefficients for selected lines and ground and metastable states of ions Ne^{2+}, Ne^{3+}, Ne^{4+}, Ne^{5+}, and Ne^{6+}.

In the series of papers by Badnell and his colleagues [5–8], the influence of core fine-structure on dielectronic recombination at low temperatures was studied for the same ions as in Refs. [1–4]. Here the SUPERSTRUCTURE code was used only for the radiative transition probabilities. The AUTOSTRUCTURE code was developed by Badnell [5–8] from SUPERSCTRUCTURE to calculate autoionization rates including configuration mixing within LS-coupling or intermediate coupling.

Recently, the DR rate coefficients to excited states of C I from C II ions were evaluated [9] using the Hartree-Fock-Relativistic Cowan code [10]. In addition to all configurations up to the principal quantum number n=6, the contributions from configurations with $6 < n < 500$ were taken into account. The importance of the contributions of highly excited states to the DR rate coefficients was emphasized by Hahn [11]. Since the DR rate coefficients to each excited state $\alpha_d(1s^2 2s^2 nl(LS))$ are not given in Refs. [5–8], new data for $\alpha_d(1s^2 2s^2 nl(LS))$ were presented in [9]. A similar method was used recently to evaluate the DR rate coefficients for the excited states of C II [12, 13] and Be-like carbon [14], neon [15], and oxygen [16].

In the present paper, energy levels, radiative transition probabilities, and autoionization rates for 52 even- and 50 odd-parity configurations $1s^22s^22pnl$, $1s^22s2p^2nl$, and $1s^22p^3nl$ (n=2-8, $l \le n-1$) in C-like oxygen (O^{2+}) are calculated using the Cowan code. We present a detailed comparison of our theoretical calculations with recommended data from the National Institute of Standards and Technology (NIST) database to test the accuracy of our results. Autoionizing levels above the thresholds $1s^22s^22p\ ^2P$, $1s^22s2p^2\ ^4P$, ^2D, ^2S, ^2P, and $1s^22p^3\ ^4S$, ^2D are considered. Branching ratios relative to the first threshold and intensity factors are calculated for the dielectronic satellite lines. The DR rate coefficients for the excited 218 odd-parity and 218 even-parity states are presented as well. The DR rate coefficients are calculated including the $1s^22s^22pnl$, $1s^22s2p^2nl$, and $1s^22p^3nl$ (n=2-8, $l \le n-1$) configurations. The contributions from the excited states higher than n=8 are estimated by extrapolation of all atomic properties to derive the total DR rate coefficient as a function of electron temperature. The dielectronic satellite line spectra are also obtained. The results of our calculations are presented in Figs. 1–20 and Tables I–XI.

II. ENERGY LEVELS, TRANSITION PROBABILITIES, AND AUTOIONIZATION RATES

The Hartree-Fock-Relativistic method by Cowan is widely used for calculation of atomic structure parameters, and its detailed description can be found elsewhere (see, e.g., [10]). One of the main features of Cowan's code is the use of scaled Slater integrals and configuration-interaction integrals for effective account of correlation effects. In the present work, the integrals were scaled to 85% of the *ab initio* Hartree-Fock values.

The results of our detailed calculations of the radiative and autoionization rates for the states $1s^22s^22pnl$, $1s^22s2p^2nl$, and $1s^22p^3nl$ with n=2-8, $l \le n-1$ are presented in Tables I to XI. The total list of levels includes 1505 even-parity and 1498 odd-parity states. In order to retain only the strong transitions which mostly contribute to dielectronic recombination, only the transition rates $A_r > 10^5$ s^{-1} are calculated in the present report. Even with this limitation the resulting list of radiative transitions between the $1s^22s^22pnl$, $1s^22s2p^nl$, and $1s^22p^3nl$ (n=2-8, $l \le n-1$) states includes 36328 even-odd parity transitions and 37108 odd-even parity transitions.

The energies of the $2s^22p^2\ ^3P_J,\ ^1D_2,\ ^1S_0$, $2s2p^3\ ^{1,3,5}L_J$, $2p^4\ ^3P_J,\ ^1D_2,\ ^1S_0$, $2s^22pnl\ ^{1,3}L_J$, $2s2p^23l\ \ ^{1,3,5}L_J$, and $2s2p^24l\ \ ^{1,3,5}L_J$ levels of O^{2+} ion are pesented in Tables II, III and IV. Theoretical results for energies calculated with the Cowan code are compared with the data from the compilation of recommended NIST data [19] as well as some theoretical results. In Table II, we include theoretical data for 46 levels given by Bhatia and Kastner in Ref. [20], by Aggarwal *et.al* in Ref. [21], and by Tachiev and Froese Fisher in Ref. [22]. The SUPERSTRUCTURE code was used in Ref. [20], the configuration interaction with relativistic correction (CIV3 code) was employed in Ref. [21], and a multi-configuration Hartree-Fock (MCHF) method with relativistic effects included through the Breit-Pauli Hamiltonian was used in Ref. [22]. Those data are given in columns "SPSTR", "CIV", and "MCHF" of Table II, respectively. As can be seen from Table II, the smallest differences between theoretical calculations and recommended NIST data are for the MCHF results (about 0.1–0.3%). A slightly worse agreement is noticed for the present results (about 0.3–1.0%) for most of levels, except for $2p^4\ ^3P_J,\ ^1D_2$ (about 3%). Finally, the results obtained by SUPERSTRUCTURE and CIV3 codes for the lowest 46 levels demonstrate noticeably worse agreement with the NIST data. This may be due to importance of correlation corrections for those levels which was emphasized in Refs. [20–22].

In Table III, the present data for $2s^22pnl\ LSJ$ levels for high nl are compared with the data from the compilation of recommended NIST data [19]. As can be seen from Table III, the differences are about 0.1–1%. Finally, the remaining set of excited, non-autoionizing levels is presented in Table IV.

In Table V, the wavelengths λ (in Å), transition rates A_r (in s^{-1}) and oscillator strengths f for the $2s^22p^2[\ ^3P_J,\ ^1D_J,\ ^3P_J]$ - $2s2p^3[\ ^{1,3}L'_J]$, $2s^22p^2[\ ^3P_J,\ ^1D_J,\ ^3P_J]$ - $2s^22p3s[\ ^{1,3}P'_J]$, and $2s^22p^2[\ ^3P_J,\ ^1D_J,\ ^3P_J]$ - $2s^22p3d[\ ^{1,3}L'_J]$ transitions in O^{2+} are compared with the results obtained by Tachiev and Froese-Fisher [25]. The Cowan data for wavelengths are seen to be in a good agreement (of the order of 0.1%–0.2%) with the MCHF results. As for the oscillator strengths and transition probabilities, the strongest lines (say, $f \gtrsim 0.01$) agree with the MCHF data within 15%-20%.

Wavelengths λ (in Å), weighted radiative rates gA_r (in s^{-1}), and sum of weighted radiative rates $\sum gA_r$ (in s^{-1}) between the $1s^22s^22pnl$, $1s^22s2p^2nl$, and $1s^22p^3nl$ (n=2-8, $l \leq n-1$) states are presented in Table VI and Table VII. As has been mentioned above, autoionizing levels are considered above the thresholds $1s^22s^22p\ ^2P$, $1s^22s2p^2\ ^4P,\ ^2D,\ ^2S,\ ^2P$, and

$1s^22p^3\ ^4S$, ^2D. In the fifth column (heading A_a) of Table VI and Table VII the autoionization rates, A_a, relative to the first threshold, $1s^22s^22p\ ^2P$, are given. Next column in Tables VI and VII shows autoionization rates as sum of A_a calculated relative to the following thresholds: E($1s^22s^22p\ ^2P$) = 443085 cm^{-1}, E($1s^22s2p^2\ ^4P$) = 514524 cm^{-1}, E($1s^22s2p^2\ ^2D$) = 570021 cm^{-1}, E($1s^22s2p^2\ ^2S$) = 607451 cm^{-1}, E($1s^22s2p^2\ ^2P$) = 623565 cm^{-1}, E($1s^22p^3\ ^4S$) = 674622 cm^{-1}, and E($1s^22p^3\ ^2D$) = 698241 cm^{-1}. The column with heading E$_S$ in Tables VI and VII gives excitation energies E$_S$ relative to the first threshold $1s^22s^22p\ ^2P$ in eV.

III. DIELECTRONIC SATELLITE SPECTRA

The DR process to bound states of C-like oxygen occurs as an electron capture of B-like oxygen to doubly excited states of C-like oxygen, followed by radiative decay to the bound states of C-like oxygen:

$$\begin{array}{lll} O^{3+}(2s^22p)+e & \rightarrow & O^{2+*}(2s2p^2nl_1+2p^3nl_2) \rightarrow O^{3+*}(2s^22pnl+2s2p^3+2p^4+2s2p^23l)+h\nu \\ & & \downarrow \\ & & O^{3+}(2s^22p, 2s2p^2, 2p^3)+e. \end{array} \quad (1)$$

As an initial state we consider the ground state of O^{3+}, $2s^22p$. The 2s2p$^2nl_1$ and 2p$^3nl_2$ levels are taken into account as doubly excited intermediate states.

During the DR process, the DR satellite lines are emitted during electron transitions from doubly excited autoionization states to bound states. Radiative transitions from $2s2p^2nl$ states to $2s^22pnl$ states give rise to satellite lines of the $2s2p^2-2s^22p$ line of the B-like oxygen. There also exist DR satellite transitions from autoionizing states $2s2p^2nl$ to $2s2p^2n'l'$ with the change of the quantum principal number n. They appear at a longer wavelength region.

The effective emission rate coefficient of the dielectronic satellite line is

$$C_S^{eff}(j,i) = 3.3\times10^{-24}\left(\frac{I_H}{kT_e}\right)^{3/2}\frac{Q_d(j,i)}{g_0}\exp\left(-\frac{E_S(i)}{kT_e}\right)\text{ photons cm}^3\text{s}^{-1}, \quad (2)$$

$$Q_d(j,i) = \frac{g(i)A_a(i,i_0)A_r(j,i)}{\sum_{i'_0}A_a(i,i'_0)+\sum_k A_r(k,i)}\,, \quad (3)$$

where I_H is the ionization potential of hydrogen, j denotes the bound state, i is the doubly excited state, i_0 is the initial state (that is, the ground state $2s^22p$), and i'_0 is the possible final state for autoionization such as, e.g., $2s^22p$ and $2s2p^2$. The statistical weight of the initial state i_0 is $g_0 = 6$, $g(i)$ is the statistical weight for a doubly excited state, $A_a(i, i_0)$ is the autoionization rate from i to i_0, $A_r(j, i)$ is the radiative transition probability from i to j, $E_S(i)$ is the excitation energy of the autoionizing state i relative to the first threshold, $2s^22p\ ^2P$, and T_e is the electron temperature. Maxwellian distribution is assumed for electron velocities. For most cases, $A_a \gg A_r$ and then Q_d is roughly estimated as $Q_d(j, i) \approx g(i)A_r(j, i)$.

It has already been mentioned that autoionization rates $A_a(i, 2s^22p)$, sum of autoionization rates $\sum A_a(i, i'_0)$= $A_a(i, 2s^22p)$+ $A_a(i, 2s2p^2)$ + $A_a(i, 2p^3)$, and excitation energies E$_S$ for even- and odd-parity states are presented in columns 5, 6, and 7 of Tables VI and VII. Weighted radiative rates $g_iA_r(j, i)$, sum of weighted radiative rates $\sum_k g_iA_r(k, i)$, and wavelengths λ for dipole-allowed transitions are given in columns 8, 9, and 10 of Tables VI and VII, respectively. The last two columns of Tables VI and VII list relative intensity factors $Q_d(j, i)$ and effective emission rate coefficients $C_S^{eff}(j, i)$ defined by Eq. (2). It should be noted that the number of transitions listed in Tables VI and VII is limited by including transitions with the largest values of $Q_d(j, i)$. We include transitions with $Q_d(j, i) > 10^{10}$ s^{-1}. That gives us 140 instead of 36328 even-odd parity transitions (Table VI) and 299 instead of 37108 odd-even parity transitions (Table VII).

Figures 1 and 2 show examples of DR satellite line spectra for T_e=10 eV for two wavelength ranges. In these figures, we include data for 1367 even-odd parity transitions and 2084 odd-even parity transitions (some of those transitions are presented in Tables VI and VII). Wavelengths (in Å, column 10), effective emission rate coefficients $C_S^{eff}(j, i)$ (in units of 10^{-15} cm^3/s, column 12) and Gaussian profiles with spectral resolution $R \equiv \lambda/\Delta\lambda = 700$ are used to synthesize these spectra. It should be noted that the limited set of transitions includes transitions with $C_S^{eff}(j, i)$ >10^{-15} cm^3/s. Synthetic spectrum of dielectronic satellite lines from O^{2+} ion at T$_e$ = 10 eV is divided into eight parts: λ = 190 - 300 Å , λ = 290 - 325 Å , λ = 325 - 415 Å , and λ = 540 - 575 Å , (Fig. 1), λ = 600 - 650 Å , λ = 650 - 850 Å, λ = 850 - 1400 Å, and λ = 1500 - 2100 Å (Fig. 2).

The strongest lines shown in Fig. 1 are due to Rydberg transitions $2s^22p^2$ - $2s2p^2np$ (λ = 190 - 300 Å) together with $2s2p^3 - 2s2p^2nd$ (λ = 190 - 325 Å) for n = 4 -8. Some of the strong lines $2p^4 - 2s2p^2np$ (λ = 325 - 415 Å) result from the strong mixing of configurations $2s^22p^2$ and $2p^4$. A large number of satellite lines of $2s - 2p$ transitions ($2s^22pnp - 2s2p^2np$, $2s^22pnd - 2s2p^2nd$, and $2s^2pnf - 2s2p^2nf$) are responsible for the spectra shown in Figs. 1

and 2 in the region of λ = 540 - 850 Å. There are contributions of the $2s2p^2 3s - 2s2p^2 4p$, $2s2p^2 3p - 2s2p^2 5d$ transitions to the region of λ = 850 - 1400 Å and the $2s2p^2 3d - 2s2p^2 4f$, $2s2p^2 3p - 2s2p^2 4d$ transitions to the region of λ = 1500 - 2100 Å of the spectrum of O^{2+} ion at T_e = 10 eV.

IV. DIELECTRONIC RECOMBINATION RATE COEFFICIENTS FOR EXCITED STATES

The DR rate coefficients for excited states are obtained by summation of the effective emission rate coefficients (Eq. (2)) for DR processes through all possible intermediate doubly excited states:

$$\alpha_d(i_0, j) = 3.3 \times 10^{-24} \left(\frac{I_H}{kT_e}\right)^{3/2} \frac{1}{g_0} \sum_i Q_d(j, i) \exp\left(-\frac{E_s(i)}{kT_e}\right). \tag{4}$$

For the DR process described by Eq. (1), one needs to calculate $\alpha_d(i_0, j)$ with $i_0 = 2s^2 2p$ and all possible excited states j of O^{2+} with energies below the first threshold, $2s^2 2p\ ^2P$ (443085 cm^{-1}). Among the $1s^2 2s^2 2pnl$, $1s^2 2s2p^2 nl$, and $1s^2 2p^3 nl$ (n=2-8, $l \leq n-1$) states, 218 states of odd parity and 218 states of even parity have energies lower than 443085 cm^{-1}. The results of our calculations of $g_0 \alpha_d(2s^2 2p, j)$ for j being an odd-parity state are shown in Figs. 8-13 and for j being an even-parity state are shown in Figs. 14-20. The electron temperature for these plots varies from T_e=0.05 eV to T_e=120 eV.

As can be seen from Figs. 8 - 20, the DR rate coefficients can be divided into three different groups. There are curves without any maximum as, e.g., $\alpha_d(2s^2 2p, j)$ for $j = 2s^2 2p^2\ ^3P_J$, $2p^4\ ^3P_J$, $2s2p^2 3s\ ^3P_J$, ^3D_J, $2s^2 2p3p\ ^1S_0$ (Fig. 8) and $2s2p^2 4s\ ^3P_J$ (Fig. 13). Then, there are curves with two maxima (at about 0.6 - 0.8 eV and 11.2 eV), e.g., $\alpha_d(2s^2 2p, j)$ for j = $2s^2 2pns\ ^1P_1$ with n = 5–8 (Fig. 17) and $2s^2 2pnd\ ^{1,3}L_J$ with n = 6–8 (Fig. 18). Most of the DR rate coefficients exhibit only one maximum around 0.8–2.3 eV or 11.2 eV. The tabulated data of $g_0 \alpha_d(2s^2 2p, j)$ for 28 points of electron temperature 0.1 eV $< T_e <$120 eV are presented in Table VIII (218 states of even parity) and Table IX (218 states of odd parity).

In order to estimate contributions from high-n autoionizing states to the DR rate coefficients for excited states (sum over i in Eq. (4)), we use empirical scaling laws [9], which can only be implemented to include the one-electron $2s - np$, $2p - ns$, and $2p - nd$ dipole transitions. Additional contributions from high-n states appear for the first low-lying configurations, $2s^22p^2$, $2s2p^3$, and $2p^4$. For these configurations the $2s^22p^2$ - $2s2p^2np$, $2s2p^3$ - $2s2p^2ns$, $2s2p^3$ - $2s2p^2nd$, $2s2p^3$ - $2p^3np$, $2p^4$ - $2p^3ns$, and $2p^4$ - $2p^3ns$ transitions with $n >$ 8 are to be considered as well.

To estimate $Q_d(j,i)$ in Eq.(2) for autoionization states i with high principal quantum number n for the $2s2p^2nl$ and $2p^3nl$ states and for the $2s-np$ and $2p-nl$ dipole transitions we used our calculated data for n =7 and the $1/n^3$ scaling law for A_a and A_r:

$$A_a\left(2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J\right) = \left(\frac{7}{n}\right)^3 A_a\left(2s2p^2(^{1,3}L_{12})7l\ ^{1,3}L_J\right)\ , \tag{5}$$

$$\begin{aligned} & A_r\left(2s^2(^1S)2p^2\ ^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J\right) \\ = & \left(\frac{7}{n}\right)^3 A_r\left(2s^2(^1S)2p^2\ ^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})7l\ ^{1,3}L_J\right) \\ \times & \left(\frac{E\left(2s^2(^1S)2p^2\ ^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J\right)}{E\left(2s^2(^1S)2p^2\ ^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})7l\ ^{1,3}L_J\right)}\right)^3 . \end{aligned} \tag{6}$$

In order to obtain the energies of the $2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J$ states as a function of nl, the following asymptotic formula was proposed in Ref. [26].

$$E(2s2p^2(^{1,3}L_{12})nl) - E(2s2p^2(^{1,3}L_{12})) = -\frac{1}{2n^2}\left(Z-5+\frac{b(l)}{n}\right)^2\ , \tag{7}$$

where $b(s) = 2.873$, $b(p) = 1.761$, $b(d) = 0.721$, $b(f) = 0.137$, and $b(g) = 0.010$. The energy differences in Eq. (6) can be found using the following formula:

$$\begin{aligned} & E\left(2s^2(^1S)2p^2\ ^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J\right) \\ = & E\left(2s^2(^1S)2p^2\ ^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})7l\ ^{1,3}L_J\right) - \frac{9}{2}\left(\frac{1}{n^2}-\frac{1}{7^2}\right) \times 219474\ \mathrm{cm}^{-1}. \end{aligned} \tag{8}$$

A similar formula was used for the excitation energies $E_S(i)$ in Eq. (4) when i=$2s2p^2(^{1,3}L_{12})nl$:

$$E_S(2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J) = E_S(2s2p^2(^{1,3}L_{12})7l\ ^{1,3}L_J) - \frac{9}{2}\left(\frac{1}{n^2}-\frac{1}{7^2}\right) \times 219474\ \mathrm{cm}^{-1}. \tag{9}$$

Using these scaling formulas for $A_a(2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J)$ and $A_r(2s^2(^1S)2p^2\ ^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J)$, we calculated $Q_d(2s^2(^1S)2p^2\ ^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J)$ as a function of n and then, using Eq. (9) for E_S, we calculate sums over n for $\alpha_d(2s^22p, 2s^22p^2\ ^{1,3}L_J)$ vs. n and T_e.

The results of our calculations are illustrated in Fig. 3. In order to check our scaling law, we compare the explicitly calculated data for $n = 8$ and the scaled data for $n = 8$ obtained from the calculated data for $n = 7$. We found that the difference between the calculated and scaled data is about 10% except for some cases when mixing of configurations is very important. In Fig. 3, we demonstrate the contribution of scaled data from $n = 9$ up to $n = 10$ (curve "2"), from $n = 9$ up to $n = 100$ (curve "3"), and from $n = 9$ up to $n = 30000$ (curve "4"). As can be seen from Fig. 3, there is no visible difference between the results calculated with $n \leq 100$ and $n \leq 30000$. The second conclusion derived from Fig. 3 is that the high-n states are important only for $T_e > 1$ eV. Similar results are obtained for the $2s2p^3\ ^{1,3,5}L_J$ states. In Fig. 3, we show the high-n contributions for $2s2p^3\ ^5S_2$ and $^3P_0$ states. The calculated contributions of high-n states (from $n = 9$ up to n=30000) for $g_0\alpha_d(2s^22p, 2s^22p^2\ ^3P_J,\ ^1D_2,\ ^1S_0)$ are given in five columns of Table X.

Similar data are presented in Table X for the DR rate coefficients $g_0\alpha_d(2s^22p, 2s^22p^2\ ^3P_J,\ ^1D_2,\ ^1S_0)$ and $g_0\alpha_d(2s^22p, 2s2p^3\ ^5S_2,\ ^3D_J,\ ^3P_J,\ ^1D_2,\ ^3S_1,\ ^1P_1)$. It was already mentioned that for $2s2p^3$ states, one has to consider $2s2p^3$ - $2s2p^2ns$, $2s2p^3$ - $2s2p^2nd$, and $2s2p^3$ - $2p^3np$ transitions. The most important for $\alpha_d(2s^22p, 2s2p^3\ ^{1,3,5}L_J)$ is the second one, the $2s2p^3$ - $2s2p^2nd$ transition. The contribution of $2s2p^3$ - $2p^3np$ transitions is smaller than other two by a factor of 10^3 - 10^4. Sum of these three contributions is given in Table X for $g_0\alpha_d$ of the ten $2s2p^3$ states. We also calculated the high-n contribution for the DR rate coefficients, $\alpha_d(2s^22p, 2p^4\ ^3P_J,\ ^1D_2,\ ^1S_0)$. For the $2p^4$ states, the $2p^4$ - $2p^3ns$ and $2p^4$ - $2p^3nd$ transitions are important. However, the high-n contributions from these transitions are smaller than 1% of the data given in Table VIII for the $2p^4$ states, and thus they are not included in Table X.

Finally, it should be noted that the high-n contributions discussed above are included in the DR rate coefficients $g_0\alpha_d(2s^22p, 2s^22p^2\ ^3P_J,\ ^1D_2,\ ^1S_0)$ and $g_0\alpha_d(2s^22p, 2s2p^3\ ^5S_2,\ ^3D_J,\ ^3P_J,\ ^1D_2,\ ^3S_1,\ ^1P_1)$ presented in Table VII and IX, respectively.

V. TOTAL DIELECTRONIC RECOMBINATION RATE COEFFICIENTS

The total DR rate coefficients are obtained by summation of the rate coefficients of DR processes through all possible intermediate singly and doubly excited states:

$$\alpha_d(i_0) = 3.3 \times 10^{-24} \left(\frac{I_H}{kT_e}\right)^{3/2} \frac{1}{g_0} \sum_i \sum_j Q_d(j,i) \exp\left(-\frac{E_s(i)}{kT_e}\right), \tag{10}$$

We have already discussed the contribution from doubly excited states with high-n levels to the DR rate coefficients (sum over i in Eq. (4)). For the total DR rate coefficients one has to consider also the contribution from singly excited states with high n, $2s^22pnl$ states. For these states, the most important transitions are $2s^22pnl - 2s2p^2nl$ [9, 13–16].

To estimate $Q_d(j,i)$ in Eq. (3) for $j = 2s^22pnl$ and $i = 2s2p^2nl$ for $n > 8$, we used the calculated data for $n = 7$ and $1/n^3$ scaling law for A_a (Eq. (5)) and E_S (Eq. (9)). The values of A_r for the $2s^22pnl - 2s2p^2nl$ transitions are almost independent of n since this is a one-electron $2s - 2p$ transition. One has to take into account the change of the energy difference following Eq. (7):

$$\begin{aligned} & A_r\left(2s^2(^1S)2pnl^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J\right) \\ = & A_r\left(2s^2(^1S)2p7l^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})7l\ ^{1,3}L_J\right) \\ \times & \left(\frac{E\left(2s^2(^1S)2pnl^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J\right)}{E\left(2s^2(^1S)2p7l^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})7l\ ^{1,3}L_J\right)}\right)^3 . \end{aligned} \tag{11}$$

Using asymptotic formula given by Eq. (8), we obtain in first approximation:

$$E\left(2s^2(^1S)2pnl^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J\right) = E\left(2s^2(^1S)2p7l^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})7l\ ^{1,3}L_J\right) \tag{12}$$

and finally [13]:

$$A_r\left(2s^2(^1S)2pnl^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J\right) = A_r\left(2s^2(^1S)2p7l^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})7l\ ^{1,3}L_J\right) \tag{13}$$

To estimate $Q_d(j,i)$ in Eq.(3) for autoionization states i with high n for the $2s^22p^2 - 2s2p^2nl$ dipole transitions we used the calculated data for $n = 7$ and the $1/n^3$ scaling law for A_a. For the $2s^22pnl - 2s2p^2nl$ transitions, the scaling begins from $n = 8$.

Using scaling formulas for $A_r\left(2s^2(^1S)2pnl^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J\right)$ (Eq.(13)) and $A_a(2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J)$ (Eq.(5)), we calculated $Q_d(2s^2(^1S)2pnl^{1,3}L'_{J'}$ −

$2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J)$ and then, using Eq. (9) for E_S, we calculated $C_S^{\rm eff}(2s^2(^1S)2pnl^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J)$. The sums over LSJ and intermediate momenta $^{1,3}L_{12}$ for $C_S^{\rm eff}(2s^2(^1S)2pnl^{1,3}L'_{J'} - 2s2p^2(^{1,3}L_{12})nl\ ^{1,3}L_J)$ give us data for $C_S^{\rm eff}(2s^22pnl - 2s2p^2nl)$ as a function of nl and T_e.

Results of the calculations for $C_S^{\rm eff}(2s^22pnl - 2s2p^2nl)$ are illustrated in Fig. 4 for the $2s^22pns - 2s2p^2ns$, $2s^22pnp - 2s2p^2np$, $2s^22pnd - 2s2p^2nd$, and $2s^22pngf - 2s2p^2nf$ transitions and in Fig. 5 for the $2s^22png - 2s2p^2ng$, $2s^22pnh - 2s2p^2nh$, $2s^22pni - 2s2p^2ni$, and $2s^22pnk - 2s2p^2nk$ transitions. In Fig. 4 and 5, we demonstrate the contribution of scaled data for n = 9 to n = 10 (curves "2"), for n = 9 to n = 100 (curves "3"), for n = 9 to n = 1000 (curves "4"), and for n = 9 to n = 30000 (curves "5"). As one can see from Figs. 4 and 5, there is no difference between the results calculated with $n \leq 1000$ and $n \leq 30000$. It should be noted that the convergence for the $2s^22pnl - 2s2p^2nl$ transitions is slower than for the $2s^22p^2 - 2s2p^2np$ and $2s2p^3 - 2s2p^2ns$, $2s2p^3 - 2s2p^2nd$ transitions considered in the previous section. Also the results of summed calculated data for $C_S^{\rm eff}(2s^2nl - 2s2pnl)$ from n = 3–8 are presented in Figs. 4 and 5. As can be seen from Figs. 4 and 5, the curve "1" describing those data is above the curves "2" - "5" describing the scaled data only for low electron temperature T_e. For $T_e > 1$ eV, the curve "1" is between the curves "2" (n = 9-10) and the curves "3" describing contribution from the scaled data for n = 9 to n = 100. We already mentioned previously that the importance of the contributions from highly excited states for the DR rate coefficients was emphasized by Hahn [11] and confirmed by the results of Refs. [9, 13–16].

The final result of our $2s^22pnl - 2s2p^2nl$ scaling is shown by Fig. 6. In this figure, we present $\sum_{n=9}^{n=30000} C_S^{eff}(2s^22pnl - 2s2p^nl)$ as a function of l and T_e. As can be seen from Fig. 6, the value of $\sum_{n=9}^{n=30000} C_S^{eff}(2s^22pnl - 2s2p^2nl)$ increases with increasing l up to l = 4 (ng curve), while for l = 5, 6, and 7 (nh, ni, and nk curves) it becomes smaller than for l = 2, 3, and 4 (nd, nf, and ng curves).

Sum of the scaled data for n = 9 - 30000 and sum of the calculated results for n = 3 - 8 (Tables VIII and IX) are shown in Fig. 7. It is clearly seen from this figure that the contribution from the low excited states is responsible for the total DR rate coefficient at low T_e, and contribution from the high-n excited states becomes more important with increasing temperature. The curve describing the contribution of these states has a maximum near 11 eV. The resulting curve for the total DR rate coefficient $g_0\alpha_d(2s^22p)$ has two maxima for

T_e near 0.6 eV and 11 eV. Our results are compared in Fig. 7 with the results by Badnell and Pindzola [6]. As can be seen from this figure, the value of $g_0\alpha_d(2s^22p)$ from Ref. [6] agrees only with our scaled data for high n.

The calculated data for $g_0\alpha_d^{\rm tot} = g_0\alpha_d^a + g_0\alpha_d^b + g_0\alpha_d^c$ are presented in Table XI. In this table, α_d^a and α_d^c are the sums from excited states with n=2-8 and n=9-30000, respectively, while α_d^b is from scaling of the $2s^22pnl - 2s2p^2nl$ transitions with n=9 to $n = 30000$. In Table XI, the values of $g_0\alpha_d^a$, $g_0\alpha_d^b$, $g_0\alpha_d^c$, and $g_0\alpha_d^{\rm tot}$ are presented as a function of electron temperature in the interval of T$_e$=0.1 eV to T$_e$=1264.6 eV.

VI. CONCLUSION

In this paper we calculated the state-selective DR rate coefficients from the ground state of B-like O ion to the bound states of C-like O ion. For T$_e$ >3 eV, the total DR rate coefficient is in good agreement with the previous work by Badnell and Pindzola [6].

Energy levels, wavelengths, weighted radiative transition probabilities, and autoionization rates were calculated for C-like oxygen ion using the Hartree-Fock-Relativistic method by Cowan. The calculated atomic data are used to derive characteristics of the dielectronic satellite lines as well as the DR rate coefficients. We take into account doubly excited states $2s2p^2nl$ and $2p^3nl$ ($n \geq 8$, $l \leq 7$) as intermediate resonance states with n up to 30000 to calculate the DR rate coefficients. Most of the state-selective DR rate coefficients show double peaks as a function of electron temperature. The transitions through intermediate states $2s2p^2nl$ show a peak in the rate coefficients at $T \sim 0.8$–11 eV.

It was also found that the configuration mixing $[2s^22pnl + 2p^3nl]$ plays an important role for the DR rate coefficients of the $2s^22pnl$ levels with $n \leq 8$ at low temperature.

The state-selective rate coefficients can be used in collisional-radiative (CR) modeling for investigation of population kinetics and plasma diagnostics for recombining plasma. The spectral line intensities of C-like O ions determined within a CR model with the presently calculated DR rate coefficients and compared with measurements of laboratory plasma emission will be reported elsewhere.

Acknowledgments

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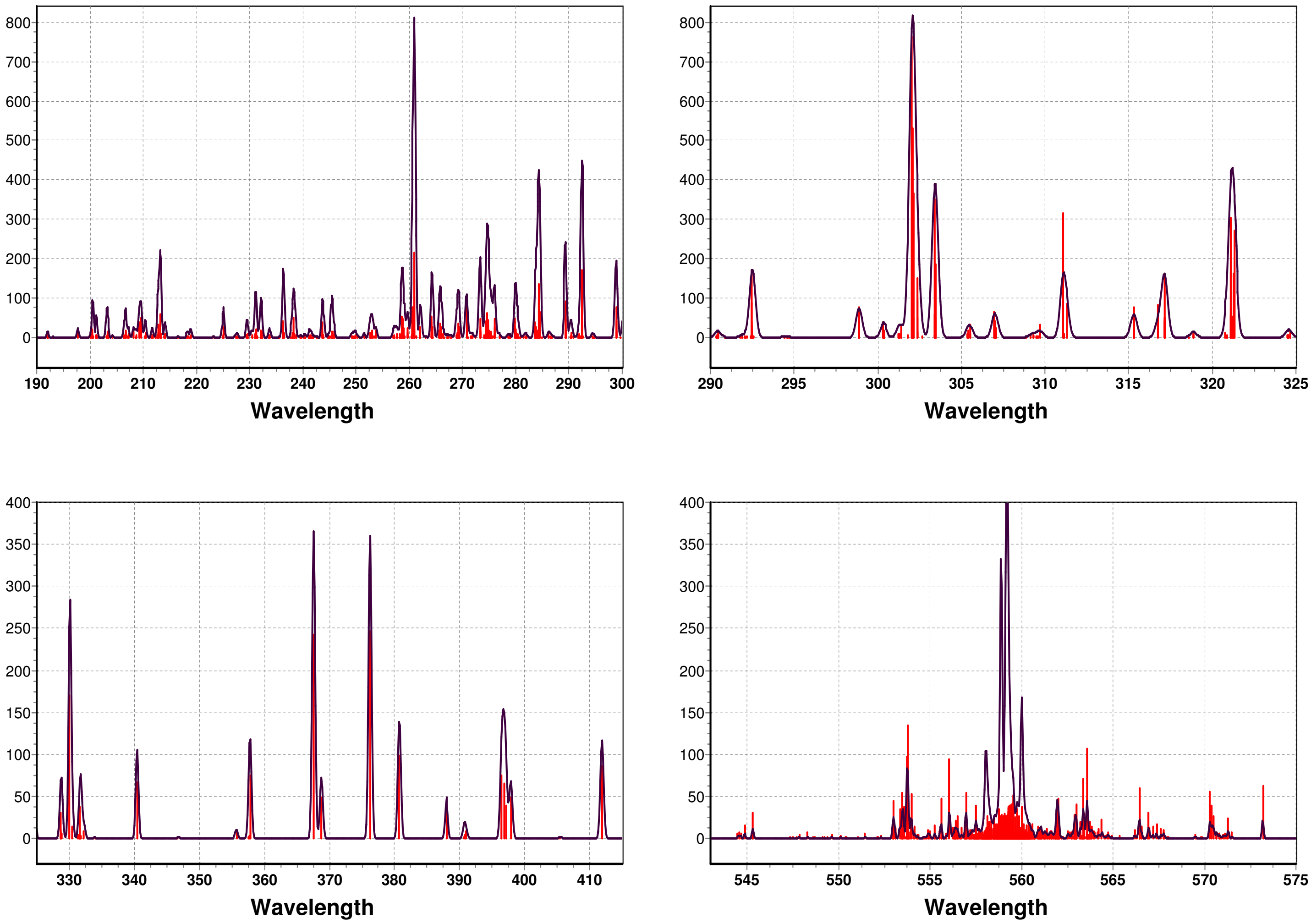

FIG. 1: Synthetic spectra of dielectronic satellite lines from O^{2+} ion at T_e = 10 eV for λ = 190 - 575 Å. Resolution power, R = $\lambda/\Delta\lambda$ = 700 is assumed to produce a Gaussian profile. The scale in the ordinate is in units of 10^{-15} cm^3/s.

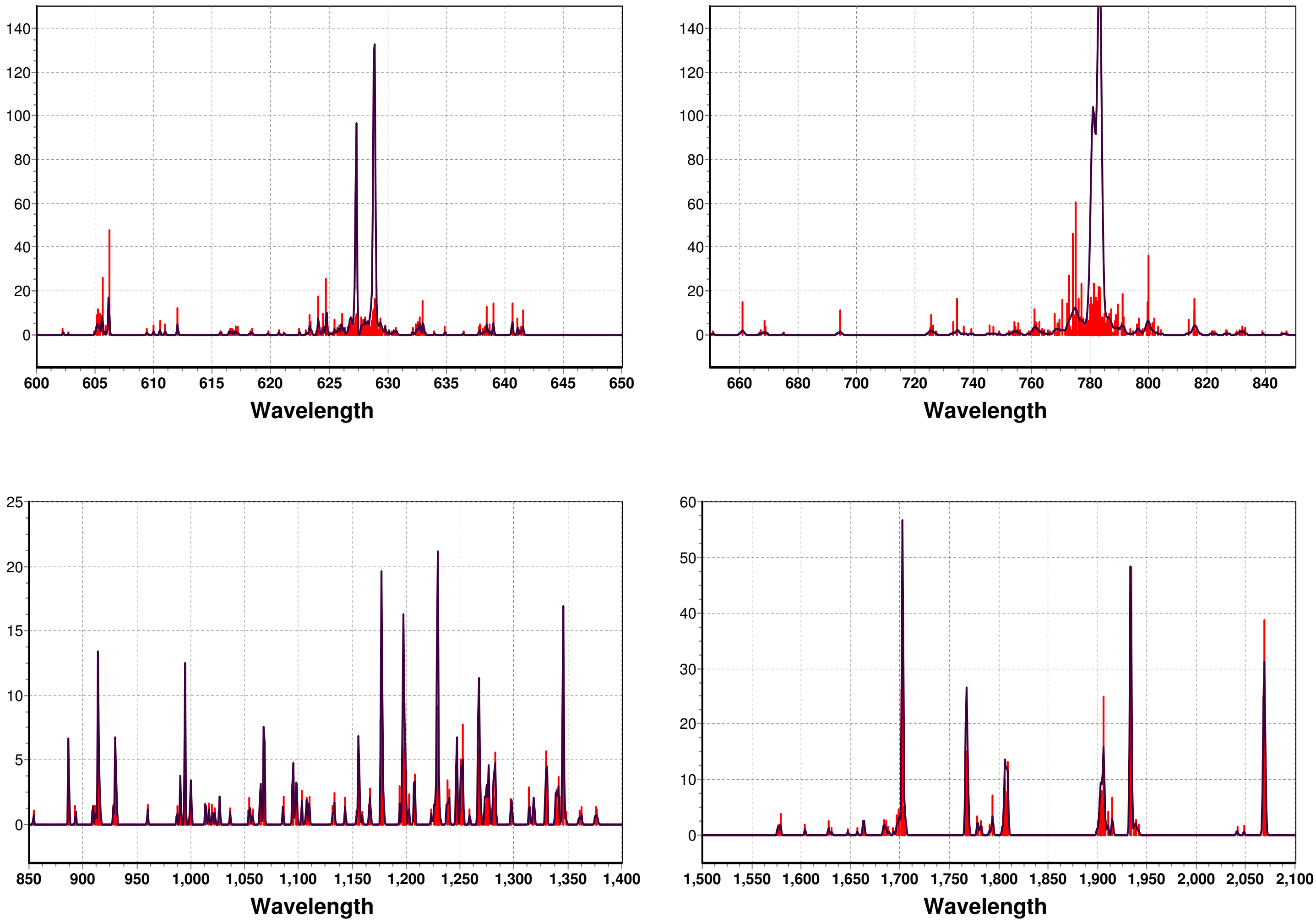

FIG. 2: Synthetic spectra of dielectronic satellite lines from O^{2+} ion at T_e = 10 eV for λ = 600 - 2100 Å. Resolution power, R = $\lambda/\Delta\lambda$ = 700 is assumed to produce a Gaussian profile. The scale in the ordinate is in units of 10^{-15} cm^3/s.

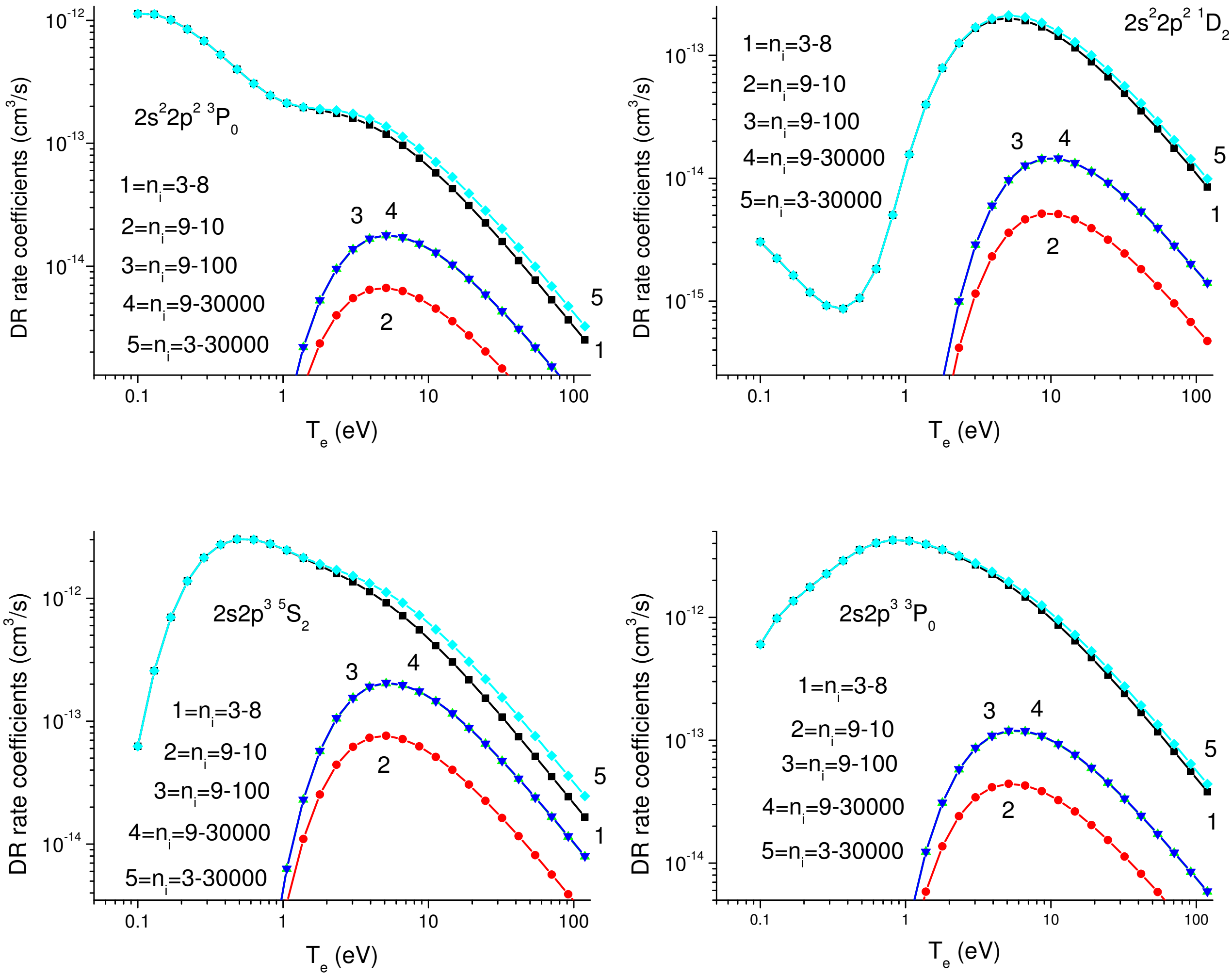

FIG. 3: DR rate coefficients $g_0\alpha_d(2s^22p, j)$ for j=$2s^22p^2\ ^3P_0$, $^1D_2$ and $2s2p^3\ ^5S_2$, $^3P_0$ levels as function of T_e. Contribution of high states in Eq. (3) in sum over i.

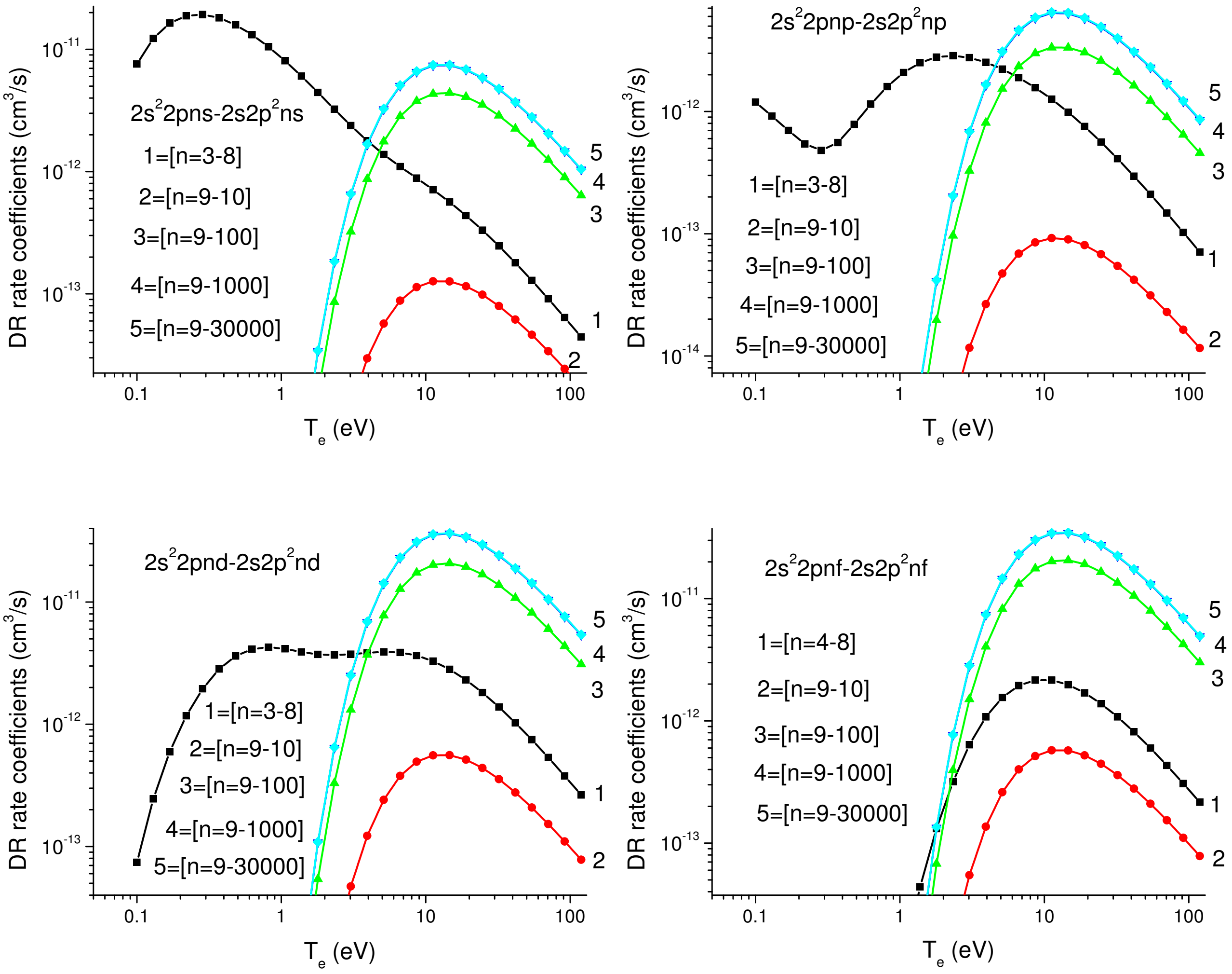

FIG. 4: The $2s^2 2pnl - 2s2p^2 nl$ contribution of high states to the total DR rate coefficient ${}_0\alpha_d(2s^2 2p, j)$ in sum over i and j in Eq. (10).

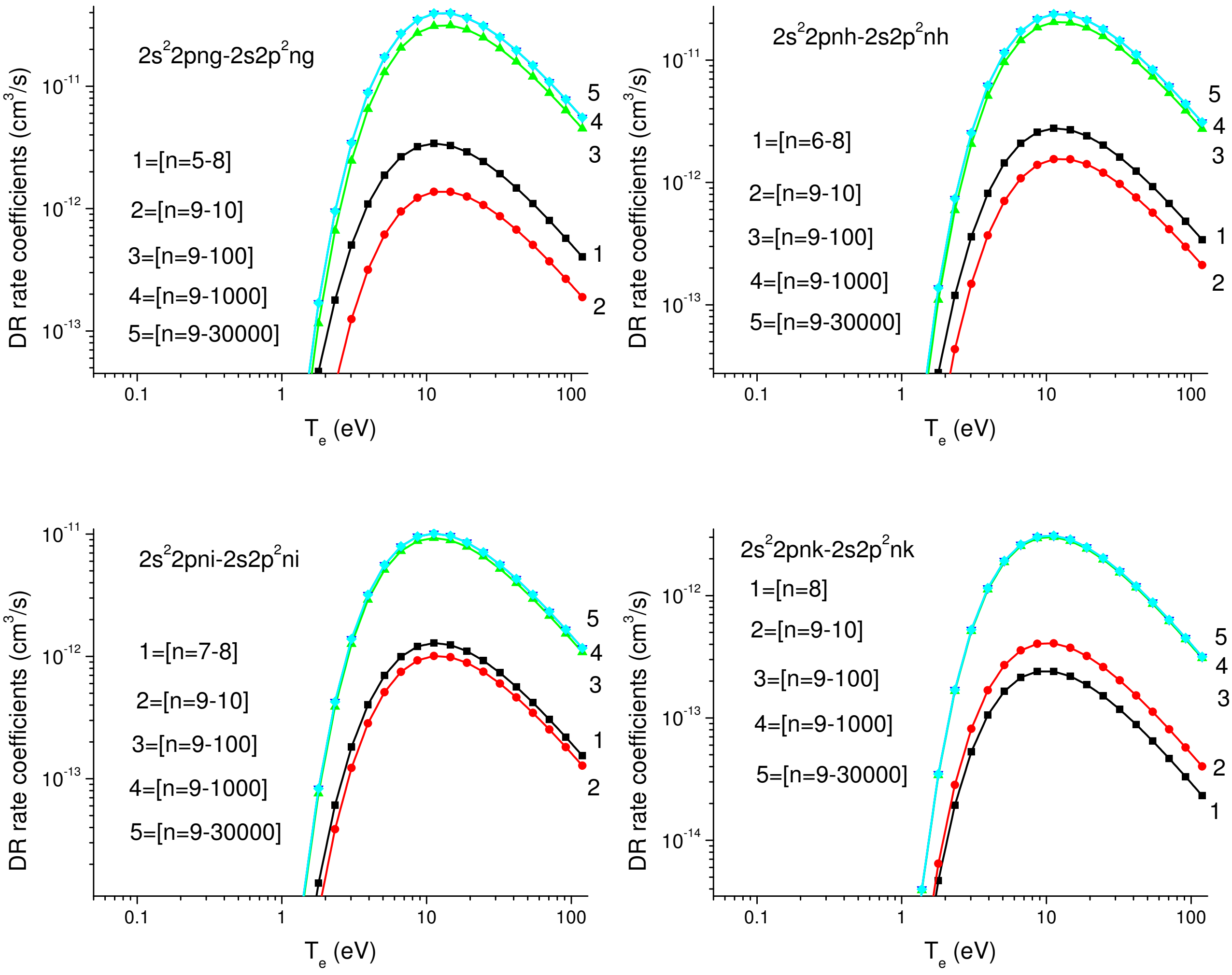

FIG. 5: The $2s^22pnl - 2s2p^2nl$ contribution of high states to the total DR rate coefficient $g_0\alpha_d(2s^22p, j)$ in sum over i and j in Eq. (10).

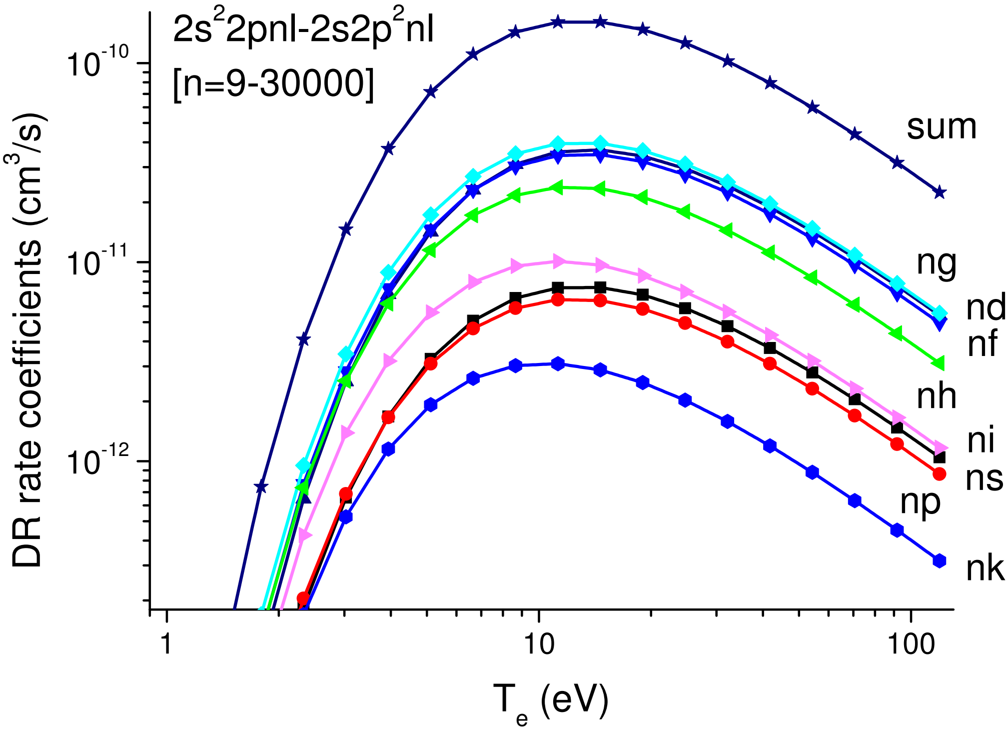

FIG. 6: The $2s^22pnl - 2s2p^2nl$ contribution of high states to the total DR rate coefficient ${}_0\alpha_d(2s^22p, j)$ as function of l and T_e in C-like oxygen.

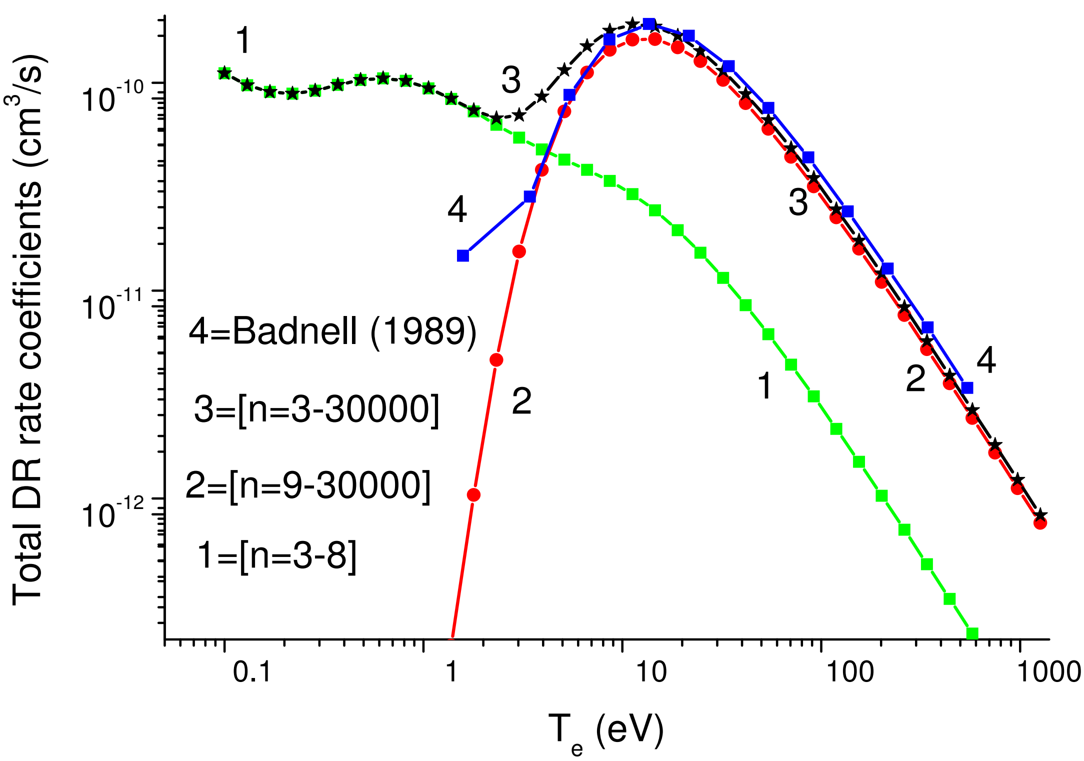

FIG. 7: Total DR rate coefficient as function of T_e in C-like oxygen. Comparison with results by Badnell and Pindzola from Ref.[6].

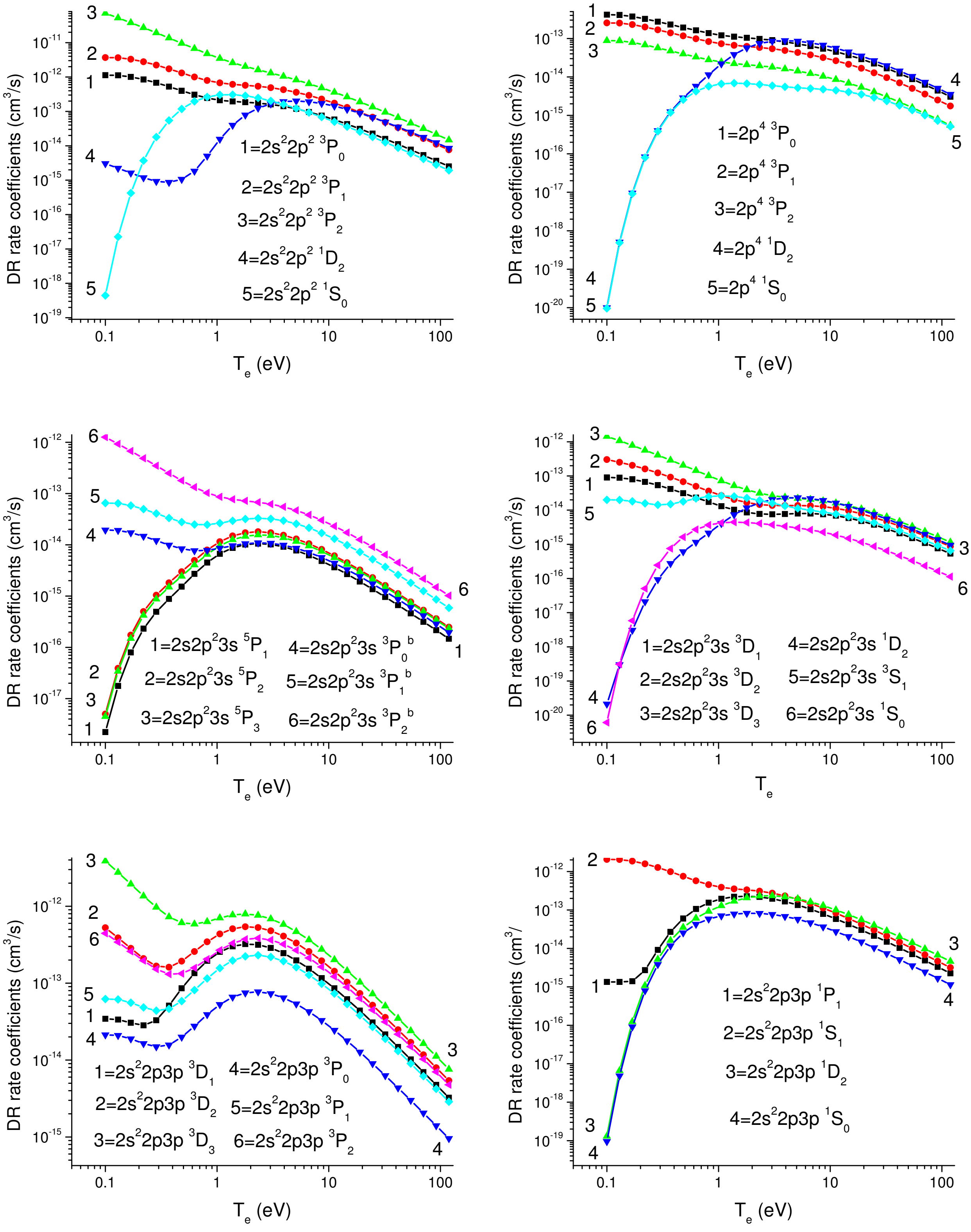

FIG. 8: DR rate coefficients $g_0\alpha_d(\gamma|2s^22p)$ for $2s^22p^2\ ^{1,3}L_J$, $2p^4\ ^{1,3}L_J$, and $2s^22p3p\ ^{1,3}L_J$ states as function of T_e in C-like oxygen

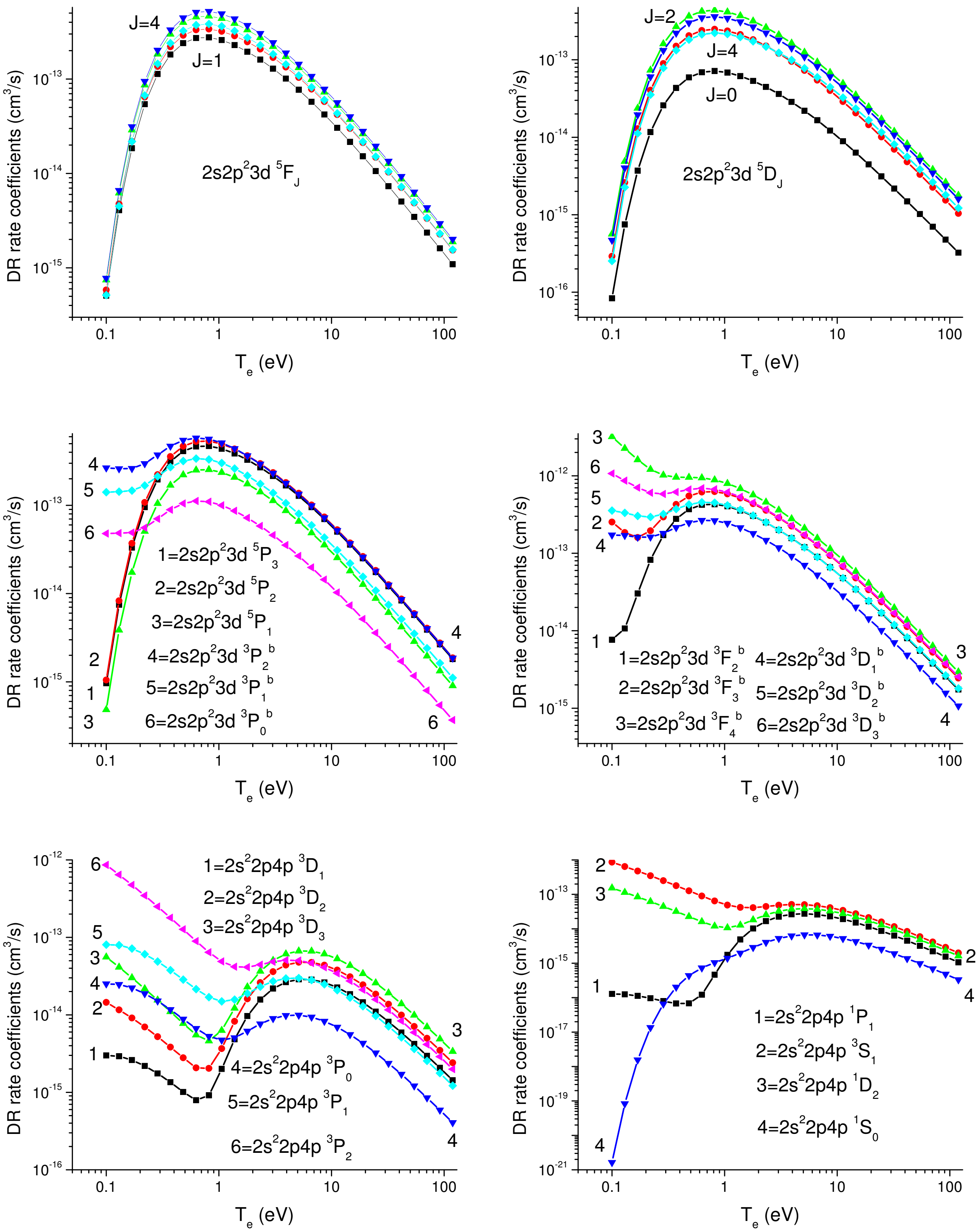

FIG. 9: DR rate coefficients $g_0\alpha_d(\gamma|2s^22p)$ for $2s2p^23d\ ^{1,3,5}L_J$ and $2s^22p4p\ ^{1,3}L_J$ states as function of T_e in C-like oxygen

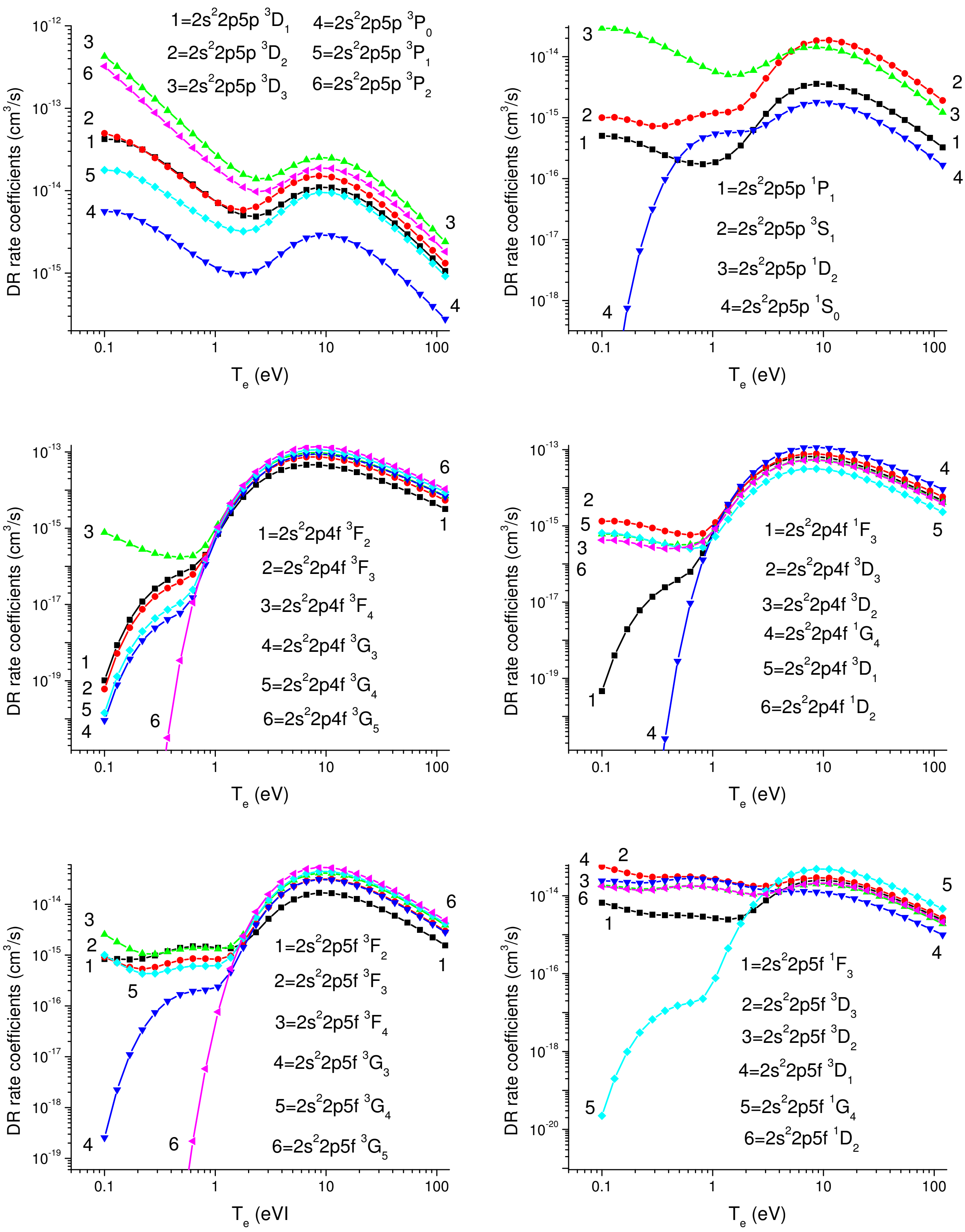

FIG. 10: DR rate coefficients $g_0\alpha_d(\gamma|2s^22p)$ for $2s^22p5p\ ^{1,3}L_J$, $2s^22p4f\ ^{1,3}L_J$, and $2s^22p5f\ ^{1,3}L_J$ states as function of T_e in C-like oxygen

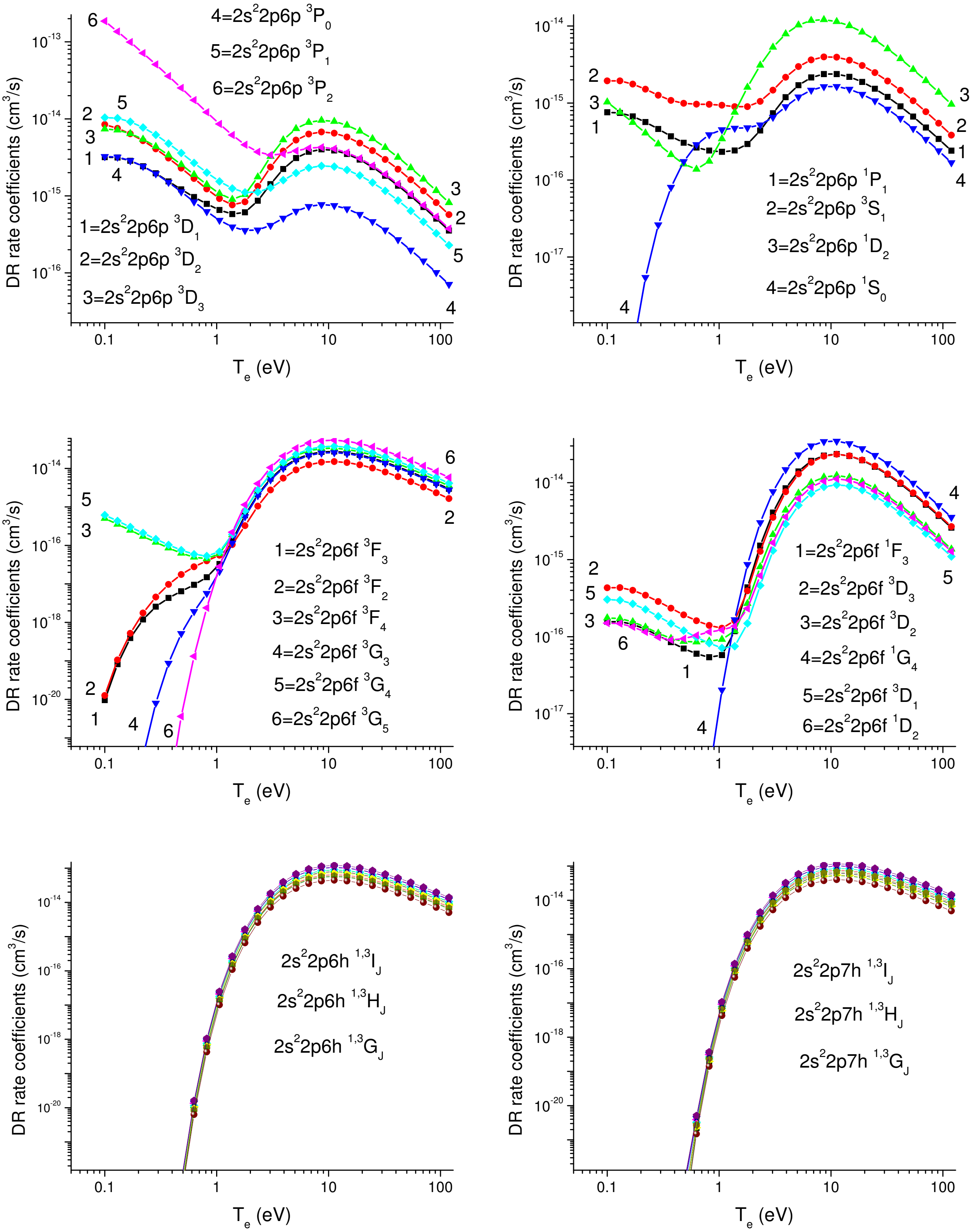

FIG. 11: DR rate coefficients $g_0\alpha_d(\gamma|2s^22p)$ for $2s^22p6p\ ^{1,3}L_J$, $2s^22p6f\ ^{1,3}L_J$, $2s^22p6h\ ^{1,3}L_J$, and $2s^22p7h\ ^{1,3}L_J$ states as function of T_e in C-like oxygen

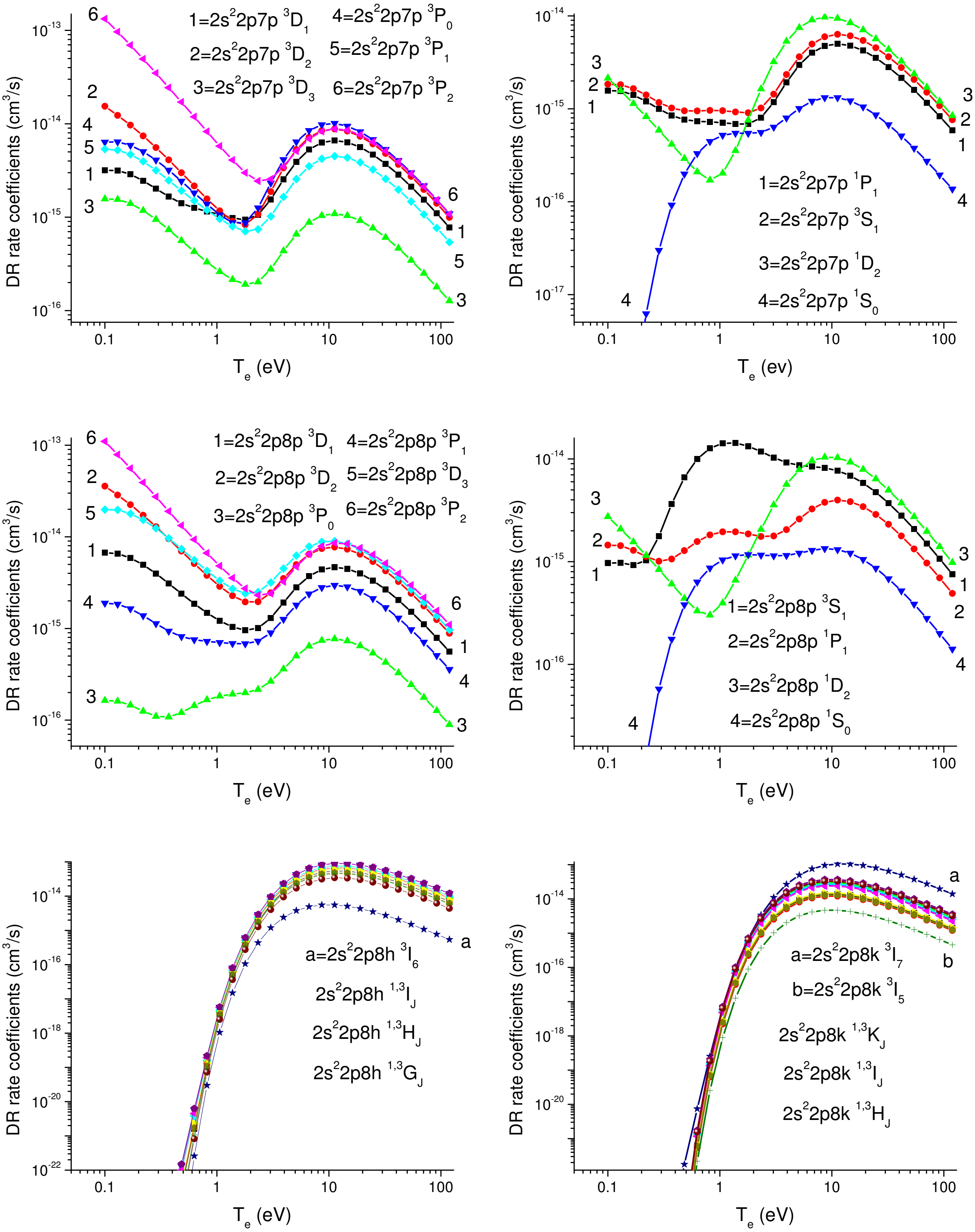

FIG. 12: DR rate coefficient $g_0\alpha_d(\gamma|2s^22p)$ for $2s^22p7p\ ^{1,3}L_J$, $2s^22p8p\ ^{1,3}L_J$, $2s^22p8h\ ^{1,3}L_J$, and $2s^22p8k\ ^{1,3}L_J$ states as function of T_e in C-like oxygen

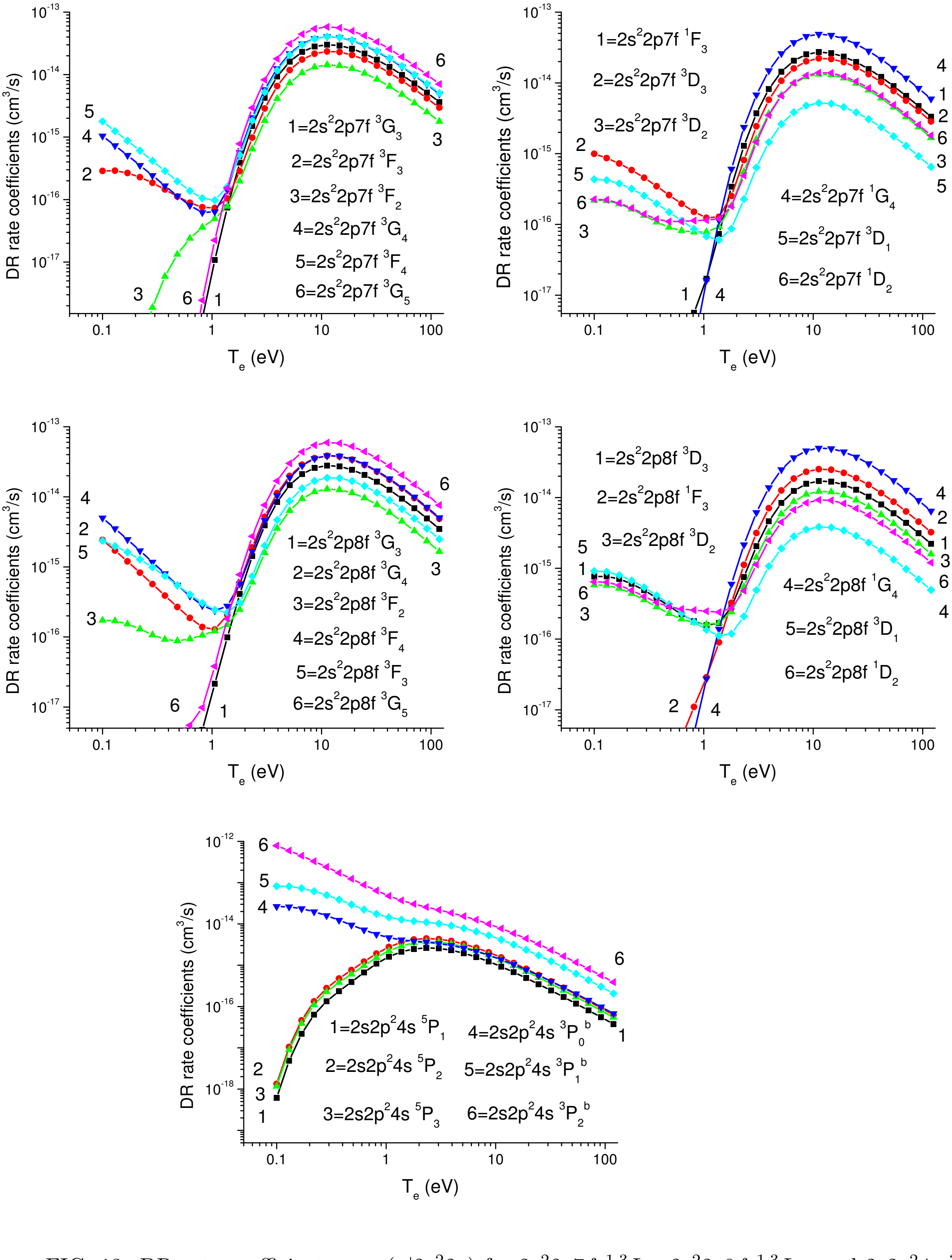

FIG. 13: DR rate coefficients $g_0\alpha_d(\gamma|2s^22p)$ for $2s^22p7f\ ^{1,3}L_J$, $2s^22p8f\ ^{1,3}L_J$, and $2s2p^24s\ ^{3,5}P_J$ states as function of T_e in C-like oxygen

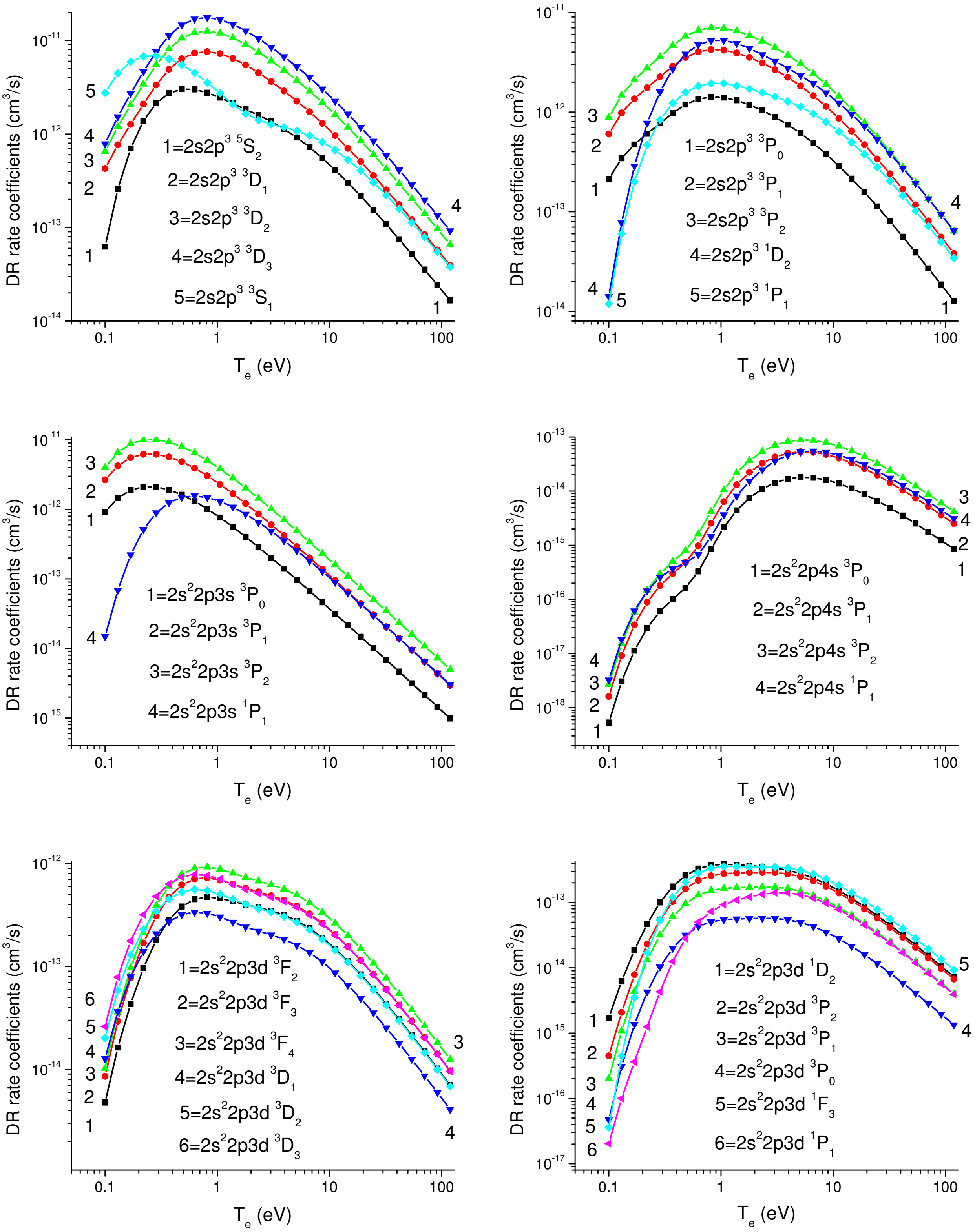

FIG. 14: DR rate coefficients $g_0\alpha_d(\gamma|2s^22p)$ for $2s2p^3\ ^{1,3,5}L_J$, $2s^22p3s\ ^{1,3}P_J$, $2s^22p4s\ ^{1,3}P_J$, and $2s^22p3d\ ^{1,3}L_J$, states as function of T_e in C-like oxygen

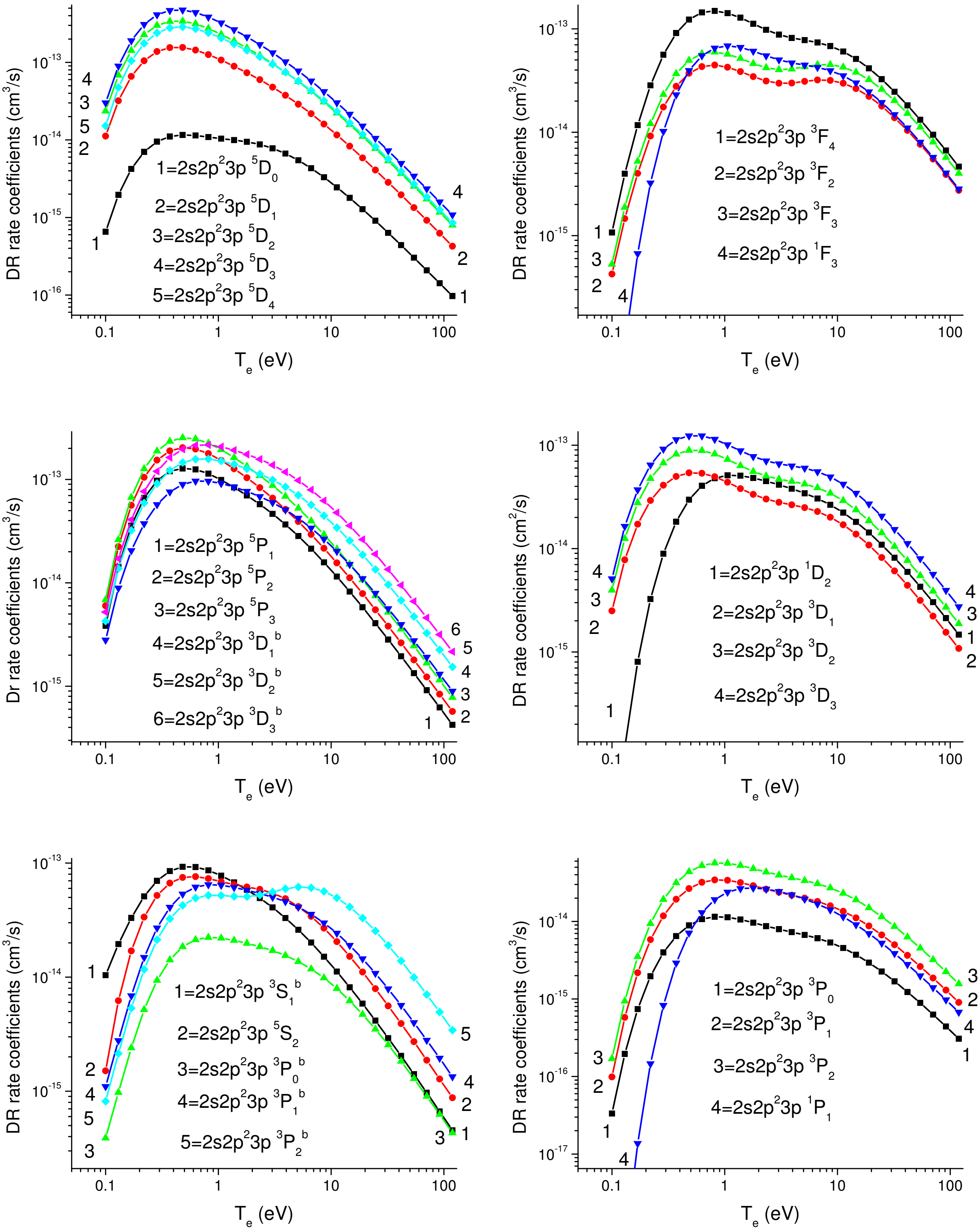

FIG. 15: DR rate coefficients $g_0\alpha_d(\gamma|2s^22p)$ for $2s2p^23p\ ^{1,3,5}L_J$ states as function of T_e in C-like oxygen

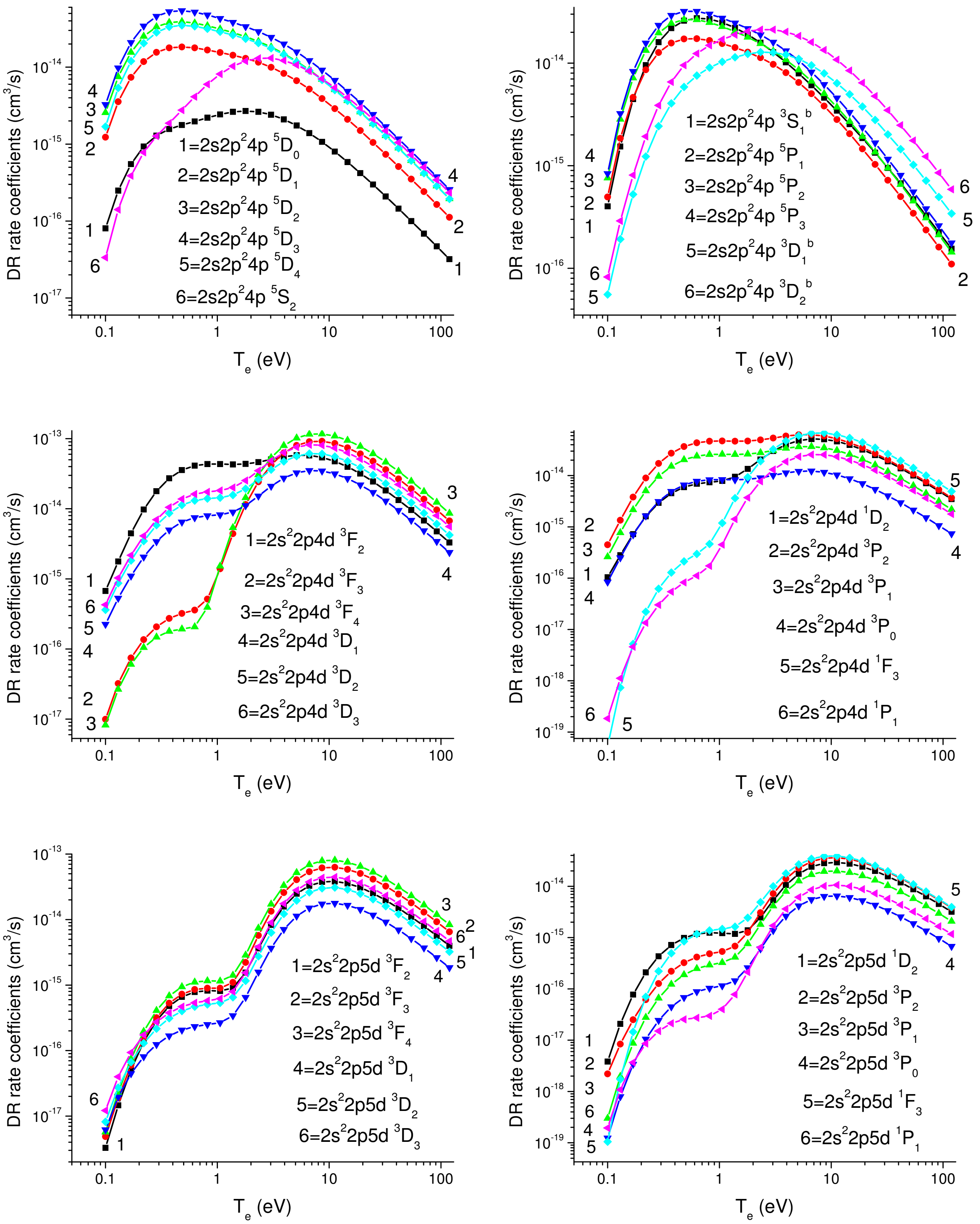

FIG. 16: DR rate coefficients $g_0\alpha_d(\gamma|2s^22p)$ for $2s2p^24p\ ^{1,3,5}L_J$, $2s^22p4d\ ^{1,3}L_J$, and $2s^22p5d\ ^{1,3}L_J$ states as function of T_e in C-like oxygen

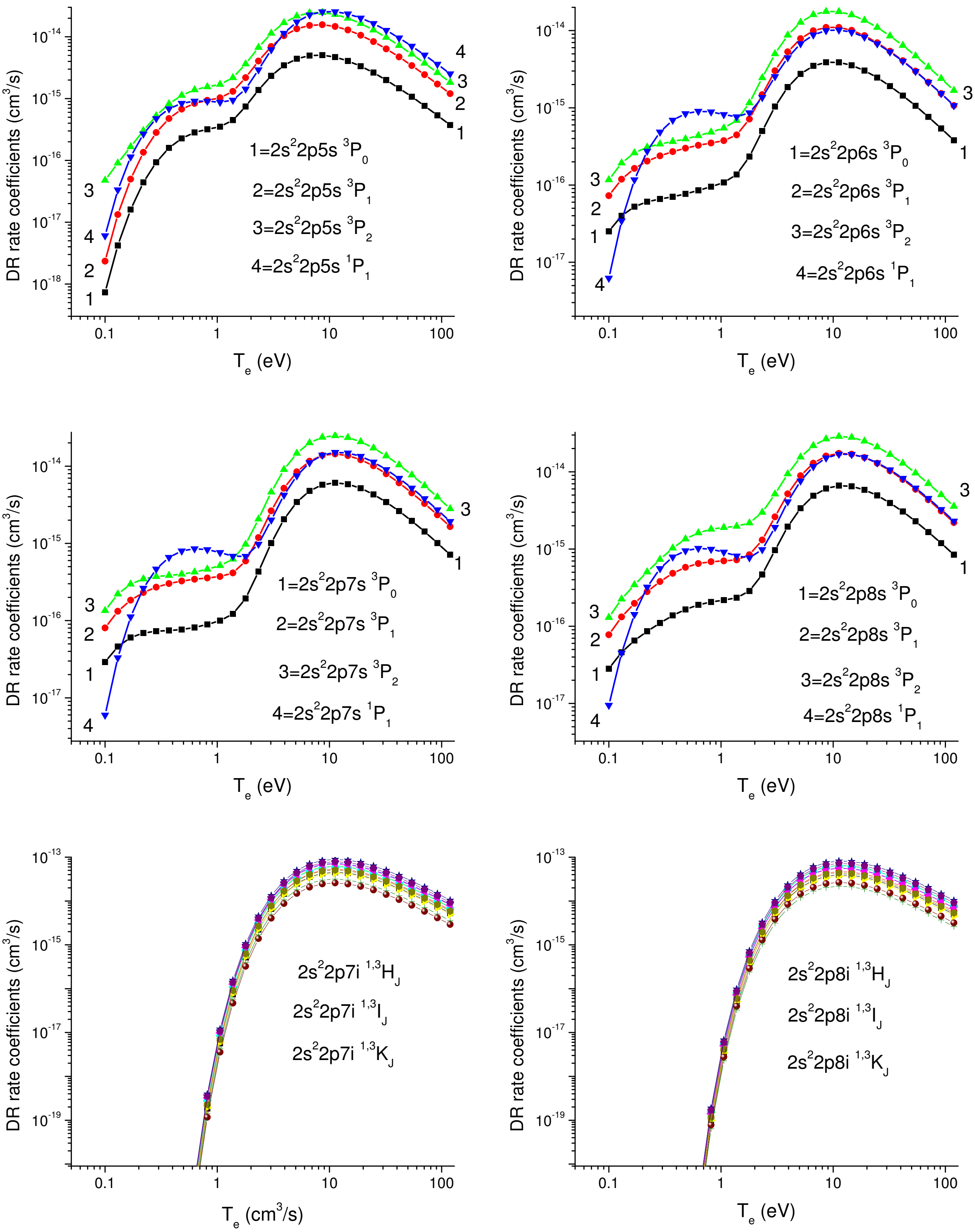

FIG. 17: DR rate coefficients $g_0\alpha_d(\gamma|2s^22p)$ for $2s^22p5s\ ^{1,3}P_J$, $2s^22p6s\ ^{1,3}P_J$, $2s^22p7s\ ^{1,3}P_J$, $2s^22p8s\ ^{1,3}P_J$, $2s^22p7i\ ^{1,3}L_J$, and $2s^22p8i\ ^{1,3}L_J$ states as function of T_e in C-like oxygen

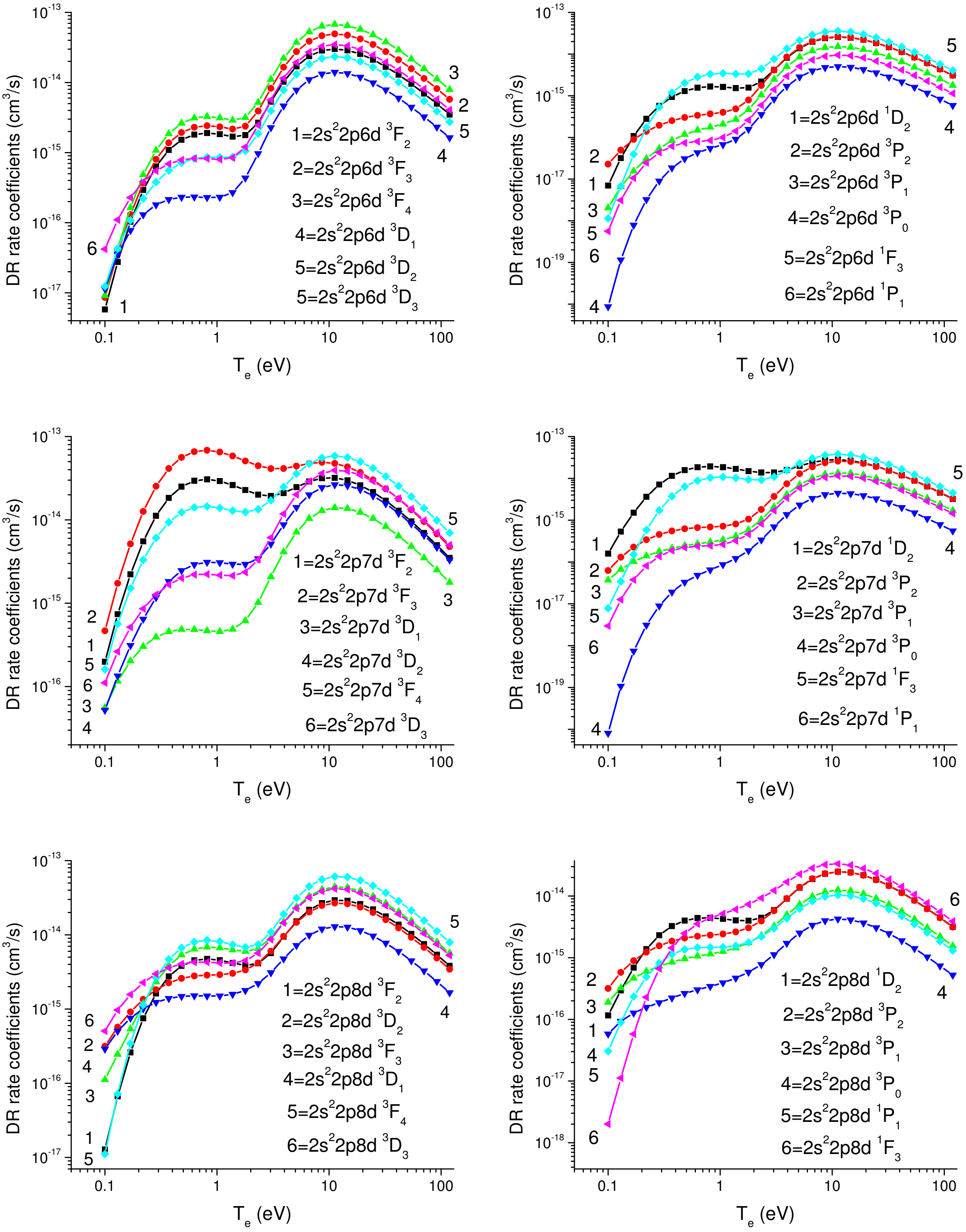

FIG. 18: DR rate coefficients $g_0\alpha_d(\gamma|2s^22p)$ for $2s^22p6d$ $^{1,3}L_J$, $2s^22p7d$ $^{1,3}L_J$, and $2s^22p8d$ $^{1,3}L_J$,states as function of T_e in C-like oxygen

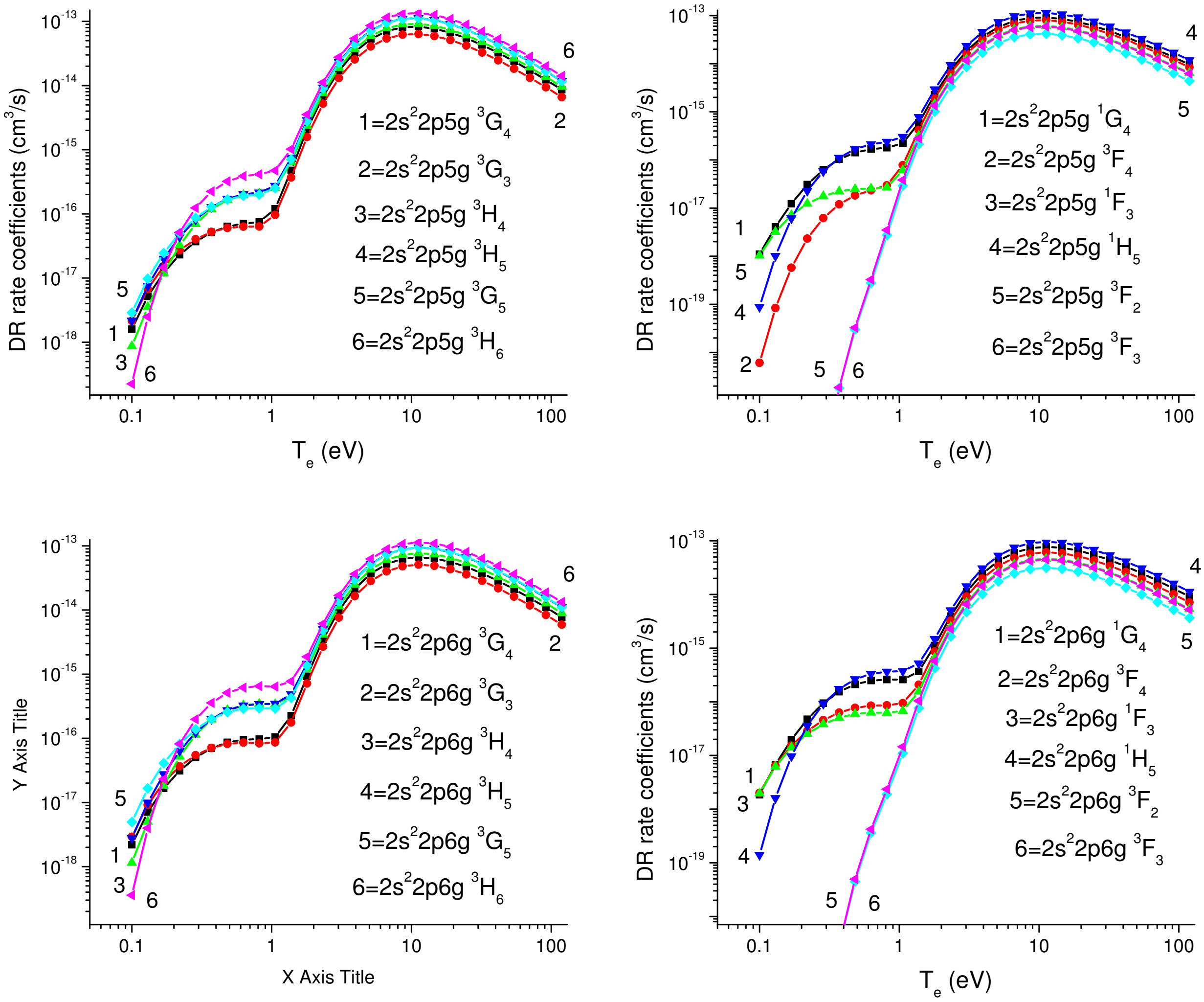

FIG. 19: DR rate coefficients $g_0\alpha_d(\gamma|2s^22p)$ for $2s^22p5g\ ^{1,3}L_J$ and $2s^22p6g\ ^{1,3}L_J$ states as function of T_e in C-like oxygen

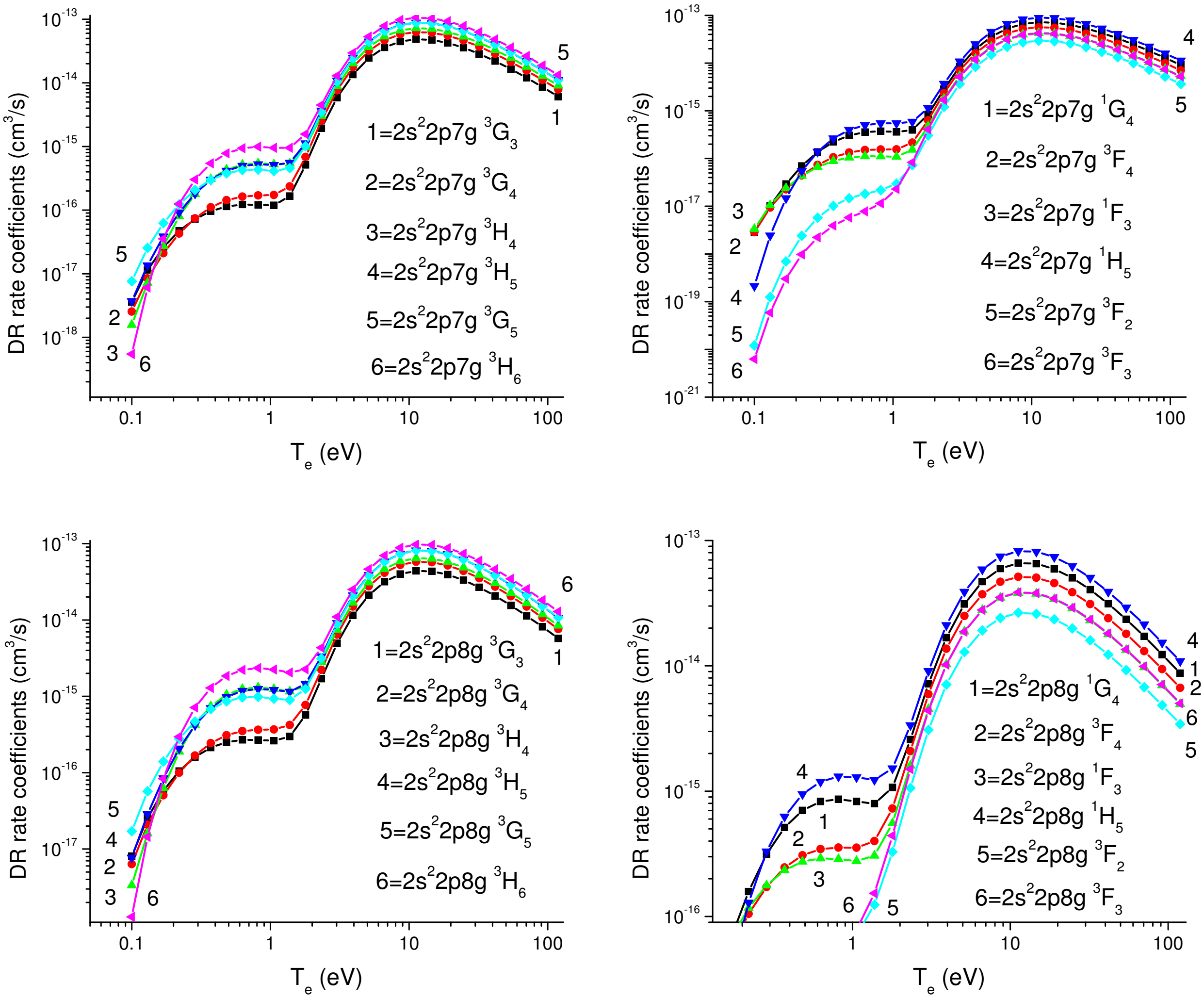

FIG. 20: DR rate coefficients $g_0\alpha_d(\gamma|2s^22p)$ for $2s^22p7g\ ^{1,3}L_J$ and $2s^22p8g\ ^{1,3}L_J$ states as function of T_e in C-like oxygen

Table I: Labeling of configurations for odd-parity and even-parity complexes

even-parity states				odd-parity states			
N	Conf.	N	Conf.	N	Conf.	N	Conf.
1	$2s^22p^2$	27	$2s2p^26d$	1	$2s2p^3$	27	$2s2p^26p$
2	$2p^4$	28	$2s2p^26g$	2	$2s^22p3s$	28	$2s2p^26f$
3	$2s^22p3p$	29	$2s2p^27s$	3	$2s^22p3d$	29	$2s2p^26h$
4	$2s2p^23s$	30	$2s2p^27d$	4	$2s2p^23p$	30	$2s2p^27p$
5	$2s2p^23d$	31	$2s2p^27g$	5	$2p^33s$	31	$2s2p^27f$
6	$2p^33p$	32	$2s2p^27i$	6	$2p^33d$	32	$2s2p^27h$
7	$2s^22p4p$	33	$2s2p^28s$	7	$2s^22p4s$	33	$2s2p^28p$
8	$2s^22p4f$	34	$2s2p^28d$	8	$2s^22p4d$	34	$2s2p^28f$
9	$2s^22p5p$	35	$2s2p^28g$	9	$2s^22p5s$	35	$2s2p^27h$
10	$2s^22p5f$	36	$2s2p^28i$	10	$2s^22p5d$	36	$2s2p^27k$
11	$2s^22p6p$	37	$2p^34p$	11	$2s^22p5g$	37	$2p^34s$
12	$2s^22p6f$	38	$2p^34f$	12	$2s^22p6s$	38	$2p^34d$
13	$2s^22p6h$	39	$2p^35p$	13	$2s^22p6d$	39	$2p^35s$
14	$2s^22p7p$	40	$2p^35f$	14	$2s^22p6g$	40	$2p^35d$
15	$2s^22p7f$	41	$2p^36p$	15	$2s^22p7s$	41	$2p^35g$
16	$2s^22p7h$	42	$2p^36f$	16	$2s^22p7d$	42	$2p^36s$
17	$2s^22p8p$	43	$2p^36h$	17	$2s^22p7g$	43	$2p^36d$
18	$2s^22p8f$	44	$2p^37p$	18	$2s^22p7i$	44	$2p^36g$
19	$2s^22p8h$	45	$2p^37f$	19	$2s^22p8s$	45	$2p^37s$
20	$2s^22p8k$	46	$2p^37h$	20	$2s^22p8d$	46	$2p^37d$
21	$2s2p^24s$	47	$2p^38p$	21	$2s^22p8g$	47	$2p^37g$
22	$2s2p^24d$	48	$2p^38f$	22	$2s^22p8i$	48	$2p^37i$
23	$2s2p^25s$	49	$2p^38h$	23	$2s2p^24p$	49	$2p^38s$
24	$2s2p^25d$	50	$2p^38k$	24	$2s2p^24f$	50	$2p^38d$
25	$2s2p^25g$			25	$2s2p^25p$	51	$2p^38g$
26	$2s2p^26s$			26	$2s2p^25f$	52	$2p^38i$

Table II: Energies (10^3 cm^{-1}) for excited states of C-like O. Comparison of present results (Cowan code) with theoretical results obtained by SUPERSTRUCTIRE code (Ref. 20), the configuration interaction method (CIV code from Ref. 21), the MCHF method with Breit-Pauli correction (Ref. 22), and recommended NIST in Ref. 19.

Level		E (10^3 cm^{-1})				
Conf.	LSJ	COWAN	SPSTR	CIV	MCHF	NIST
$2s^22p^2$	$(^3P)\ ^3P_0$	0.0	0.000	0.000	0.000	0.000
$2s^22p^2$	$(^3P)\ ^3P_1$	0.110	0.114	0.110	0.113	0.113
$2s^22p^2$	$(^3P)\ ^3P_2$	0.323	0.310	0.300	0.306	0.306
$2s^22p^2$	$(^1D)\ ^1D_2$	19.550	22.539	23.360	20.369	20.273
$2s^22p^2$	$(^1S)\ ^1S_0$	38.597	40.081	50.350	43.278	43.186
$2s2p^3$	$(^4S)\ ^5S_2$	63.001	48.895	58.490	60.532	60.325
$2s2p^3$	$(^2D)\ ^3D_1$	122.735	121.256	122.710	120.464	120.025
$2s2p^3$	$(^2D)\ ^3D_2$	122.735	121.256	122.740	120.492	120.053
$2s2p^3$	$(^2D)\ ^3D_3$	122.738	121.258	120.550	120.498	120.058
$2s2p^3$	$(^2P)\ ^3P_2$	142.022	143.379	148.130	142.903	142.381
$2s2p^3$	$(^2P)\ ^3P_1$	142.020	143.380	148.130	142.905	142.382
$2s2p^3$	$(^2P)\ ^3P_0$	142.019	143.381	148.150	142.919	142.394
$2s2p^3$	$(^2D)\ ^1D_2$	187.779	200.958	191.620	187.666	187.054
$2s2p^3$	$(^4S)\ ^3S_1$	194.267	209.577	201.850	197.581	197.088
$2s2p^3$	$(^2P)\ ^1P_1$	207.670	222.871	220.260	211.184	210.462
$2s^22p3s$	$(^1S)\ ^3P_0$	265.286	275.538	273.960	267.842	267.259
$2s^22p3s$	$(^1S)\ ^3P_1$	265.405	275.646	274.060	267.960	267.377
$2s^22p3s$	$(^1S)\ ^3P_2$	265.661	275.882	267.580	268.216	267.634
$2s^22p3s$	$(^1S)\ ^1P_1$	270.599	281.705	281.880	273.720	273.081
$2p^4$	$(^3P)\ ^3P_2$	290.876	296.491	295.760	284.696	283.760
$2p^4$	$(^3P)\ ^3P_1$	291.075	296.714	292.380	284.911	283.977
$2p^4$	$(^3P)\ ^3P_0$	291.172	296.823	292.210	285.006	284.072
$2s^22p3p$	$(^1S)\ ^1P_1$	289.329	298.732	293.640	291.673	290.958
$2s^22p3p$	$(^1S)\ ^3D_1$	291.744	300.891	297.050	294.577	293.866
$2s^22p3p$	$(^1S)\ ^3D_2$	291.878	301.018	297.170	294.713	294.003
$2s^22p3p$	$(^1S)\ ^3D_3$	292.094	301.223	297.370	294.913	294.223
$2s^22p3p$	$(^1S)\ ^3S_1$	294.900	304.507	300.900	298.229	297.559
$2s^22p3p$	$(^1S)\ ^3P_0$	300.217	311.641	304.660	300.907	300.240
$2s^22p3p$	$(^1S)\ ^3P_1$	300.296	311.710	304.730	300.989	300.312
$2s^22p3p$	$(^1S)\ ^3P_2$	300.436	311.836	304.840	301.118	300.443
$2s^22p3p$	$(^1S)\ ^1D_2$	306.914	317.604	312.490	307.322	306.586
$2p^4$	$(^1D)\ ^1D_2$	307.746	318.900	307.750	299.392	298.294
$2s^22p3p$	$(^1S)\ ^1S_0$	314.199	327.034	320.670	314.671	313.803
$2s^22p3d$	$(^1S)\ ^3F_2$	323.472	331.843	324.870	325.113	324.465
$2s^22p3d$	$(^1S)\ ^3F_3$	323.666	331.978	325.020	325.313	324.661
$2s^22p3d$	$(^1S)\ ^1D_2$	323.746	332.624	325.060	325.491	324.736
$2s^22p3d$	$(^1S)\ ^3F_4$	323.846	332.143	325.170	325.375	324.839
$2s^22p3d$	$(^1S)\ ^3D_1$	325.812	335.627	328.620	327.828	327.229
$2s^22p3d$	$(^1S)\ ^3D_2$	325.861	335.570	328.660	327.877	327.278
$2s^22p3d$	$(^1S)\ ^3D_3$	325.936	335.741	328.720	327.950	327.352
$2s^22p3d$	$(^1S)\ ^3P_2$	327.822	337.476	330.830	330.078	329.470
$2s^22p3d$	$(^1S)\ ^3P_1$	327.933	337.578	330.920	330.192	329.584
$2s^22p3d$	$(^1S)\ ^3P_0$	327.990	337.629	330.860	330.254	329.645
$2s^22p3d$	$(^1S)\ ^1F_3$	330.654	342.040	335.570	332.453	331.821
$2s^22p3d$	$(^1S)\ ^1P_1$	331.265	343.199	336.620	333.421	332.779
$2p^4$	$(^1S)\ ^1S_0$	346.076	367.607	359.810	344.762	343.306

Table III: Energies (10^3 cm^{-1}) for excited states of C-like O. Comparison of present results (Cowan code) with recommended NIST in Ref. 19. Superscript b corresponds to the ^4P term of the core $2s2p^2$.

Level		E (10^3cm^{-1})		Level		E (10^3cm^{-1})		Level		E (10^3 cm^{-1})	
Conf.	LSJ	Cowan	NIST	Conf.	LSJ	Cowan	NIST	Conf.	LSJ	Cowan	NIST
$2s2p^23s$	$(^3P)\ ^5P_1$	336.218	338.577	$2s^22p4f$	$(^1S)\ ^3F_4$	380.503	380.686	$2s^22p5d$	$(^1S)\ ^3F_4$	402.112	401.893
$2s2p^23s$	$(^3P)\ ^5P_2$	336.344	338.702	$2s^22p4d$	$(^1S)\ ^1F_3$	380.819	380.782	$2s^22p5d$	$(^1S)\ ^1D_2$	402.011	401.792
$2s2p^23s$	$(^3P)\ ^5P_3$	336.533	338.863	$2s^22p4d$	$(^1S)\ ^1P_1$	380.980	381.089	$2s^22p5d$	$(^1S)\ ^3D_1$	402.443	
$2s2p^23s$	$(^3P)\ ^3P_0^b$	348.912	350.024	$2s^22p4f$	$(^1S)\ ^3G_3$	380.966	381.177	$2s^22p5d$	$(^1S)\ ^3D_2$	402.500	402.412
$2s2p^23s$	$(^3P)\ ^3P_1^b$	349.011	350.124	$2s^22p4f$	$(^1S)\ ^3G_4$	381.003	381.211	$2s^22p5d$	$(^1S)\ ^3D_3$	402.623	402.533
$2s2p^23s$	$(^3P)\ ^3P_2^b$	349.207	350.298	$2s^22p4f$	$(^1S)\ ^3D_3$	381.187	381.457	$2s^22p5d$	$(^1S)\ ^3P_2$	402.811	
$2s^22p4s$	$(^1S)\ ^3P_0$	356.722	356.736	$2s^22p4f$	$(^1S)\ ^3G_5$	381.187	381.405	$2s^22p5d$	$(^1S)\ ^3P_1$	402.873	
$2s^22p4s$	$(^1S)\ ^3P_1$	356.830	356.845	$2s^22p4f$	$(^1S)\ ^3D_2$	381.218	381.478	$2s^22p5d$	$(^1S)\ ^3P_0$	402.905	
$2s^22p4s$	$(^1S)\ ^3P_2$	357.101	357.117	$2s^22p4f$	$(^1S)\ ^1G_4$	381.271	381.473	$2s^22p5f$	$(^1S)\ ^1F_3$	403.170	403.380
$2s^22p4s$	$(^1S)\ ^1P_1$	358.565	358.669	$2s^22p4f$	$(^1S)\ ^3D_1$	381.347	381.624	$2s2p^23d$	$(^3P)\ ^3D_1^b$	404.205	405.802
$2s2p^23p$	$(^3P)\ ^3S_1^b$	361.817	363.263	$2s^22p4f$	$(^1S)\ ^1D_2$	381.382	381.645	$2s2p^23d$	$(^3P)\ ^3D_2^b$	404.240	405.830
$2s2p^23p$	$(^3P)\ ^5D_0$	363.052	365.527	$2s^22p5s$	$(^1S)\ ^3P_0$	391.990	391.831	$2s2p^23d$	$(^3P)\ ^3D_3^b$	404.287	405.880
$2s2p^23p$	$(^3P)\ ^5D_1$	363.087	365.562	$2s^22p5s$	$(^1S)\ ^3P_1$	392.074	391.918	$2s^22p6d$	$(^1S)\ ^1D_2$	414.868	414.676
$2s2p^23p$	$(^3P)\ ^5D_2$	363.158	365.630	$2s^22p5s$	$(^1S)\ ^3P_2$	392.366	392.210	$2s^22p6d$	$(^1S)\ ^3F_4$	415.029	
$2s2p^23p$	$(^3P)\ ^5D_3$	363.266	365.731	$2s^22p5s$	$(^1S)\ ^1P_1$	392.884	392.781	$2s^22p6d$	$(^1S)\ ^3D_1$	415.084	415.180
$2s2p^23p$	$(^3P)\ ^5D_4$	363.411	365.858	$2s2p^23d$	$(^3P)\ ^5F_1$	392.976	394.528	$2s^22p6d$	$(^1S)\ ^3D_2$	415.179	415.180
$2s2p^23p$	$(^3P)\ ^5P_1$	365.502	368.539	$2s2p^23d$	$(^3P)\ ^5F_2$	393.018	394.567	$2s^22p6d$	$(^1S)\ ^3D_3$	415.299	415.180
$2s2p^23p$	$(^3P)\ ^5P_2$	365.572	368.596	$2s2p^23d$	$(^3P)\ ^5F_3$	393.081	394.625	$2s^22p7d$	$(^1S)\ ^1F_3$	423.070	422.979
$2s2p^23p$	$(^3P)\ ^5P_3$	365.680	368.697	$2s2p^23d$	$(^3P)\ ^5F_4$	393.168	394.700	$2s2p^23p$	$(^1D)\ ^1D_2$	425.470	426.340
$2s^22p4p$	$(^1S)\ ^1P_1$	365.934	365.727	$2s2p^23d$	$(^3P)\ ^5F_5$	393.279	394.793	$2s2p^23p$	$(^1D)\ ^1F_3$	426.442	425.000
$2s^22p4p$	$(^1S)\ ^3D_1$	366.459	366.488	$2s2p^23s$	$(^1D)\ ^3D_1$	394.052	394.079	$2s2p^24s$	$(^3P)\ ^5P_1$	428.010	428.501
$2s^22p4p$	$(^1S)\ ^3D_2$	366.557	366.596	$2s2p^23s$	$(^1D)\ ^3D_2$	394.096	394.127	$2s2p^24s$	$(^3P)\ ^5P_2$	428.137	428.627
$2s^22p4p$	$(^1S)\ ^3D_3$	366.761	366.803	$2s2p^23s$	$(^1D)\ ^3D_3$	394.160	394.198	$2s2p^24s$	$(^3P)\ ^5P_3$	428.328	428.792
$2s^22p4p$	$(^1S)\ ^3S_1$	367.632	367.954	$2s2p^23d$	$(^3P)\ ^5D_0$	395.866	398.146	$2s2p^23p$	$(^1D)\ ^1P_1$	429.724	430.027
$2s^22p4p$	$(^1S)\ ^3P_0$	371.073	370.329	$2s2p^23d$	$(^3P)\ ^5D_1$	395.867	398.144	$2s2p^24p$	$(^3P)\ ^3S_1^b$	436.975	437.013
$2s^22p4p$	$(^1S)\ ^3P_1$	371.159	370.418	$2s2p^23d$	$(^3P)\ ^5D_2$	395.873	398.140	$2s2p^24p$	$(^3P)\ ^5D_0$	437.740	
$2s^22p4p$	$(^1S)\ ^3P_2$	371.257	370.526	$2s2p^23d$	$(^3P)\ ^5D_3$	395.892	398.150	$2s2p^24p$	$(^3P)\ ^5D_1$	437.770	438.253
$2s^22p4p$	$(^1S)\ ^1D_2$	371.489	370.902	$2s2p^23d$	$(^3P)\ ^5D_4$	395.979	398.231	$2s2p^24p$	$(^3P)\ ^5D_2$	437.833	438.314
$2s2p^23p$	$(^3P)\ ^3D_1^b$	373.729	374.572	$2s2p^23d$	$(^3P)\ ^5P_3$	396.262	398.487	$2s2p^24p$	$(^3P)\ ^5D_3$	437.932	438.409
$2s2p^23p$	$(^3P)\ ^3D_2^b$	373.830	374.664	$2s2p^23d$	$(^3P)\ ^5P_2$	396.339	398.557	$2s2p^24p$	$(^3P)\ ^5D_4$	438.076	438.531
$2s2p^23p$	$(^3P)\ ^3D_3^b$	373.982	374.795	$2s2p^23d$	$(^3P)\ ^5P_1$	396.382	398.596	$2s2p^24p$	$(^3P)\ ^5P_1$	438.557	439.291
$2s^22p4p$	$(^1S)\ ^1S_0$	374.711		$2s^22p5p$	$(^1S)\ ^1P_1$	396.394		$2s2p^24p$	$(^3P)\ ^5P_2$	438.622	439.342
$2s2p^23p$	$(^3P)\ ^5S_2$	376.936	376.080	$2s^22p5p$	$(^1S)\ ^3S_1$	397.094		$2s2p^24p$	$(^3P)\ ^5P_3$	438.727	439.441
$2s^22p4d$	$(^1S)\ ^3F_2$	377.562	377.386	$2s^22p5p$	$(^1S)\ ^1D_2$	397.863		$2s2p^24p$	$(^3P)\ ^3D_3^b$	443.236	442.718
$2s^22p4d$	$(^1S)\ ^3F_3$	377.763	377.562	$2s^22p5p$	$(^1S)\ ^3D_1$	397.936		$2s2p^24d$	$(^3P)\ ^5P_3$	449.540	450.178
$2s^22p4d$	$(^1S)\ ^3F_4$	377.950	377.749	$2s^22p5p$	$(^1S)\ ^3D_2$	398.128		$2s2p^24d$	$(^3P)\ ^5P_2$	449.620	450.251
$2s2p^23p$	$(^3P)\ ^3P_0^b$	377.558	378.435	$2s^22p5p$	$(^1S)\ ^3D_3$	398.172		$2s2p^24d$	$(^3P)\ ^5P_1$	449.670	450.305
$2s2p^23p$	$(^3P)\ ^3P_1^b$	377.575	378.418	$2s^22p5p$	$(^1S)\ ^3P_0$	398.180		$2s2p^23d$	$(^1D)\ ^3F_2$	448.410	452.870
$2s2p^23p$	$(^3P)\ ^3P_2^b$	377.617	378.406	$2s^22p5p$	$(^1S)\ ^3P_1$	398.293		$2s2p^23d$	$(^1D)\ ^3F_3$	448.460	452.870
$2s^22p4d$	$(^1S)\ ^1D_2$	377.906	377.687	$2s^22p5p$	$(^1S)\ ^3P_2$	398.418		$2s2p^23d$	$(^1D)\ ^3F_4$	448.530	452.870
$2s^22p4d$	$(^1S)\ ^3D_1$	379.127	379.227	$2s2p^23d$	$(^3P)\ ^3P_2^b$	399.075	400.352	$2s2p^23d$	$(^1D)\ ^3D_1$	453.430	454.181
$2s^22p4d$	$(^1S)\ ^3D_2$	379.188	379.293	$2s2p^23d$	$(^3P)\ ^3P_1^b$	399.189	400.461	$2s2p^23d$	$(^1D)\ ^3D_2$	453.440	454.181
$2s^22p4d$	$(^1S)\ ^3D_3$	379.269	379.357	$2s2p^23d$	$(^3P)\ ^3P_0^b$	399.247	400.515	$2s2p^23d$	$(^1D)\ ^3D_3$	453.460	454.181
$2s^22p4d$	$(^1S)\ ^3P_2$	380.089	380.707	$2s2p^23d$	$(^3P)\ ^3F_2^b$	400.142	401.375	$2s2p^23d$	$(^1D)\ ^3P_0$	457.320	457.574
$2s^22p4d$	$(^1S)\ ^3P_1$	380.138	380.718	$2s2p^23d$	$(^3P)\ ^3F_3^b$	400.251	401.476	$2s2p^23d$	$(^1D)\ ^3P_1$	457.320	457.574
$2s^22p4d$	$(^1S)\ ^3P_0$	380.168	380.737	$2s2p^23d$	$(^3P)\ ^3F_4^b$	400.400	401.606	$2s2p^23d$	$(^1D)\ ^3P_2$	457.320	457.574
$2s^22p4f$	$(^1S)\ ^1F_3$	380.428	380.612	$2s^22p5p$	$(^1S)\ ^1S_0$	400.662		$2s2p^25d$	$(^3P)\ ^5P_3$	473.360	473.762
$2s^22p4f$	$(^1S)\ ^3F_2$	380.440	380.622	$2s^22p5d$	$(^1S)\ ^3F_2$	401.743	401.520	$2s2p^25d$	$(^3P)\ ^5P_2$	473.430	473.762
$2s^22p4f$	$(^1S)\ ^3F_3$	380.487	380.671	$2s^22p5d$	$(^1S)\ ^3F_3$	401.905	401.726	$2s2p^25d$	$(^3P)\ ^5P_1$	473.480	473.762

Table IV: Energies (10^3 cm^{-1}) of $2s^22p5l$, $2s^22p6l$, $2s^22p7l$, and $2s^22p8l$ excited states of C-like O calculated by Cowan code. Superscript b corresponds to the ^4P term of the core $2s2p^2$.

Level		E	Level		E	Level		E
Conf.	LSJ	Cowan	Conf.	LSJ	Cowan	Conf.	LSJ	Cowan
$2s^22p5f$	$(^1S)\ ^3F_2$	403.187	$2s^22p6g$	$(^1S)\ ^3G_3$	415.728	$2s2p^23p$	$(^1D)\ ^3F_2$	422.574
$2s^22p5f$	$(^1S)\ ^3F_3$	403.204	$2s^22p6g$	$(^1S)\ ^3H_4$	415.734	$2s2p^23p$	$(^1D)\ ^3F_3$	422.599
$2s^22p5f$	$(^1S)\ ^3F_4$	403.227	$2s^22p6g$	$(^1S)\ ^3H_5$	415.734	$2s^22p7d$	$(^1S)\ ^3D_1$	422.644
$2s^22p5d$	$(^1S)\ ^1F_3$	403.531	$2s^22p6d$	$(^1S)\ ^1F_3$	415.783	$2s^22p7d$	$(^1S)\ ^3D_2$	422.784
$2s^22p5f$	$(^1S)\ ^3G_3$	403.538	$2s^22p6h$	$(^1S)\ ^3H_5$	415.784	$2s^22p7d$	$(^1S)\ ^3F_4$	422.798
$2s^22p5f$	$(^1S)\ ^3G_4$	403.563	$2s^22p6h$	$(^1S)\ ^3H_4$	415.784	$2s^22p7f$	$(^1S)\ ^3G_3$	422.866
$2s^22p5g$	$(^1S)\ ^3G_4$	403.626	$2s^22p6h$	$(^1S)\ ^3I_5$	415.785	$2s^22p7f$	$(^1S)\ ^3F_3$	422.871
$2s^22p5g$	$(^1S)\ ^3G_3$	403.626	$2s^22p6h$	$(^1S)\ ^3I_6$	415.785	$2s^22p7f$	$(^1S)\ ^3F_2$	422.879
$2s^22p5f$	$(^1S)\ ^3D_3$	403.631	$2s^22p6f$	$(^1S)\ ^3G_3$	415.818	$2s^22p7f$	$(^1S)\ ^3G_4$	422.884
$2s^22p5d$	$(^1S)\ ^1P_1$	403.634	$2s^22p6f$	$(^1S)\ ^3G_4$	415.831	$2s^22p7d$	$(^1S)\ ^3D_3$	422.896
$2s^22p5g$	$(^1S)\ ^3H_4$	403.636	$2s^22p6f$	$(^1S)\ ^3D_3$	415.885	$2s^22p7d$	$(^1S)\ ^3P_2$	422.965
$2s^22p5g$	$(^1S)\ ^3H_5$	403.636	$2s^22p6d$	$(^1S)\ ^1P_1$	415.897	$2s^22p7d$	$(^1S)\ ^3P_1$	422.991
$2s^22p5f$	$(^1S)\ ^3D_2$	403.658	$2s^22p6f$	$(^1S)\ ^3D_2$	415.900	$2s^22p7d$	$(^1S)\ ^3P_0$	423.006
$2s^22p5f$	$(^1S)\ ^3G_5$	403.688	$2s^22p6f$	$(^1S)\ ^3G_5$	415.908	$2s^22p7g$	$(^1S)\ ^3G_3$	423.027
$2s^22p5f$	$(^1S)\ ^3D_1$	403.734	$2s^22p6f$	$(^1S)\ ^1G_4$	415.960	$2s^22p7g$	$(^1S)\ ^3G_4$	423.027
$2s^22p5f$	$(^1S)\ ^1G_4$	403.758	$2s^22p6f$	$(^1S)\ ^3D_1$	415.968	$2s^22p7g$	$(^1S)\ ^3H_4$	423.031
$2s^22p5f$	$(^1S)\ ^1D_2$	403.776	$2s^22p6f$	$(^1S)\ ^1D_2$	415.987	$2s^22p7g$	$(^1S)\ ^3H_5$	423.031
$2s^22p5g$	$(^1S)\ ^1G_4$	403.979	$2s^22p6g$	$(^1S)\ ^1G_4$	416.088	$2s^22p7h$	$(^1S)\ ^3H_4$	423.065
$2s^22p5g$	$(^1S)\ ^3G_5$	403.979	$2s^22p6g$	$(^1S)\ ^3G_5$	416.088	$2s^22p7h$	$(^1S)\ ^3H_5$	423.065
$2s^22p5g$	$(^1S)\ ^3F_4$	404.014	$2s^22p6g$	$(^1S)\ ^3F_4$	416.107	$2s^22p7h$	$(^1S)\ ^3I_5$	423.066
$2s^22p5g$	$(^1S)\ ^1F_3$	404.015	$2s^22p6g$	$(^1S)\ ^1F_3$	416.107	$2s^22p7h$	$(^1S)\ ^3I_6$	423.066
$2s^22p5g$	$(^1S)\ ^3H_6$	404.063	$2s^22p6g$	$(^1S)\ ^3H_6$	416.140	$2s^22p7i$	$(^1S)\ ^1H_5$	423.070
$2s^22p5g$	$(^1S)\ ^1H_5$	404.064	$2s^22p6g$	$(^1S)\ ^1H_5$	416.141	$2s^22p7i$	$(^1S)\ ^3H_6$	423.070
$2s^22p5g$	$(^1S)\ ^3F_2$	404.089	$2s^22p6h$	$(^1S)\ ^1H_5$	416.152	$2s^22p7i$	$(^1S)\ ^3K_6$	423.070
$2s^22p5g$	$(^1S)\ ^3F_3$	404.089	$2s^22p6h$	$(^1S)\ ^3H_6$	416.152	$2s^22p7i$	$(^1S)\ ^3K_7$	423.070
$2s2p^23s$	$(^1D)\ ^1D_2$	405.267	$2s^22p6g$	$(^1S)\ ^3F_2$	416.153	$2s^22p7f$	$(^1S)\ ^1F_3$	423.218
$2s^22p6s$	$(^1S)\ ^3P_0$	409.228	$2s^22p6g$	$(^1S)\ ^3F_3$	416.154	$2s^22p7f$	$(^1S)\ ^3F_4$	423.226
$2s^22p6s$	$(^1S)\ ^3P_1$	409.296	$2s^22p6h$	$(^1S)\ ^3G_5$	416.160	$2s^22p7f$	$(^1S)\ ^3D_3$	423.259
$2s^22p6s$	$(^1S)\ ^3P_2$	409.607	$2s^22p6h$	$(^1S)\ ^1G_4$	416.160	$2s^22p7f$	$(^1S)\ ^3D_2$	423.268
$2s^22p6s$	$(^1S)\ ^1P_1$	409.909	$2s^22p6h$	$(^1S)\ ^1I_6$	416.180	$2s^22p7f$	$(^1S)\ ^3G_5$	423.272
$2s^22p6p$	$(^1S)\ ^1P_1$	411.741	$2s^22p6h$	$(^1S)\ ^3I_7$	416.180	$2s^22p7d$	$(^1S)\ ^1P_1$	423.280
$2s^22p6p$	$(^1S)\ ^3D_1$	412.000	$2s^22p6h$	$(^1S)\ ^3G_3$	416.187	$2s^22p7f$	$(^1S)\ ^1G_4$	423.310
$2s^22p6p$	$(^1S)\ ^3D_2$	412.093	$2s^22p6h$	$(^1S)\ ^3G_4$	416.187	$2s^22p7f$	$(^1S)\ ^3D_1$	423.316
$2s^22p6p$	$(^1S)\ ^3S_1$	412.155	$2s^22p7s$	$(^1S)\ ^3P_0$	419.014	$2s^22p7f$	$(^1S)\ ^1D_2$	423.329
$2s^22p6p$	$(^1S)\ ^3D_3$	412.316	$2s^22p7s$	$(^1S)\ ^3P_1$	419.070	$2s^22p7g$	$(^1S)\ ^1G_4$	423.394
$2s^22p6p$	$(^1S)\ ^3P_0$	412.597	$2s^22p7s$	$(^1S)\ ^3P_2$	419.393	$2s^22p7g$	$(^1S)\ ^3G_5$	423.394
$2s^22p6p$	$(^1S)\ ^3P_1$	412.729	$2s^22p7s$	$(^1S)\ ^1P_1$	419.596	$2s^22p7g$	$(^1S)\ ^3F_4$	423.405
$2s^22p6p$	$(^1S)\ ^3P_2$	412.823	$2s^22p7p$	$(^1S)\ ^1P_1$	420.575	$2s^22p7g$	$(^1S)\ ^1F_3$	423.405
$2s^22p6p$	$(^1S)\ ^1D_2$	413.890	$2s^22p7p$	$(^1S)\ ^3D_1$	420.699	$2s^22p7g$	$(^1S)\ ^3H_6$	423.428
$2s^22p6p$	$(^1S)\ ^1S_0$	414.266	$2s^22p7p$	$(^1S)\ ^3D_2$	420.812	$2s^22p7g$	$(^1S)\ ^1H_5$	423.428
$2s^22p6d$	$(^1S)\ ^3F_2$	414.653	$2s^22p7p$	$(^1S)\ ^3S_1$	420.903	$2s^22p7g$	$(^1S)\ ^3F_2$	423.436
$2s^22p6d$	$(^1S)\ ^3F_3$	414.797	$2s^22p7p$	$(^1S)\ ^3P_0$	421.041	$2s^22p7g$	$(^1S)\ ^3F_3$	423.436
$2s^22p6d$	$(^1S)\ ^3F_4$	415.029	$2s^22p7p$	$(^1S)\ ^3D_3$	421.059	$2s^22p7h$	$(^1S)\ ^1H_5$	423.438
$2s^22p6d$	$(^1S)\ ^3P_2$	415.408	$2s^22p7p$	$(^1S)\ ^3P_1$	421.204	$2s^22p7h$	$(^1S)\ ^3H_6$	423.438
$2s^22p6d$	$(^1S)\ ^3P_1$	415.448	$2s^22p7p$	$(^1S)\ ^3P_2$	421.284	$2s^22p7h$	$(^1S)\ ^1G_4$	423.443
$2s^22p6d$	$(^1S)\ ^3P_0$	415.469	$2s^22p7p$	$(^1S)\ ^1D_2$	421.907	$2s^22p7h$	$(^1S)\ ^3G_5$	423.443
$2s^22p6f$	$(^1S)\ ^1F_3$	415.475	$2s^22p7p$	$(^1S)\ ^1S_0$	422.293	$2s^22p7i$	$(^1S)\ ^1I_6$	423.448
$2s^22p6f$	$(^1S)\ ^3F_3$	415.483	$2s^22p7d$	$(^1S)\ ^3F_2$	422.295	$2s^22p7i$	$(^1S)\ ^3I_7$	423.448
$2s^22p6f$	$(^1S)\ ^3F_2$	415.486	$2s^22p7d$	$(^1S)\ ^3F_3$	422.387	$2s^22p7i$	$(^1S)\ ^3I_5$	423.450
$2s^22p6f$	$(^1S)\ ^3F_4$	415.502	$2s^22p7d$	$(^1S)\ ^1D_2$	422.473	$2s^22p7i$	$(^1S)\ ^3I_6$	423.450
$2s^22p6g$	$(^1S)\ ^3G_4$	415.728	$2s2p^23p$	$(^1D)\ ^3F_4$	422.488	$2s^22p7h$	$(^1S)\ ^1I_6$	423.456

Level		E	Level		E	Level		E
Conf.	LSJ	Cowan	Conf.	LSJ	Cowan	Conf.	LSJ	Cowan
$2s^22p7h$	$(^1S)\ ^3I_7$	423.456	$2s^22p8g$	$(^1S)\ ^3H_4$	427.767	$2s^22p8h$	$(^1S)\ ^1H_5$	428.167
$2s^22p7i$	$(^1S)\ ^3K_8$	423.458	$2s^22p8g$	$(^1S)\ ^3H_5$	427.767	$2s^22p8h$	$(^1S)\ ^3H_6$	428.167
$2s^22p7i$	$(^1S)\ ^1K_7$	423.458	$2s^22p8d$	$(^1S)\ ^1D_2$	427.784	$2s^22p8h$	$(^1S)\ ^3G_5$	428.170
$2s^22p7h$	$(^1S)\ ^3G_3$	423.460	$2s^22p8h$	$(^1S)\ ^3H_4$	427.791	$2s^22p8h$	$(^1S)\ ^1G_4$	428.170
$2s^22p7h$	$(^1S)\ ^3G_4$	423.460	$2s^22p8h$	$(^1S)\ ^3H_5$	427.791	$2s^22p8i$	$(^1S)\ ^3I_7$	428.174
$2s^22p7i$	$(^1S)\ ^3H_4$	423.460	$2s^22p8h$	$(^1S)\ ^3I_5$	427.791	$2s^22p8i$	$(^1S)\ ^1I_6$	428.174
$2s^22p7i$	$(^1S)\ ^3H_5$	423.460	$2s^22p8h$	$(^1S)\ ^3I_6$	427.791	$2s^22p8i$	$(^1S)\ ^3I_5$	428.176
$2s^22p8s$	$(^1S)\ ^3P_0$	425.074	$2s^22p8i$	$(^1S)\ ^1H_5$	427.795	$2s^22p8i$	$(^1S)\ ^3I_6$	428.176
$2s^22p8s$	$(^1S)\ ^3P_1$	425.124	$2s^22p8i$	$(^1S)\ ^3H_6$	427.795	$2s^22p8k$	$(^1S)\ ^3K_8$	428.176
$2s^22p8s$	$(^1S)\ ^3P_2$	425.446	$2s^22p8i$	$(^1S)\ ^3K_7$	427.795	$2s^22p8k$	$(^1S)\ ^1K_7$	428.176
$2s^22p8s$	$(^1S)\ ^1P_1$	425.625	$2s^22p8i$	$(^1S)\ ^3K_6$	427.795	$2s^22p8k$	$(^1S)\ ^3I_7$	428.177
$2s2p^23p$	$(^1D)\ ^3D_1$	425.732	$2s^22p8k$	$(^1S)\ ^3K_7$	427.796	$2s^22p8k$	$(^1S)\ ^1I_6$	428.177
$2s^22p8p$	$(^1S)\ ^3S_1$	425.743	$2s^22p8k$	$(^1S)\ ^3K_6$	427.796	$2s^22p8h$	$(^1S)\ ^3I_6$	428.177
$2s2p^23p$	$(^1D)\ ^3D_2$	425.748	$2s^22p8k$	$(^1S)\ ^3L_8$	427.796	$2s^22p8h$	$(^1S)\ ^1I_6$	428.179
$2s2p^23p$	$(^1D)\ ^3D_3$	425.770	$2s^22p8k$	$(^1S)\ ^3L_7$	427.796	$2s^22p8k$	$(^1S)\ ^3I_7$	428.179
$2s^22p8p$	$(^1S)\ ^3D_1$	426.195	$2s^22p8d$	$(^1S)\ ^3D_3$	427.802	$2s^22p8k$	$(^1S)\ ^3L_9$	428.181
$2s^22p8p$	$(^1S)\ ^3D_2$	426.320	$2s^22p8d$	$(^1S)\ ^3P_2$	427.848	$2s^22p8k$	$(^1S)\ ^1L_8$	428.181
$2s^22p8p$	$(^1S)\ ^1P_1$	426.356	$2s^22p8d$	$(^1S)\ ^3P_1$	427.863	$2s^22p8i$	$(^1S)\ ^3K_8$	428.181
$2s^22p8p$	$(^1S)\ ^3P_0$	426.383	$2s^22p8d$	$(^1S)\ ^3P_0$	427.872	$2s^22p8i$	$(^1S)\ ^1K_7$	428.181
$2s^22p8p$	$(^1S)\ ^3P_1$	426.578	$2s^22p8f$	$(^1S)\ ^1F_3$	428.016	$2s^22p8k$	$(^1S)\ ^3I_5$	428.182
$2s^22p8p$	$(^1S)\ ^3D_3$	426.599	$2s^22p8f$	$(^1S)\ ^3F_4$	428.021	$2s^22p8h$	$(^1S)\ ^3G_3$	428.182
$2s^22p8p$	$(^1S)\ ^3P_2$	426.653	$2s^22p8f$	$(^1S)\ ^3F_3$	428.043	$2s^22p8h$	$(^1S)\ ^3G_4$	428.182
$2s^22p8p$	$(^1S)\ ^1D_2$	427.161	$2s^22p8f$	$(^1S)\ ^3G_5$	428.048	$2s^22p8i$	$(^1S)\ ^3H_5$	428.183
$2s^22p8d$	$(^1S)\ ^3F_2$	427.342	$2s^22p8f$	$(^1S)\ ^3D_2$	428.049	$2s^22p8i$	$(^1S)\ ^3H_4$	428.183
$2s^22p8p$	$(^1S)\ ^1S_0$	427.460	$2s^22p8d$	$(^1S)\ ^1P_1$	428.074	$2s^22p8d$	$(^1S)\ ^1F_3$	428.434
$2s^22p8d$	$(^1S)\ ^3D_2$	427.462	$2s^22p8f$	$(^1S)\ ^1G_4$	428.077	$2s2p^23p$	$(^1D)\ ^3P_0$	429.307
$2s^22p8d$	$(^1S)\ ^3F_3$	427.463	$2s^22p8f$	$(^1S)\ ^3D_1$	428.082	$2s2p^23p$	$(^1D)\ ^3P_1$	429.316
$2s^22p8d$	$(^1S)\ ^3D_1$	427.521	$2s^22p8f$	$(^1S)\ ^1D_2$	428.092	$2s2p^23p$	$(^1D)\ ^3P_2$	429.335
$2s2p^23s$	$(^1S)\ ^3S_1$	427.553	$2s^22p8g$	$(^1S)\ ^1G_4$	428.136	$2s2p^24s$	$(^3P)\ ^3P_0^b$	432.876
$2s^22p8f$	$(^1S)\ ^3G_3$	427.653	$2s^22p8g$	$(^1S)\ ^3G_5$	428.136	$2s2p^24s$	$(^3P)\ ^3P_1^b$	432.980
$2s^22p8f$	$(^1S)\ ^3D_3$	427.660	$2s^22p8g$	$(^1S)\ ^3F_4$	428.143	$2s2p^24s$	$(^3P)\ ^3P_2^b$	433.185
$2s^22p8f$	$(^1S)\ ^3G_4$	427.667	$2s^22p8g$	$(^1S)\ ^1F_3$	428.144	$2s2p^23s$	$(^1S)\ ^1S_0$	435.473
$2s^22p8f$	$(^1S)\ ^3F_2$	427.668	$2s^22p8g$	$(^1S)\ ^3H_6$	428.159	$2s2p^24p$	$(^3P)\ ^5S_2$	442.318
$2s^22p8d$	$(^1S)\ ^3F_4$	427.706	$2s^22p8g$	$(^1S)\ ^1H_5$	428.159	$2s2p^24p$	$(^3P)\ ^3D_1^b$	442.986
$2s^22p8g$	$(^1S)\ ^3G_3$	427.765	$2s^22p8g$	$(^1S)\ ^3F_2$	428.164	$2s2p^24p$	$(^3P)\ ^3D_2^b$	443.083
$2s^22p8g$	$(^1S)\ ^3G_4$	427.765	$2s^22p8g$	$(^1S)\ ^3F_3$	428.164			

Table V: Wavelengths (λ in Å), oscillator strengths (f), and radiative rates (A_r in s^{-1}) for transitions between even- and odd-parity states of C-like oxygen. Comparison of present results (Cowan code) with theoretical results obtained by Tachiev and Froese-Fisher in Ref. 25.

Low level		Upper level		λ		f		A_r	
Conf.	LSJ	Conf.	LSJ	COWAN	MCHF	COWAN	MCHF	COWAN	MCHF
$2s^22p^2$	$(^3P)\ ^3P_0$	$2s2p^3$	$(^2P)\ ^3P_1$	704.13	702.34	1.59[-1]	1.36[-1]	7.13[8]	6.11[8]
$2s^22p^2$	$(^3P)\ ^3P_1$	$2s2p^3$	$(^2P)\ ^3P_0$	704.67	702.83	5.35[-2]	4.56[-2]	2.16[9]	1.85[9]
$2s^22p^2$	$(^3P)\ ^3P_1$	$2s2p^3$	$(^2P)\ ^3P_1$	704.67	702.90	4.11[-2]	3.49[-2]	5.52[8]	4.71[8]
$2s^22p^2$	$(^3P)\ ^3P_1$	$2s2p^3$	$(^2P)\ ^3P_2$	704.66	702.91	6.52[-2]	5.56[-2]	5.25[8]	4.51[8]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s2p^3$	$(^2P)\ ^3P_1$	705.73	703.85	3.98[-2]	3.39[-2]	8.89[8]	7.61[8]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s2p^3$	$(^2P)\ ^3P_2$	705.72	703.86	1.21[-1]	1.03[-1]	1.62[9]	1.39[9]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s2p^3$	$(^2D)\ ^1D_2$	534.46	535.48	1.41[-5]	1.21[-5]	3.29[5]	2.81[5]
$2s^22p^2$	$(^3P)\ ^3P_0$	$2s^22p3s$	$(^1S)\ ^3P_1$	376.78	374.00	1.07[-1]	8.22[-2]	1.67[9]	1.31[9]
$2s^22p^2$	$(^3P)\ ^3P_1$	$2s^22p3s$	$(^1S)\ ^3P_0$	377.11	374.33	3.56[-2]	2.75[-2]	5.01[9]	3.92[9]
$2s^22p^2$	$(^3P)\ ^3P_1$	$2s^22p3s$	$(^1S)\ ^3P_1$	376.94	374.16	2.67[-2]	2.06[-2]	1.25[9]	9.79[8]
$2s^22p^2$	$(^3P)\ ^3P_1$	$2s^22p3s$	$(^1S)\ ^3P_2$	376.58	373.80	4.47[-2]	3.43[-2]	1.26[9]	9.82[8]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s^22p3s$	$(^1S)\ ^3P_1$	377.24	374.43	2.67[-2]	2.06[-2]	2.08[9]	1.64[9]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s^22p3s$	$(^1S)\ ^3P_2$	376.88	374.07	8.02[-2]	6.18[-2]	3.77[9]	2.95[9]
$2s^22p^2$	$(^3P)\ ^3P_0$	$2s^22p3s$	$(^1S)\ ^1P_1$	369.55	366.19	6.76[-5]	4.23[-5]	1.10[6]	7.01[5]
$2s^22p^2$	$(^3P)\ ^3P_1$	$2s^22p3s$	$(^1S)\ ^1P_1$	369.70	366.34	3.24[-5]	1.88[-5]	1.58[6]	9.32[5]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s^22p3s$	$(^1S)\ ^1P_1$	369.99	365.60	1.10[-5]	8.99[-6]	8.97[5]	7.44[5]
$2s^22p^2$	$(^1D)\ ^1D_2$	$2s^22p3s$	$(^1S)\ ^1P_1$	398.33	395.56	7.37[-2]	4.25[-2]	5.16[9]	3.02[9]
$2s^22p^2$	$(^1D)\ ^1D_2$	$2s^22p3s$	$(^1S)\ ^3P_1$	406.74	404.69	5.98[-5]	2.78[-5]	4.02[6]	1.89[6]
$2s^22p^2$	$(^1D)\ ^1D_2$	$2s^22p3s$	$(^1S)\ ^3P_2$	406.32	404.27	4.33[-6]	4.63[-6]	1.75[5]	1.89[5]
$2s^22p^2$	$(^1S)\ ^1S_0$	$2s^22p3s$	$(^1S)\ ^1P_1$	431.03	434.98	1.48[-1]	1.40[-1]	1.78[9]	1.65[9]
$2s^22p^2$	$(^1S)\ ^1S_0$	$2s^22p3s$	$(^1S)\ ^3P_1$	440.90	446.05	1.17[-4]	9.21[-5]	1.34[6]	1.03[6]
$2s^22p^2$	$(^3P)\ ^3P_0$	$2s^22p3d$	$(^1S)\ ^3D_1$	306.93	305.60	5.67[-1]	5.01[-1]	1.34[10]	1.19[10]
$2s^22p^2$	$(^3P)\ ^3P_1$	$2s^22p3d$	$(^1S)\ ^3D_1$	307.03	305.70	1.25[-1]	1.12[-1]	8.86[9]	8.00[9]
$2s^22p^2$	$(^3P)\ ^3P_1$	$2s^22p3d$	$(^1S)\ ^3D_2$	306.98	305.66	4.24[-1]	3.75[-1]	1.80[10]	1.61[10]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s^22p3d$	$(^1S)\ ^3D_1$	307.23	305.88	3.82[-3]	3.52[-3]	4.49[8]	4.18[8]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s^22p3d$	$(^1S)\ ^3D_2$	307.18	305.84	6.52[-2]	5.95[-2]	4.61[9]	4.23[9]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s^22p3d$	$(^1S)\ ^3D_3$	307.11	305.77	4.48[-1]	3.99[-1]	2.26[10]	2.03[10]
$2s^22p^2$	$(^3P)\ ^3P_0$	$2s^22p3d$	$(^1S)\ ^3P_1$	304.94	303.41	1.51[-1]	1.36[-1]	3.61[9]	3.28[9]
$2s^22p^2$	$(^3P)\ ^3P_1$	$2s^22p3d$	$(^1S)\ ^3P_0$	304.99	303.46	6.11[-2]	5.39[-2]	1.31[10]	1.17[10]
$2s^22p^2$	$(^3P)\ ^3P_1$	$2s^22p3d$	$(^1S)\ ^3P_1$	305.04	303.52	5.44[-2]	4.73[-2]	3.90[9]	3.42[9]
$2s^22p^2$	$(^3P)\ ^3P_1$	$2s^22p3d$	$(^1S)\ ^3P_2$	305.15	303.62	5.22[-2]	4.82[-2]	2.24[9]	2.09[9]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s^22p3d$	$(^1S)\ ^3P_1$	305.24	303.69	4.73[-2]	4.17[-2]	5.64[9]	5.03[9]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s^22p3d$	$(^1S)\ ^3P_2$	305.34	303.80	1.52[-1]	1.33[-1]	1.09[10]	9.64[9]
$2s^22p^2$	$(^3P)\ ^3P_1$	$2s^22p3d$	$(^1S)\ ^3F_2$	309.25	308.31	1.36[-4]	8.09[-5]	5.67[6]	3.41[6]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s^22p3d$	$(^1S)\ ^3F_2$	309.46	308.49	1.80[-4]	1.31[-2]	1.26[7]	9.17[8]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s^22p3d$	$(^1S)\ ^3F_3$	309.27	308.30	1.26[-3]	8.13[-4]	6.29[7]	4.08[7]
$2s^22p^2$	$(^3P)\ ^3P_0$	$2s^22p3d$	$(^1S)\ ^1P_1$	301.87	300.50	6.19[-4]	6.37[-4]	1.51[7]	1.57[7]
$2s^22p^2$	$(^3P)\ ^3P_1$	$2s^22p3d$	$(^1S)\ ^1P_1$	301.97	300.60	2.22[-5]	1.59[-5]	1.62[6]	1.17[6]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s^22p3d$	$(^1S)\ ^1P_1$	302.17	300.78	9.39[-6]	1.12[-5]	1.14[6]	1.37[6]
$2s^22p^2$	$(^3P)\ ^3P_1$	$2s^22p3d$	$(^1S)\ ^1D_2$	308.99	308.05	1.31[-3]	8.18[-4]	5.48[7]	3.45[7]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s^22p3d$	$(^1S)\ ^1F_3$	302.73	301.64	7.72[-5]	9.27[-5]	4.01[6]	4.85[6]
$2s^22p^2$	$(^1D)\ ^1D_2$	$2s^22p3d$	$(^1S)\ ^3F_2$	329.03	328.74	4.35[-2]	4.41[-2]	2.68[9]	2.72[9]
$2s^22p^2$	$(^1D)\ ^1D_2$	$2s^22p3d$	$(^1S)\ ^3F_3$	328.82	328.53	2.18[-4]	1.84[-4]	9.61[6]	8.13[6]
$2s^22p^2$	$(^1D)\ ^1D_2$	$2s^22p3d$	$(^1S)\ ^1D_2$	328.74	328.45	1.24[-1]	1.12[-1]	7.67[9]	6.92[9]
$2s^22p^2$	$(^1D)\ ^1D_2$	$2s^22p3d$	$(^1S)\ ^1F_3$	321.44	320.98	5.04[-1]	4.26[-1]	2.32[10]	1.97[10]
$2s^22p^2$	$(^1D)\ ^1D_2$	$2s^22p3d$	$(^1S)\ ^1P_1$	320.81	319.99	4.38[-3]	2.64[-3]	4.72[8]	2.86[8]
$2s^22p^2$	$(^1D)\ ^1D_2$	$2s^22p3d$	$(^1S)\ ^3D_1$	326.52	325.78	6.19[-6]	4.55[-6]	6.45[5]	4.77[5]
$2s^22p^2$	$(^1D)\ ^1D_2$	$2s^22p3d$	$(^1S)\ ^3D_2$	326.47	325.73	9.98[-5]	4.84[-5]	6.24[6]	3.04[6]
$2s^22p^2$	$(^1D)\ ^1D_2$	$2s^22p3d$	$(^1S)\ ^3D_3$	326.39	325.65	8.75[-5]	9.14[-5]	3.91[6]	4.11[6]
$2s^22p^2$	$(^1D)\ ^1D_2$	$2s^22p3d$	$(^1S)\ ^3P_2$	324.39	323.42	2.13[-4]	1.60[-4]	1.35[7]	1.02[7]

Table VI: Autoinization rates (A_a in s^{-1}) and excitation energies (E_S in eV) for even-parity states. Wavelengths (λ in Å), weighted radiative rates (gA_r in s^{-1}), factor intensities (Q_d in s^{-1}) and effective emission rate coefficients ($C_S^{\rm eff}$ in cm^3/s) for transitions between even- and odd-parity states of C-like oxygen.

Low level		Upper level		A_a	ΣA_a	E_S	ΣgA_r	gA_r	λ	Q_d	$C_S^{\rm eff}$
Conf.	LSJ	Conf.	LSJ	s^{-1}	s^{-1}	eV	s^{-1}	s^{-1}	Å	s^{-1}	cm^3/s
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s2p^24p$	$(^3P)\ ^3D_3^b$	1.86[13]	1.86[13]	0.019	1.82[10]	1.49[10]	225.78	1.49[10]	7.78[-14]
$2s^22p^2$	$(^3P)\ ^3P_2$	$2s2p^25p$	$(^3P)\ ^3D_3^b$	8.41[12]	8.41[12]	3.247	2.65[10]	1.56[10]	213.24	1.56[10]	5.91[-14]
$2s^22p^2$	$(^1D)\ ^1D_2$	$2s2p^24p$	$(^1D)\ ^1F_3$	3.67[13]	3.67[13]	6.631	2.83[10]	1.83[10]	209.64	1.82[10]	4.92[-14]
$2s^22p^2$	$(^1D)\ ^1D_2$	$2s2p^24p$	$(^1D)\ ^1D_2$	2.58[13]	2.58[13]	6.728	2.78[10]	1.45[10]	209.29	1.45[10]	3.88[-14]
$2s^22p^2$	$(^1S)\ ^1S_0$	$2s2p^23p$	$(^1S)\ ^1P_1$	5.07[13]	5.07[13]	1.874	2.38[10]	1.17[10]	238.32	1.16[10]	5.05[-14]
$2s^22p3p$	$(^1S)\ ^3D_2$	$2s2p^23p$	$(^3P)\ ^3D_2^a$	2.70[11]	2.70[11]	3.653	3.22[10]	1.52[10]	553.50	1.48[10]	5.38[-14]
$2s^22p3p$	$(^1S)\ ^3D_3$	$2s2p^23p$	$(^1S)\ ^3P_2$	4.82[13]	4.82[13]	1.733	2.05[10]	1.09[10]	606.19	1.09[10]	4.78[-14]
$2s^22p3p$	$(^1S)\ ^3D_3$	$2s2p^23p$	$(^3P)\ ^3D_3^a$	1.23[11]	1.23[11]	3.670	4.50[10]	2.81[10]	553.75	2.67[10]	9.69[-14]
$2s^22p3p$	$(^1S)\ ^3S_1$	$2s2p^23p$	$(^3P)\ ^3P_2^a$	1.07[14]	1.07[14]	4.017	3.58[10]	1.07[10]	553.76	1.07[10]	3.73[-14]
$2s^22p3p$	$(^1S)\ ^3P_2$	$2s2p^23p$	$(^3P)\ ^3S_1^a$	5.94[10]	5.94[10]	4.502	3.23[10]	1.23[10]	558.78	1.04[10]	3.48[-14]
$2s^22p3p$	$(^1S)\ ^1D_2$	$2s2p^23p$	$(^3P)\ ^1D_2$	1.45[13]	1.45[13]	4.747	3.34[10]	1.94[10]	573.20	1.94[10]	6.32[-14]
$2s^22p4p$	$(^1S)\ ^3D_3$	$2s2p^24p$	$(^3P)\ ^3D_3^a$	2.14[13]	6.23[13]	12.866	5.65[10]	3.07[10]	555.26	1.06[10]	1.53[-14]
$2s^22p4f$	$(^1S)\ ^1F_3$	$2s2p^24f$	$(^3P)\ ^3G_4^a$	1.11[14]	1.39[14]	14.367	7.60[10]	1.67[10]	560.13	1.34[10]	1.66[-14]
$2s^22p4f$	$(^1S)\ ^3F_2$	$2s2p^24f$	$(^3P)\ ^3G_3^a$	1.12[14]	1.40[14]	14.361	5.92[10]	1.57[10]	560.30	1.25[10]	1.56[-14]
$2s^22p4f$	$(^1S)\ ^3F_3$	$2s2p^24f$	$(^3P)\ ^1G_4$	1.11[14]	1.36[14]	14.400	7.57[10]	1.66[10]	559.47	1.34[10]	1.67[-14]
$2s^22p4f$	$(^1S)\ ^3F_4$	$2s2p^24f$	$(^3P)\ ^3G_5^a$	1.12[14]	1.41[14]	14.386	9.30[10]	2.77[10]	559.87	2.19[10]	2.72[-14]
$2s^22p4f$	$(^1S)\ ^3F_4$	$2s2p^24f$	$(^3P)\ ^3D_3^a$	4.70[12]	9.89[12]	14.404	6.26[10]	3.20[10]	559.43	1.52[10]	1.88[-14]
$2s^22p4f$	$(^1S)\ ^3G_3$	$2s2p^24f$	$(^3P)\ ^3G_3^a$	1.12[14]	1.40[14]	14.361	5.92[10]	2.74[10]	561.96	2.17[10]	2.71[-14]
$2s^22p4f$	$(^1S)\ ^3G_3$	$2s2p^24f$	$(^3P)\ ^3F_2^a$	8.54[13]	9.04[13]	14.470	4.10[10]	1.77[10]	559.20	1.67[10]	2.05[-14]
$2s^22p4f$	$(^1S)\ ^3G_4$	$2s2p^24f$	$(^3P)\ ^3G_4^a$	1.11[14]	1.39[14]	14.367	7.60[10]	3.53[10]	561.94	2.82[10]	3.51[-14]
$2s^22p4f$	$(^1S)\ ^3G_4$	$2s2p^24f$	$(^3P)\ ^3F_3^a$	8.73[13]	9.22[13]	14.472	5.96[10]	1.90[10]	559.28	1.80[10]	2.21[-14]
$2s^22p4f$	$(^1S)\ ^3D_3$	$2s2p^24f$	$(^3P)\ ^3F_4^a$	9.04[13]	9.56[13]	14.474	7.66[10]	2.76[10]	559.78	2.61[10]	3.21[-14]
$2s^22p4f$	$(^1S)\ ^3G_5$	$2s2p^24f$	$(^1D)\ ^3H_6$	6.04[13]	6.04[13]	8.192	2.80[10]	1.02[10]	781.41	1.02[10]	2.34[-14]
$2s^22p4f$	$(^1S)\ ^3G_5$	$2s2p^24f$	$(^3P)\ ^3G_5^a$	1.12[14]	1.41[14]	14.386	9.30[10]	4.89[10]	562.02	3.87[10]	4.81[-14]
$2s^22p4f$	$(^1S)\ ^3G_5$	$2s2p^24f$	$(^3P)\ ^3F_4^a$	9.04[13]	9.56[13]	14.474	7.66[10]	2.98[10]	559.78	2.81[10]	3.46[-14]
$2s^22p4f$	$(^1S)\ ^1G_4$	$2s2p^24f$	$(^3P)\ ^1G_4$	1.11[14]	1.36[14]	14.400	7.57[10]	4.05[10]	561.94	3.29[10]	4.08[-14]
$2s^22p4f$	$(^1S)\ ^1G_4$	$2s2p^24f$	$(^3P)\ ^1F_3$	9.08[13]	9.52[13]	14.491	5.89[10]	2.14[10]	559.63	2.04[10]	2.51[-14]
$2s^22p4f$	$(^1S)\ ^3D_1$	$2s2p^24f$	$(^3P)\ ^3F_2^a$	8.54[13]	9.04[13]	14.470	4.10[10]	1.45[10]	560.39	1.37[10]	1.68[-14]
$2s^22p4f$	$(^1S)\ ^1D_2$	$2s2p^24f$	$(^3P)\ ^3F_3^a$	8.73[13]	9.22[13]	14.472	5.96[10]	1.12[10]	560.46	1.06[10]	1.31[-14]
$2s^22p4f$	$(^1S)\ ^1D_2$	$2s2p^24f$	$(^3P)\ ^1F_3$	9.08[13]	9.52[13]	14.491	5.89[10]	1.15[10]	559.98	1.10[10]	1.35[-14]
$2s2p^23d$	$(^3P)\ ^3F_4^b$	$2s2p^24f$	$(^3P)\ ^3G_5^b$	6.19[09]	6.19[09]	1.119	1.35[10]	1.24[10]	1933.86	1.03[10]	4.82[-14]
$2s^22p5f$	$(^1S)\ ^3G_5$	$2s2p^25f$	$(^3P)\ ^3F_4^a$	5.00[13]	1.14[14]	17.200	6.44[10]	2.71[10]	561.39	1.19[10]	1.11[-14]
$2s^22p6h$	$(^1S)\ ^3H_5$	$2s2p^26h$	$(^3P)\ ^3I_6^a$	1.74[11]	2.12[11]	18.801	9.84[10]	3.76[10]	558.85	2.98[10]	2.38[-14]
$2s^22p6h$	$(^1S)\ ^3H_5$	$2s2p^26h$	$(^3P)\ ^3G_5^a$	5.02[10]	5.48[10]	18.801	8.40[10]	1.50[10]	558.84	1.20[10]	9.61[-15]
$2s^22p6h$	$(^1S)\ ^3H_4$	$2s2p^26h$	$(^3P)\ ^3I_5^a$	1.74[11]	2.12[11]	18.801	8.33[10]	3.12[10]	558.85	2.47[10]	1.97[-14]
$2s^22p6h$	$(^1S)\ ^3I_5$	$2s2p^26h$	$(^3P)\ ^3I_5^a$	1.74[11]	2.12[11]	18.801	8.33[10]	2.13[10]	558.85	1.69[10]	1.35[-14]
$2s^22p6h$	$(^1S)\ ^3I_5$	$2s2p^26h$	$(^3P)\ ^1G_4$	5.02[10]	5.47[10]	18.801	6.87[10]	3.21[10]	558.85	2.58[10]	2.06[-14]
$2s^22p6h$	$(^1S)\ ^3I_5$	$2s2p^26h$	$(^3P)\ ^1I_6$	1.80[11]	2.28[11]	18.831	9.84[10]	1.76[10]	558.09	1.35[10]	1.08[-14]
$2s^22p6h$	$(^1S)\ ^3I_6$	$2s2p^26h$	$(^3P)\ ^3I_6^a$	1.74[11]	2.12[11]	18.801	9.84[10]	2.52[10]	558.85	2.00[10]	1.60[-14]
$2s^22p6h$	$(^1S)\ ^3I_6$	$2s2p^26h$	$(^3P)\ ^3G_5^a$	5.02[10]	5.48[10]	18.801	8.40[10]	3.87[10]	558.85	3.11[10]	2.48[-14]
$2s^22p6h$	$(^1S)\ ^3I_6$	$2s2p^26h$	$(^3P)\ ^3I_7^a$	1.80[11]	2.28[11]	18.831	1.14[11]	2.06[10]	558.09	1.58[10]	1.26[-14]
$2s^22p6f$	$(^1S)\ ^3G_5$	$2s2p^26f$	$(^1D)\ ^3H_6$	2.42[13]	2.50[13]	12.477	1.64[10]	1.04[10]	782.39	1.01[10]	1.52[-14]
$2s^22p6f$	$(^1S)\ ^3G_5$	$2s2p^26f$	$(^3P)\ ^3F_4^a$	1.62[13]	3.12[13]	18.792	6.97[10]	3.29[10]	559.46	1.71[10]	1.36[-14]
$2s^22p6f$	$(^1S)\ ^3G_5$	$2s2p^26f$	$(^3P)\ ^3G_5^a$	2.27[13]	7.94[13]	18.883	8.43[10]	4.38[10]	557.17	1.25[10]	9.92[-15]
$2s^22p6h$	$(^1S)\ ^1H_5$	$2s2p^26h$	$(^3P)\ ^1I_6$	1.80[11]	2.28[11]	18.831	9.84[10]	2.23[10]	559.23	1.71[10]	1.36[-14]
$2s^22p6h$	$(^1S)\ ^1H_5$	$2s2p^26h$	$(^3P)\ ^3H_4^a$	1.04[11]	1.08[11]	18.834	6.86[10]	3.08[10]	559.15	2.77[10]	2.21[-14]
$2s^22p6h$	$(^1S)\ ^3H_6$	$2s2p^26h$	$(^3P)\ ^3I_6^a$	1.74[11]	2.12[11]	18.801	9.84[10]	1.32[10]	560.00	1.04[10]	8.33[-15]
$2s^22p6h$	$(^1S)\ ^3H_6$	$2s2p^26h$	$(^3P)\ ^3I_7^a$	1.80[11]	2.28[11]	18.831	1.14[11]	2.60[10]	559.23	1.99[10]	1.59[-14]
$2s^22p6h$	$(^1S)\ ^3H_6$	$2s2p^26h$	$(^3P)\ ^3H_5^a$	1.04[11]	1.08[11]	18.834	8.39[10]	3.71[10]	559.15	3.34[10]	2.65[-14]
$2s^22p6h$	$(^1S)\ ^3H_6$	$2s2p^26h$	$(^3P)\ ^3H_6^a$	1.58[11]	1.71[11]	18.835	9.88[10]	1.28[10]	559.13	1.13[10]	8.97[-15]
$2s^22p6h$	$(^1S)\ ^3G_5$	$2s2p^26h$	$(^3P)\ ^3H_6^a$	1.58[11]	1.71[11]	18.835	9.88[10]	3.80[10]	559.16	3.36[10]	2.67[-14]

$2s^22p6h$	$(^1S)\ ^1G_4$	$2s2p^26h$	$(^3P)\ ^1H_5$	1.58[11]	1.71[11]	18.835	8.36[10]	3.16[10]	559.16	2.79[10]	2.22[-14]

Low level		Upper level		A_a	ΣA_a	E_S	ΣgA_r	gA_r	λ	Q_d	$C_S^{\rm eff}$
Conf.	LSJ	Conf.	LSJ	s^{-1}	s^{-1}	eV	s^{-1}	s^{-1}	Å	s^{-1}	cm^3/s
$2s^22p6h$	$(^1S)\ ^1I_6$	$2s2p^26h$	$(^1D)\ ^1K_7$	1.47[12]	1.56[12]	12.498	1.54[10]	1.32[10]	783.01	1.24[10]	1.87[-14]
$2s^22p6h$	$(^1S)\ ^1I_6$	$2s2p^26h$	$(^1S)\ ^1H_5$	6.06[11]	6.89[11]	16.379	4.14[10]	1.54[10]	628.89	1.34[10]	1.37[-14]
$2s^22p6h$	$(^1S)\ ^1I_6$	$2s2p^26h$	$(^3P)\ ^3I_5^a$	1.74[11]	2.12[11]	18.801	8.33[10]	1.37[10]	560.09	1.09[10]	8.68[-15]
$2s^22p6h$	$(^1S)\ ^1I_6$	$2s2p^26h$	$(^3P)\ ^1I_6$	1.80[11]	2.28[11]	18.831	9.84[10]	5.55[10]	559.32	4.25[10]	3.39[-14]
$2s^22p6h$	$(^1S)\ ^1I_6$	$2s2p^26h$	$(^3P)\ ^1H_5$	1.58[11]	1.71[11]	18.835	8.36[10]	2.76[10]	559.22	2.44[10]	1.94[-14]
$2s^22p6h$	$(^1S)\ ^3I_7$	$2s2p^26h$	$(^1D)\ ^3K_8$	1.47[12]	1.56[12]	12.498	1.74[10]	1.51[10]	783.01	1.42[10]	2.14[-14]
$2s^22p6h$	$(^1S)\ ^3I_7$	$2s2p^26h$	$(^1S)\ ^3H_6$	6.06[11]	6.89[11]	16.379	4.89[10]	1.80[10]	628.89	1.57[10]	1.60[-14]
$2s^22p6h$	$(^1S)\ ^3I_7$	$2s2p^26h$	$(^3P)\ ^3I_6^a$	1.74[11]	2.12[11]	18.801	9.84[10]	1.60[10]	560.09	1.27[10]	1.01[-14]
$2s^22p6h$	$(^1S)\ ^3I_7$	$2s2p^26h$	$(^3P)\ ^3I_7^a$	1.80[11]	2.28[11]	18.831	1.14[11]	6.42[10]	559.32	4.91[10]	3.91[-14]
$2s^22p6h$	$(^1S)\ ^3I_7$	$2s2p^26h$	$(^3P)\ ^3H_6^a$	1.58[11]	1.71[11]	18.835	9.88[10]	3.23[10]	559.22	2.85[10]	2.27[-14]
$2s^22p6h$	$(^1S)\ ^3G_3$	$2s2p^26h$	$(^3P)\ ^3H_4^a$	1.04[11]	1.08[11]	18.834	6.86[10]	2.53[10]	559.26	2.28[10]	1.81[-14]
$2s^22p6h$	$(^1S)\ ^3G_4$	$2s2p^26h$	$(^3P)\ ^3H_5^a$	1.04[11]	1.08[11]	18.834	8.39[10]	3.18[10]	559.26	2.86[10]	2.28[-14]
$2s^22p7f$	$(^1S)\ ^3F_3$	$2s2p^27f$	$(^3P)\ ^3F_4^a$	1.12[13]	2.32[13]	19.687	6.88[10]	2.11[10]	558.65	1.02[10]	7.44[-15]
$2s^22p7f$	$(^1S)\ ^3G_4$	$2s2p^27f$	$(^3P)\ ^3G_5^a$	1.66[13]	2.62[13]	19.743	8.37[10]	1.65[10]	557.30	1.05[10]	7.63[-15]
$2s^22p7h$	$(^1S)\ ^3H_4$	$2s2p^27h$	$(^3P)\ ^3I_5^a$	2.30[11]	2.67[11]	19.704	8.23[10]	3.09[10]	558.84	2.59[10]	1.89[-14]
$2s^22p7h$	$(^1S)\ ^3H_4$	$2s2p^27h$	$(^3P)\ ^1G_4$	7.37[10]	7.96[10]	19.704	6.86[10]	1.21[10]	558.84	1.02[10]	7.46[-15]
$2s^22p7h$	$(^1S)\ ^3H_5$	$2s2p^27h$	$(^3P)\ ^3I_6^a$	2.30[11]	2.67[11]	19.704	9.73[10]	3.72[10]	558.84	3.12[10]	2.28[-14]
$2s^22p7h$	$(^1S)\ ^3H_5$	$2s2p^27h$	$(^3P)\ ^3G_5^a$	7.38[10]	7.97[10]	19.704	8.38[10]	1.48[10]	558.84	1.25[10]	9.15[-15]
$2s^22p7h$	$(^1S)\ ^3I_5$	$2s2p^27h$	$(^3P)\ ^3I_5^a$	2.30[11]	2.67[11]	19.704	8.23[10]	2.13[10]	558.85	1.79[10]	1.31[-14]
$2s^22p7h$	$(^1S)\ ^3I_5$	$2s2p^27h$	$(^3P)\ ^1G_4$	7.37[10]	7.96[10]	19.704	6.86[10]	3.28[10]	558.84	2.77[10]	2.02[-14]
$2s^22p7h$	$(^1S)\ ^3I_5$	$2s2p^27h$	$(^3P)\ ^1I_6$	2.40[11]	2.86[11]	19.734	9.71[10]	1.67[10]	558.07	1.36[10]	9.90[-15]
$2s^22p7h$	$(^1S)\ ^3I_6$	$2s2p^27h$	$(^3P)\ ^3I_6^a$	2.30[11]	2.67[11]	19.704	9.73[10]	2.53[10]	558.85	2.12[10]	1.55[-14]
$2s^22p7h$	$(^1S)\ ^3I_6$	$2s2p^27h$	$(^3P)\ ^3G_5^a$	7.38[10]	7.97[10]	19.704	8.38[10]	3.94[10]	558.84	3.33[10]	2.43[-14]
$2s^22p7h$	$(^1S)\ ^3I_6$	$2s2p^27h$	$(^3P)\ ^3I_7^a$	2.40[11]	2.86[11]	19.734	1.12[11]	1.95[10]	558.07	1.59[10]	1.16[-14]
$2s^22p7f$	$(^1S)\ ^3F_4$	$2s2p^27f$	$(^3P)\ ^3G_4^a$	1.60[13]	2.65[13]	19.724	6.84[10]	2.20[10]	558.82	1.33[10]	9.68[-15]
$2s^22p7f$	$(^1S)\ ^3D_3$	$2s2p^27f$	$(^3P)\ ^3G_4^a$	1.60[13]	2.65[13]	19.724	6.84[10]	1.79[10]	558.93	1.08[10]	7.89[-15]
$2s^22p7f$	$(^1S)\ ^3G_5$	$2s2p^27f$	$(^1D)\ ^3H_6$	1.54[13]	1.58[13]	13.387	1.44[10]	1.06[10]	782.58	1.03[10]	1.42[-14]
$2s^22p7f$	$(^1S)\ ^3G_5$	$2s2p^27f$	$(^3P)\ ^3F_4^a$	1.12[13]	2.32[13]	19.687	6.88[10]	3.22[10]	559.90	1.55[10]	1.13[-14]
$2s^22p7f$	$(^1S)\ ^3G_5$	$2s2p^27f$	$(^3P)\ ^3G_5^a$	1.66[13]	2.62[13]	19.743	8.37[10]	4.77[10]	558.51	3.03[10]	2.20[-14]
$2s^22p7f$	$(^1S)\ ^1G_4$	$2s2p^27f$	$(^3P)\ ^1G_4$	1.70[13]	2.68[13]	19.743	6.84[10]	3.61[10]	558.63	2.28[10]	1.66[-14]
$2s^22p7h$	$(^1S)\ ^1H_5$	$2s2p^27h$	$(^3P)\ ^1I_6$	2.40[11]	2.86[11]	19.734	9.71[10]	2.26[10]	559.23	1.84[10]	1.34[-14]
$2s^22p7h$	$(^1S)\ ^1H_5$	$2s2p^27h$	$(^3P)\ ^3H_4^a$	1.34[11]	1.39[11]	19.737	6.84[10]	3.18[10]	559.18	2.90[10]	2.11[-14]
$2s^22p7h$	$(^1S)\ ^3H_6$	$2s2p^27h$	$(^3P)\ ^3I_7^a$	2.40[11]	2.86[11]	19.734	1.12[11]	2.64[10]	559.23	2.15[10]	1.57[-14]
$2s^22p7h$	$(^1S)\ ^3H_6$	$2s2p^27h$	$(^3P)\ ^3H_5^a$	1.34[11]	1.40[11]	19.737	8.36[10]	3.83[10]	559.18	3.49[10]	2.54[-14]
$2s^22p7h$	$(^1S)\ ^3H_6$	$2s2p^27h$	$(^3P)\ ^3H_6^a$	2.12[11]	2.27[11]	19.737	9.81[10]	1.30[10]	559.17	1.18[10]	8.56[-15]
$2s^22p7h$	$(^1S)\ ^1G_4$	$2s2p^27h$	$(^3P)\ ^1H_5$	2.12[11]	2.27[11]	19.737	8.30[10]	3.10[10]	559.19	2.80[10]	2.04[-14]
$2s^22p7h$	$(^1S)\ ^3G_5$	$2s2p^27h$	$(^3P)\ ^3H_6^a$	2.12[11]	2.27[11]	19.737	9.81[10]	3.73[10]	559.19	3.38[10]	2.45[-14]
$2s^22p7h$	$(^1S)\ ^1I_6$	$2s2p^27h$	$(^1D)\ ^1K_7$	1.81[12]	1.90[12]	13.400	1.44[10]	1.30[10]	783.05	1.24[10]	1.70[-14]
$2s^22p7h$	$(^1S)\ ^1I_6$	$2s2p^27h$	$(^1S)\ ^1H_5$	7.44[11]	8.28[11]	17.281	4.08[10]	1.56[10]	628.89	1.39[10]	1.30[-14]
$2s^22p7h$	$(^1S)\ ^1I_6$	$2s2p^27h$	$(^3P)\ ^3I_5^a$	2.30[11]	2.67[11]	19.704	8.23[10]	1.48[10]	560.07	1.24[10]	9.07[-15]
$2s^22p7h$	$(^1S)\ ^1I_6$	$2s2p^27h$	$(^3P)\ ^1I_6$	2.40[11]	2.86[11]	19.734	9.71[10]	5.55[10]	559.29	4.53[10]	3.29[-14]
$2s^22p7h$	$(^1S)\ ^1I_6$	$2s2p^27h$	$(^3P)\ ^1H_5$	2.12[11]	2.27[11]	19.737	8.30[10]	2.72[10]	559.23	2.46[10]	1.79[-14]
$2s^22p7h$	$(^1S)\ ^3I_7$	$2s2p^27h$	$(^1D)\ ^3K_8$	1.81[12]	1.90[12]	13.400	1.63[10]	1.48[10]	783.05	1.42[10]	1.94[-14]
$2s^22p7h$	$(^1S)\ ^3I_7$	$2s2p^27h$	$(^1S)\ ^3H_6$	7.44[11]	8.28[11]	17.281	4.82[10]	1.82[10]	628.89	1.63[10]	1.52[-14]
$2s^22p7h$	$(^1S)\ ^3I_7$	$2s2p^27h$	$(^3P)\ ^3I_6^a$	2.30[11]	2.67[11]	19.704	9.73[10]	1.73[10]	560.07	1.45[10]	1.06[-14]
$2s^22p7h$	$(^1S)\ ^3I_7$	$2s2p^27h$	$(^3P)\ ^3I_7^a$	2.40[11]	2.86[11]	19.734	1.12[11]	6.41[10]	559.29	5.23[10]	3.81[-14]
$2s^22p7h$	$(^1S)\ ^3I_7$	$2s2p^27h$	$(^3P)\ ^3H_6^a$	2.12[11]	2.27[11]	19.737	9.81[10]	3.18[10]	559.23	2.87[10]	2.09[-14]
$2s^22p7h$	$(^1S)\ ^3G_3$	$2s2p^27h$	$(^3P)\ ^3H_4^a$	1.34[11]	1.39[11]	19.737	6.84[10]	2.42[10]	559.25	2.20[10]	1.60[-14]
$2s^22p7h$	$(^1S)\ ^3G_4$	$2s2p^27h$	$(^3P)\ ^3H_5^a$	1.34[11]	1.40[11]	19.737	8.36[10]	3.04[10]	559.25	2.77[10]	2.02[-14]
$2s^22p8f$	$(^1S)\ ^3G_4$	$2s2p^28f$	$(^3P)\ ^3G_4^a$	1.08[13]	1.73[13]	20.305	6.77[10]	1.63[10]	558.07	1.02[10]	7.01[-15]
$2s^22p8f$	$(^1S)\ ^3G_4$	$2s2p^28f$	$(^3P)\ ^3G_5^a$	1.20[13]	1.51[13]	20.321	8.22[10]	1.53[10]	557.66	1.21[10]	8.32[-15]
$2s^22p8h$	$(^1S)\ ^3H_4$	$2s2p^28h$	$(^3P)\ ^3I_5^a$	2.23[11]	2.52[11]	20.290	8.15[10]	3.03[10]	558.84	2.61[10]	1.80[-14]

$2s^22p8h$	$(^1S)\ ^3H_4$	$2s2p^28h$	$(^3P)\ ^3H_4^a$	7.59[10]	8.15[10]	20.290	6.90[10]	1.20[10]	558.84	1.02[10]	7.04[-15]
$2s^22p8h$	$(^1S)\ ^3H_5$	$2s2p^28h$	$(^3P)\ ^3I_6^a$	2.23[11]	2.52[11]	20.290	9.63[10]	3.65[10]	558.84	3.14[10]	2.16[-14]

Low level		Upper level		A_a	ΣA_a	E_S	ΣgA_r	gA_r	λ	Q_d	C_S^{eff}
Conf.	LSJ	Conf.	LSJ	s^{-1}	s^{-1}	eV	s^{-1}	s^{-1}	Å	s^{-1}	cm^3/s
$2s^22p8h$	$(^1S)\ ^3H_5$	$2s2p^28h$	$(^3P)\ ^3G_5^a$	7.60[10]	8.16[10]	20.290	8.43[10]	1.48[10]	558.84	1.26[10]	8.64[-15]
$2s^22p8h$	$(^1S)\ ^3I_5$	$2s2p^28h$	$(^3P)\ ^3I_5^a$	2.23[11]	2.52[11]	20.290	8.15[10]	2.13[10]	558.84	1.83[10]	1.26[-14]
$2s^22p8h$	$(^1S)\ ^3I_5$	$2s2p^28h$	$(^3P)\ ^3H_4^a$	7.59[10]	8.15[10]	20.290	6.90[10]	3.35[10]	558.84	2.85[10]	1.96[-14]
$2s^22p8h$	$(^1S)\ ^3I_5$	$2s2p^28h$	$(^3P)\ ^1I_6$	2.32[11]	2.69[11]	20.321	9.58[10]	1.60[10]	558.06	1.34[10]	9.22[-15]
$2s^22p8h$	$(^1S)\ ^3I_6$	$2s2p^28h$	$(^3P)\ ^3I_6^a$	2.23[11]	2.52[11]	20.290	9.63[10]	2.52[10]	558.84	2.17[10]	1.49[-14]
$2s^22p8h$	$(^1S)\ ^3I_6$	$2s2p^28h$	$(^3P)\ ^3G_5^a$	7.60[10]	8.16[10]	20.290	8.43[10]	4.04[10]	558.84	3.44[10]	2.36[-14]
$2s^22p8h$	$(^1S)\ ^3I_6$	$2s2p^28h$	$(^3P)\ ^3I_7^a$	2.32[11]	2.69[11]	20.321	1.11[11]	1.87[10]	558.06	1.57[10]	1.08[-14]
$2s^22p8k$	$(^1S)\ ^3L_8$	$2s2p^28k$	$(^1D)\ ^3M_9$	2.75[10]	2.89[10]	13.985	1.68[10]	1.08[10]	780.74	1.00[10]	1.29[-14]
$2s^22p8f$	$(^1S)\ ^3F_4$	$2s2p^28f$	$(^3P)\ ^3G_4^a$	1.08[13]	1.73[13]	20.305	6.77[10]	2.07[10]	559.18	1.29[10]	8.89[-15]
$2s^22p8f$	$(^1S)\ ^3F_3$	$2s2p^28f$	$(^3P)\ ^3G_4^a$	1.08[13]	1.73[13]	20.305	6.77[10]	2.13[10]	559.25	1.33[10]	9.14[-15]
$2s^22p8f$	$(^1S)\ ^3G_5$	$2s2p^28f$	$(^1D)\ ^3H_6$	1.03[13]	1.05[13]	13.976	1.31[10]	1.07[10]	782.71	1.05[10]	1.36[-14]
$2s^22p8f$	$(^1S)\ ^3G_5$	$2s2p^28f$	$(^3P)\ ^3F_4^a$	7.46[12]	2.01[13]	20.274	6.85[10]	3.04[10]	560.04	1.12[10]	7.75[-15]
$2s^22p8f$	$(^1S)\ ^3G_5$	$2s2p^28f$	$(^3P)\ ^3G_5^a$	1.20[13]	1.51[13]	20.321	8.22[10]	4.85[10]	558.85	3.85[10]	2.64[-14]
$2s^22p8f$	$(^1S)\ ^1G_4$	$2s2p^28f$	$(^3P)\ ^1G_4$	1.23[13]	1.54[13]	20.321	6.76[10]	3.63[10]	558.94	2.89[10]	1.98[-14]
$2s^22p8h$	$(^1S)\ ^1H_5$	$2s2p^28h$	$(^3P)\ ^1I_6$	2.32[11]	2.69[11]	20.321	9.58[10]	2.24[10]	559.24	1.88[10]	1.29[-14]
$2s^22p8h$	$(^1S)\ ^1H_5$	$2s2p^28h$	$(^3P)\ ^3H_4^a$	7.59[10]	8.15[10]	20.322	6.90[10]	3.27[10]	559.20	2.78[10]	1.91[-14]
$2s^22p8h$	$(^1S)\ ^1H_5$	$2s2p^28h$	$(^3P)\ ^1H_5$	2.08[11]	2.21[11]	20.322	8.27[10]	1.11[10]	559.19	1.01[10]	6.94[-15]
$2s^22p8h$	$(^1S)\ ^3H_6$	$2s2p^28h$	$(^3P)\ ^3I_7^a$	2.32[11]	2.69[11]	20.321	1.11[11]	2.62[10]	559.24	2.20[10]	1.51[-14]
$2s^22p8h$	$(^1S)\ ^3H_6$	$2s2p^28h$	$(^3P)\ ^3G_5^a$	7.60[10]	8.16[10]	20.322	8.43[10]	3.94[10]	559.20	3.35[10]	2.30[-14]
$2s^22p8h$	$(^1S)\ ^3H_6$	$2s2p^28h$	$(^3P)\ ^3H_6^a$	2.08[11]	2.21[11]	20.322	9.77[10]	1.31[10]	559.19	1.20[10]	8.22[-15]
$2s^22p8h$	$(^1S)\ ^3G_5$	$2s2p^28h$	$(^3P)\ ^3H_6^a$	2.08[11]	2.21[11]	20.322	9.77[10]	3.64[10]	559.20	3.32[10]	2.28[-14]
$2s^22p8h$	$(^1S)\ ^1G_4$	$2s2p^28h$	$(^3P)\ ^1H_5$	2.08[11]	2.21[11]	20.322	8.27[10]	3.03[10]	559.20	2.76[10]	1.89[-14]
$2s^22p8h$	$(^1S)\ ^1I_6$	$2s2p^28h$	$(^1D)\ ^1K_7$	1.68[12]	1.74[12]	13.985	1.36[10]	1.26[10]	783.07	1.21[10]	1.57[-14]
$2s^22p8h$	$(^1S)\ ^1I_6$	$2s2p^28h$	$(^3P)\ ^3I_5^a$	2.23[11]	2.52[11]	20.290	8.15[10]	1.57[10]	560.06	1.35[10]	9.29[-15]
$2s^22p8h$	$(^1S)\ ^1I_6$	$2s2p^28h$	$(^3P)\ ^1I_6$	2.32[11]	2.69[11]	20.321	9.58[10]	5.55[10]	559.27	4.66[10]	3.20[-14]
$2s^22p8h$	$(^1S)\ ^1I_6$	$2s2p^28h$	$(^3P)\ ^1H_5$	2.08[11]	2.21[11]	20.322	8.27[10]	2.73[10]	559.23	2.49[10]	1.71[-14]
$2s^22p8h$	$(^1S)\ ^3I_7$	$2s2p^28h$	$(^1D)\ ^3K_8$	1.68[12]	1.74[12]	13.985	1.54[10]	1.44[10]	783.07	1.39[10]	1.79[-14]
$2s^22p8h$	$(^1S)\ ^3I_7$	$2s2p^28h$	$(^3P)\ ^3I_6^a$	2.23[11]	2.52[11]	20.290	9.63[10]	1.83[10]	560.06	1.58[10]	1.09[-14]
$2s^22p8h$	$(^1S)\ ^3I_7$	$2s2p^28h$	$(^3P)\ ^3I_7^a$	2.32[11]	2.69[11]	20.321	1.11[11]	6.41[10]	559.27	5.39[10]	3.70[-14]
$2s^22p8h$	$(^1S)\ ^3I_7$	$2s2p^28h$	$(^3P)\ ^3H_6^a$	2.08[11]	2.21[11]	20.322	9.77[10]	3.19[10]	559.23	2.91[10]	1.99[-14]
$2s^22p8k$	$(^1S)\ ^3L_9$	$2s2p^28k$	$(^1D)\ ^3M_{10}$	2.76[10]	2.90[10]	13.985	1.84[10]	1.78[10]	783.09	1.64[10]	2.13[-14]
$2s^22p8k$	$(^1S)\ ^1L_8$	$2s2p^28k$	$(^1D)\ ^1M_9$	2.76[10]	2.90[10]	13.985	1.67[10]	1.60[10]	783.09	1.48[10]	1.91[-14]
$2s^22p8h$	$(^1S)\ ^3G_3$	$2s2p^28h$	$(^3P)\ ^3H_4^a$	7.59[10]	8.15[10]	20.322	6.90[10]	2.33[10]	559.25	1.98[10]	1.36[-14]
$2s^22p8h$	$(^1S)\ ^3G_4$	$2s2p^28h$	$(^3P)\ ^3G_5^a$	7.60[10]	8.16[10]	20.322	8.43[10]	2.93[10]	559.25	2.49[10]	1.71[-14]

Table VII: Autoinization rates (A_a in s^{-1}) and excitation energies (E_S in eV) for even-parity states. Wavelengths (λ in Å), weighted radiative rates (gA_r in s^{-1}), factor intensities (Q_d in s^{-1}) and effective emission rate coefficients ($C_S^{\rm eff}$ in cm^3/s) for transitions between odd- and even-parity states of C-like oxygen.

Low level		Upper level		A_a	ΣA_a	E_S	ΣgA_r	gA_r	λ	Q_d	$C_S^{\rm eff}$
Conf.	*LSJ*	Conf.	*LSJ*	s^{-1}	s^{-1}	eV	s^{-1}	s^{-1}	Å	s^{-1}	cm^3/s
$2s2p^3$	$(^2D)\,^3D_2$	$2s2p^24d$	$(^3P)\,^3F_3^b$	7.19[13]	7.19[13]	1.323	1.34[11]	1.16[11]	302.10	1.16[11]	5.31[-13]
$2s2p^3$	$(^2D)\,^3D_3$	$2s2p^24d$	$(^3P)\,^3F_4^b$	7.33[13]	7.33[13]	1.331	1.75[11]	1.67[11]	302.04	1.67[11]	7.64[-13]
$2s2p^3$	$(^2D)\,^1D_2$	$2s2p^24d$	$(^1D)\,^1F_3$	1.76[14]	1.76[14]	8.200	1.70[11]	1.37[11]	311.09	1.37[11]	3.16[-13]
$2s2p^3$	$(^4S)\,^3S_1$	$2s2p^23d$	$(^3P)\,^3P_2^a$	3.74[13]	3.74[13]	7.736	1.52[11]	1.13[11]	321.32	1.12[11]	2.71[-13]
$2s2p^3$	$(^4S)\,^5S_2$	$2s2p^24d$	$(^3P)\,^5P_2$	2.97[09]	2.97[09]	0.811	5.24[10]	5.03[10]	258.65	1.11[10]	5.36[-14]
$2s2p^3$	$(^4S)\,^5S_2$	$2s2p^25d$	$(^3P)\,^5P_2$	4.09[09]	4.09[09]	3.763	2.59[10]	2.42[10]	243.64	1.07[10]	3.83[-14]
$2s2p^3$	$(^4S)\,^5S_2$	$2s2p^26d$	$(^3P)\,^5P_3$	2.21[11]	2.21[11]	5.338	1.58[10]	1.41[10]	236.33	1.40[10]	4.29[-14]
$2s2p^3$	$(^4S)\,^5S_2$	$2s2p^26d$	$(^3P)\,^5P_2$	3.59[10]	3.59[10]	5.346	1.37[10]	1.24[10]	236.30	1.15[10]	3.52[-14]
$2s2p^3$	$(^2D)\,^3D_1$	$2s2p^24d$	$(^3P)\,^3D_1^b$	1.78[13]	1.78[13]	1.139	3.79[10]	2.66[10]	303.46	2.66[10]	1.24[-13]
$2s2p^3$	$(^2D)\,^3D_1$	$2s2p^24d$	$(^3P)\,^3D_2^b$	1.86[13]	1.86[13]	1.141	6.44[10]	1.11[10]	303.44	1.11[10]	5.18[-14]
$2s2p^3$	$(^2D)\,^3D_1$	$2s2p^23d$	$(^1D)\,^3D_1$	2.03[13]	2.03[13]	1.283	4.56[10]	1.06[10]	302.39	1.06[10]	4.89[-14]
$2s2p^3$	$(^2D)\,^3D_1$	$2s2p^24d$	$(^3P)\,^3F_2^b$	7.30[13]	7.30[13]	1.316	9.68[10]	7.99[10]	302.15	7.98[10]	3.66[-13]
$2s2p^3$	$(^2D)\,^3D_1$	$2s2p^25d$	$(^3P)\,^3F_2^b$	3.49[12]	3.49[12]	3.865	2.30[10]	1.86[10]	284.48	1.86[10]	6.62[-14]
$2s2p^3$	$(^2D)\,^3D_1$	$2s2p^23d$	$(^3P)\,^3F_2^a$	6.64[14]	6.64[14]	7.192	5.12[10]	1.01[10]	264.30	1.01[10]	2.58[-14]
$2s2p^3$	$(^2D)\,^3D_1$	$2s2p^24d$	$(^1D)\,^3F_2$	1.08[14]	1.08[14]	7.794	5.93[10]	4.28[10]	260.95	4.28[10]	1.03[-13]
$2s2p^3$	$(^2D)\,^3D_1$	$2s2p^24d$	$(^1D)\,^3D_1$	2.68[13]	2.68[13]	7.852	2.74[10]	1.20[10]	260.64	1.20[10]	2.86[-14]
$2s2p^3$	$(^2D)\,^3D_2$	$2s2p^24d$	$(^3P)\,^3D_2^b$	1.86[13]	1.86[13]	1.141	6.44[10]	4.00[10]	303.44	4.00[10]	1.87[-13]
$2s2p^3$	$(^2D)\,^3D_2$	$2s2p^24d$	$(^3P)\,^3D_3^b$	1.95[13]	1.95[13]	1.145	9.25[10]	1.27[10]	303.42	1.27[10]	5.94[-14]
$2s2p^3$	$(^2D)\,^3D_2$	$2s2p^23d$	$(^1D)\,^3D_2$	2.17[13]	2.17[13]	1.284	7.61[10]	2.12[10]	302.38	2.12[10]	9.74[-14]
$2s2p^3$	$(^2D)\,^3D_2$	$2s2p^24d$	$(^3P)\,^3F_2^b$	7.30[13]	7.30[13]	1.316	9.68[10]	1.08[10]	302.15	1.08[10]	4.96[-14]
$2s2p^3$	$(^2D)\,^3D_2$	$2s2p^25d$	$(^3P)\,^3F_3^b$	3.48[12]	3.48[12]	3.878	3.21[10]	2.76[10]	284.39	2.75[10]	9.78[-14]
$2s2p^3$	$(^2D)\,^3D_2$	$2s2p^26d$	$(^3P)\,^3F_3^b$	2.43[12]	2.43[12]	5.400	1.82[10]	1.42[10]	274.80	1.41[10]	4.31[-14]
$2s2p^3$	$(^2D)\,^3D_2$	$2s2p^28d$	$(^3P)\,^3F_3^b$	8.53[10]	8.53[10]	6.908	1.40[10]	1.06[10]	265.91	1.03[10]	2.71[-14]
$2s2p^3$	$(^2D)\,^3D_2$	$2s2p^23d$	$(^3P)\,^3F_3^a$	6.62[14]	6.62[14]	7.202	7.14[10]	1.47[10]	264.24	1.47[10]	3.75[-14]
$2s2p^3$	$(^2D)\,^3D_2$	$2s2p^24d$	$(^1D)\,^3F_3$	1.10[14]	1.10[14]	7.794	8.10[10]	6.16[10]	260.95	6.16[10]	1.48[-13]
$2s2p^3$	$(^2D)\,^3D_2$	$2s2p^24d$	$(^1D)\,^3D_2$	2.69[13]	2.69[13]	7.852	4.56[10]	1.83[10]	260.63	1.83[10]	4.37[-14]
$2s2p^3$	$(^2D)\,^3D_2$	$2s2p^24d$	$(^3P)\,^3F_3^a$	1.09[14]	1.23[14]	13.915	5.99[10]	1.58[10]	231.17	1.40[10]	1.82[-14]
$2s2p^3$	$(^2D)\,^3D_3$	$2s2p^23d$	$(^1D)\,^3F_4$	4.92[13]	4.92[13]	0.676	1.99[10]	1.32[10]	306.94	1.32[10]	6.47[-14]
$2s2p^3$	$(^2D)\,^3D_3$	$2s2p^24d$	$(^3P)\,^3D_2^b$	1.86[13]	1.86[13]	1.141	6.44[10]	1.03[10]	303.44	1.03[10]	4.80[-14]
$2s2p^3$	$(^2D)\,^3D_3$	$2s2p^24d$	$(^3P)\,^3D_3^b$	1.95[13]	1.95[13]	1.145	9.25[10]	7.53[10]	303.42	7.53[10]	3.51[-13]
$2s2p^3$	$(^2D)\,^3D_3$	$2s2p^23d$	$(^1D)\,^3D_3$	2.18[13]	2.18[13]	1.287	1.04[11]	3.25[10]	302.36	3.25[10]	1.50[-13]
$2s2p^3$	$(^2D)\,^3D_3$	$2s2p^23d$	$(^1D)\,^3P_2$	4.23[13]	4.23[13]	1.766	7.52[10]	1.74[10]	298.87	1.74[10]	7.63[-14]
$2s2p^3$	$(^2D)\,^3D_3$	$2s2p^25d$	$(^3P)\,^3F_4^b$	3.57[12]	3.57[12]	3.897	4.16[10]	3.87[10]	284.27	3.87[10]	1.37[-13]
$2s2p^3$	$(^2D)\,^3D_3$	$2s2p^26d$	$(^3P)\,^3F_4^b$	9.56[11]	9.56[11]	5.418	2.30[10]	2.08[10]	274.69	2.08[10]	6.33[-14]
$2s2p^3$	$(^2D)\,^3D_3$	$2s2p^27d$	$(^3P)\,^3F_4^b$	1.67[11]	1.67[11]	6.335	1.53[10]	1.35[10]	269.22	1.33[10]	3.70[-14]
$2s2p^3$	$(^2D)\,^3D_3$	$2s2p^28d$	$(^3P)\,^3F_4^b$	3.45[10]	3.45[10]	6.928	1.68[10]	1.41[10]	265.80	1.33[10]	3.49[-14]
$2s2p^3$	$(^2D)\,^3D_3$	$2s2p^23d$	$(^3P)\,^3F_4^a$	6.60[14]	6.60[14]	7.216	9.12[10]	2.04[10]	264.17	2.04[10]	5.19[-14]
$2s2p^3$	$(^2D)\,^3D_3$	$2s2p^23d$	$(^3P)\,^3D_3^a$	5.83[14]	5.83[14]	7.597	8.79[10]	1.08[10]	262.04	1.07[10]	2.63[-14]
$2s2p^3$	$(^2D)\,^3D_3$	$2s2p^24d$	$(^1D)\,^3F_4$	1.12[14]	1.12[14]	7.794	1.05[11]	9.02[10]	260.95	9.02[10]	2.16[-13]
$2s2p^3$	$(^2D)\,^3D_3$	$2s2p^24d$	$(^1D)\,^3D_3$	2.70[13]	2.70[13]	7.852	6.37[10]	3.22[10]	260.63	3.22[10]	7.68[-14]
$2s2p^3$	$(^2D)\,^3D_3$	$2s2p^28d$	$(^1D)\,^3F_4$	2.56[13]	2.92[13]	13.922	3.65[10]	1.83[10]	231.14	1.60[10]	2.08[-14]
$2s2p^3$	$(^2P)\,^3P_0$	$2s2p^23d$	$(^1D)\,^3D_1$	2.03[13]	2.03[13]	1.283	4.56[10]	1.64[10]	321.12	1.63[10]	7.52[-14]
$2s2p^3$	$(^2P)\,^3P_0$	$2s2p^23d$	$(^1S)\,^3D_1$	1.37[14]	1.37[14]	5.061	3.38[10]	1.26[10]	292.49	1.26[10]	3.98[-14]
$2s2p^3$	$(^2P)\,^3P_1$	$2s2p^23d$	$(^1D)\,^3D_1$	2.03[13]	2.03[13]	1.283	4.56[10]	1.22[10]	321.12	1.22[10]	5.62[-14]
$2s2p^3$	$(^2P)\,^3P_1$	$2s2p^23d$	$(^1D)\,^3D_2$	2.17[13]	2.17[13]	1.284	7.61[10]	3.57[10]	321.11	3.57[10]	1.64[-13]
$2s2p^3$	$(^2P)\,^3P_1$	$2s2p^23d$	$(^1D)\,^3P_2$	4.23[13]	4.23[13]	1.766	7.52[10]	1.15[10]	317.15	1.14[10]	5.02[-14]
$2s2p^3$	$(^2P)\,^3P_1$	$2s2p^23d$	$(^1D)\,^3S_1$	8.55[13]	8.55[13]	1.992	3.53[10]	1.07[10]	315.33	1.07[10]	4.59[-14]
$2s2p^3$	$(^2P)\,^3P_1$	$2s2p^23d$	$(^1S)\,^3D_2$	1.39[14]	1.39[14]	5.062	5.65[10]	2.85[10]	292.49	2.84[10]	8.98[-14]
$2s2p^3$	$(^2P)\,^3P_1$	$2s2p^26d$	$(^3P)\,^3D_2^b$	4.57[13]	4.57[13]	5.519	2.76[10]	1.55[10]	289.37	1.55[10]	4.66[-14]
$2s2p^3$	$(^2P)\,^3P_1$	$2s2p^23d$	$(^3P)\,^3D_2^a$	5.85[14]	5.85[14]	7.592	6.40[10]	1.08[10]	276.02	1.08[10]	2.64[-14]
$2s2p^3$	$(^2P)\,^3P_2$	$2s2p^23d$	$(^1D)\,^3D_2$	2.17[13]	2.17[13]	1.284	7.61[10]	1.18[10]	321.11	1.18[10]	5.44[-14]

$2s2p^3$	$(^2P)\ ^3P_2$	$2s2p^23d$	$(^1D)\ ^3D_3$	2.18[13]	2.18[13]	1.287	1.04[11]	6.64[10]	321.08	6.63[10]	3.05[-13]

Low level		Upper level		A_a	ΣA_a	E_S	ΣgA_r	gA_r	λ	Q_d	C_S^{eff}
Conf.	LSJ	Conf.	LSJ	s^{-1}	s^{-1}	eV	s^{-1}	s^{-1}	Å	s^{-1}	cm^3/s
$2s2p^3$	$(^2P)\ ^3P_2$	$2s2p^23d$	$(^1D)\ ^3P_1$	4.27[13]	4.27[13]	1.766	4.53[10]	1.16[10]	317.16	1.16[10]	5.08[-14]
$2s2p^3$	$(^2P)\ ^3P_2$	$2s2p^23d$	$(^1D)\ ^3P_2$	4.23[13]	4.23[13]	1.766	7.52[10]	3.53[10]	317.15	3.53[10]	1.55[-13]
$2s2p^3$	$(^2P)\ ^3P_2$	$2s2p^23d$	$(^1D)\ ^3S_1$	8.55[13]	8.55[13]	1.992	3.53[10]	1.78[10]	315.33	1.78[10]	7.64[-14]
$2s2p^3$	$(^2P)\ ^3P_2$	$2s2p^25d$	$(^3P)\ ^3D_3^b$	1.01[12]	1.01[12]	3.959	2.06[10]	1.11[10]	300.31	1.11[10]	3.91[-14]
$2s2p^3$	$(^2P)\ ^3P_2$	$2s2p^23d$	$(^1S)\ ^3D_3$	1.42[14]	1.42[14]	5.062	7.96[10]	5.40[10]	292.49	5.40[10]	1.70[-13]
$2s2p^3$	$(^2P)\ ^3P_2$	$2s2p^26d$	$(^3P)\ ^3D_3^b$	4.54[13]	4.54[13]	5.524	3.87[10]	3.07[10]	289.33	3.06[10]	9.23[-14]
$2s2p^3$	$(^2P)\ ^3P_2$	$2s2p^27d$	$(^3P)\ ^3D_3^b$	2.30[12]	2.30[12]	6.382	1.99[10]	1.37[10]	283.66	1.37[10]	3.78[-14]
$2s2p^3$	$(^2P)\ ^3P_2$	$2s2p^28d$	$(^3P)\ ^3D_3^b$	1.01[12]	1.01[12]	6.968	2.94[10]	1.86[10]	279.91	1.85[10]	4.82[-14]
$2s2p^3$	$(^2P)\ ^3P_2$	$2s2p^23d$	$(^3P)\ ^3D_3^a$	5.83[14]	5.83[14]	7.597	8.79[10]	1.89[10]	275.99	1.89[10]	4.63[-14]
$2s2p^3$	$(^2P)\ ^3P_2$	$2s2p^24d$	$(^1D)\ ^3D_3$	2.70[13]	2.70[13]	7.852	6.37[10]	1.73[10]	274.43	1.72[10]	4.12[-14]
$2s2p^3$	$(^2P)\ ^3P_2$	$2s2p^24d$	$(^1D)\ ^3S_1$	2.31[13]	2.31[13]	8.024	2.43[10]	1.12[10]	273.39	1.12[10]	2.62[-14]
$2s2p^3$	$(^2P)\ ^3P_2$	$2s2p^24d$	$(^1D)\ ^3P_2$	4.93[13]	4.93[13]	8.033	5.13[10]	2.01[10]	273.33	2.01[10]	4.71[-14]
$2s2p^3$	$(^2P)\ ^3P_2$	$2s2p^26s$	$(^1D)\ ^3D_3$	3.36[13]	5.92[13]	11.670	3.78[10]	1.87[10]	253.05	1.06[10]	1.73[-14]
$2s2p^3$	$(^2D)\ ^1D_2$	$2s2p^23s$	$(^3P)\ ^1P_1$	3.49[14]	3.49[14]	0.911	5.89[10]	2.07[10]	380.73	2.07[10]	9.90[-14]
$2s2p^3$	$(^2D)\ ^1D_2$	$2s2p^23d$	$(^1D)\ ^1F_3$	1.38[14]	1.38[14]	1.298	6.14[10]	5.36[10]	376.26	5.36[10]	2.46[-13]
$2s2p^3$	$(^2D)\ ^1D_2$	$2s2p^23d$	$(^1D)\ ^1P_1$	6.31[13]	6.31[13]	1.973	2.66[10]	1.13[10]	368.70	1.13[10]	4.87[-14]
$2s2p^3$	$(^2D)\ ^1D_2$	$2s2p^23d$	$(^1D)\ ^1D_2$	3.02[13]	3.02[13]	2.082	8.35[10]	5.72[10]	367.52	5.72[10]	2.43[-13]
$2s2p^3$	$(^2D)\ ^1D_2$	$2s2p^23d$	$(^3P)\ ^1F_3$	5.98[14]	5.98[14]	7.488	7.06[10]	3.32[10]	316.76	3.32[10]	8.23[-14]
$2s2p^3$	$(^2D)\ ^1D_2$	$2s2p^24d$	$(^1D)\ ^1D_2$	3.30[13]	3.30[13]	8.175	4.70[10]	3.72[10]	311.29	3.72[10]	8.60[-14]
$2s2p^3$	$(^2D)\ ^1D_2$	$2s2p^23d$	$(^3P)\ ^1D_2$	5.13[14]	5.13[14]	8.375	1.33[11]	1.44[10]	309.73	1.44[10]	3.27[-14]
$2s2p^3$	$(^2D)\ ^1D_2$	$2s2p^24d$	$(^3P)\ ^1F_3$	8.88[13]	1.45[14]	14.132	1.48[11]	1.04[11]	270.79	6.41[10]	8.16[-14]
$2s2p^3$	$(^2D)\ ^1D_2$	$2s2p^25d$	$(^3P)\ ^1F_3$	1.26[14]	2.30[14]	17.211	8.93[10]	3.55[10]	253.73	1.94[10]	1.82[-14]
$2s2p^3$	$(^2D)\ ^1D_2$	$2s2p^26d$	$(^3P)\ ^1F_3$	7.79[13]	1.34[14]	18.755	7.50[10]	2.17[10]	245.96	1.26[10]	1.01[-14]
$2s2p^3$	$(^4S)\ ^3S_1$	$2s2p^23s$	$(^3P)\ ^3P_2^a$	3.79[13]	3.79[13]	0.390	6.44[10]	1.30[10]	396.88	1.30[10]	6.54[-14]
$2s2p^3$	$(^4S)\ ^3S_1$	$2s2p^23d$	$(^3P)\ ^3P_1^a$	3.48[13]	3.48[13]	7.745	9.15[10]	6.76[10]	321.25	6.75[10]	1.63[-13]
$2s2p^3$	$(^4S)\ ^3S_1$	$2s2p^23d$	$(^3P)\ ^3P_0^a$	3.31[13]	3.31[13]	7.750	3.05[10]	2.26[10]	321.21	2.25[10]	5.44[-14]
$2s2p^3$	$(^4S)\ ^3S_1$	$2s2p^24d$	$(^3P)\ ^3P_2^a$	5.34[13]	1.23[14]	14.250	7.43[10]	3.39[10]	274.91	1.47[10]	1.85[-14]
$2s2p^3$	$(^4S)\ ^3S_1$	$2s2p^24d$	$(^3P)\ ^3P_1^a$	7.95[13]	1.25[14]	14.268	3.05[10]	1.66[10]	274.80	1.05[10]	1.32[-14]
$2s2p^3$	$(^2P)\ ^1P_1$	$2s2p^23s$	$(^3P)\ ^1P_1$	3.49[14]	3.49[14]	0.911	5.89[10]	1.81[10]	411.92	1.81[10]	8.65[-14]
$2s2p^3$	$(^2P)\ ^1P_1$	$2s2p^23d$	$(^1D)\ ^1P_1$	6.31[13]	6.31[13]	1.973	2.66[10]	1.14[10]	397.88	1.14[10]	4.91[-14]
$2s2p^3$	$(^2P)\ ^1P_1$	$2s2p^23d$	$(^1D)\ ^1D_2$	3.02[13]	3.02[13]	2.082	8.35[10]	1.76[10]	396.50	1.76[10]	7.49[-14]
$2s2p^3$	$(^2P)\ ^1P_1$	$2s2p^23d$	$(^1S)\ ^1D_2$	1.96[14]	1.96[14]	5.462	4.19[10]	2.48[10]	357.82	2.48[10]	7.52[-14]
$2s2p^3$	$(^2P)\ ^1P_1$	$2s2p^23d$	$(^3P)\ ^1P_1$	7.41[13]	7.41[13]	7.229	5.34[10]	2.61[10]	340.45	2.60[10]	6.62[-14]
$2s2p^3$	$(^2P)\ ^1P_1$	$2s2p^24d$	$(^1D)\ ^1P_1$	1.34[13]	1.34[13]	8.192	2.60[10]	1.66[10]	331.69	1.66[10]	3.84[-14]
$2s2p^3$	$(^2P)\ ^1P_1$	$2s2p^23d$	$(^3P)\ ^1D_2$	5.13[14]	5.13[14]	8.375	1.33[11]	7.49[10]	330.07	7.49[10]	1.70[-13]
$2s2p^3$	$(^2P)\ ^1P_1$	$2s2p^24d$	$(^3P)\ ^1D_2$	2.33[14]	4.25[14]	14.458	7.35[10]	2.47[10]	284.07	1.35[10]	1.67[-14]
$2s^22p3s$	$(^1S)\ ^3P_2$	$2s2p^23s$	$(^3P)\ ^3P_2^a$	3.79[13]	3.79[13]	0.390	6.44[10]	2.67[10]	553.80	2.67[10]	1.34[-13]
$2s^22p3s$	$(^1S)\ ^1P_1$	$2s2p^23s$	$(^3P)\ ^1P_1$	3.49[14]	3.49[14]	0.911	5.89[10]	1.98[10]	556.06	1.98[10]	9.46[-14]
$2s^22p3d$	$(^1S)\ ^3F_2$	$2s2p^23d$	$(^3P)\ ^3F_2^a$	6.64[14]	6.64[14]	7.192	5.12[10]	1.59[10]	562.99	1.58[10]	4.04[-14]
$2s^22p3d$	$(^1S)\ ^3F_3$	$2s2p^23d$	$(^3P)\ ^3F_3^a$	6.62[14]	6.62[14]	7.202	7.14[10]	2.81[10]	563.36	2.80[10]	7.14[-14]
$2s^22p3d$	$(^1S)\ ^3F_3$	$2s2p^23d$	$(^3P)\ ^3D_2^a$	5.85[14]	5.85[14]	7.592	6.40[10]	1.52[10]	553.56	1.52[10]	3.72[-14]
$2s^22p3d$	$(^1S)\ ^1D_2$	$2s2p^23d$	$(^3P)\ ^1P_1$	7.41[13]	7.41[13]	7.229	5.34[10]	1.10[10]	562.91	1.10[10]	2.80[-14]
$2s^22p3d$	$(^1S)\ ^3F_4$	$2s2p^23d$	$(^1D)\ ^3G_5$	4.33[14]	4.33[14]	1.214	1.56[10]	1.30[10]	775.01	1.30[10]	6.01[-14]
$2s^22p3d$	$(^1S)\ ^3F_4$	$2s2p^23d$	$(^3P)\ ^3F_4^a$	6.60[14]	6.60[14]	7.216	9.12[10]	4.22[10]	563.57	4.22[10]	1.07[-13]
$2s^22p3d$	$(^1S)\ ^3F_4$	$2s2p^23d$	$(^3P)\ ^3D_3^a$	5.83[14]	5.83[14]	7.597	8.79[10]	2.16[10]	553.99	2.16[10]	5.30[-14]
$2s^22p3d$	$(^1S)\ ^3D_1$	$2s2p^23d$	$(^3P)\ ^3F_2^a$	6.64[14]	6.64[14]	7.192	5.12[10]	1.07[10]	570.50	1.07[10]	2.72[-14]
$2s^22p3d$	$(^1S)\ ^3D_2$	$2s2p^23d$	$(^3P)\ ^3F_3^a$	6.62[14]	6.62[14]	7.202	7.14[10]	1.51[10]	570.41	1.51[10]	3.86[-14]
$2s^22p3d$	$(^1S)\ ^3D_2$	$2s2p^23d$	$(^3P)\ ^3P_1^a$	3.48[13]	3.48[13]	7.745	9.15[10]	1.12[10]	556.50	1.12[10]	2.70[-14]
$2s^22p3d$	$(^1S)\ ^3D_3$	$2s2p^23d$	$(^3P)\ ^3F_4^a$	6.60[14]	6.60[14]	7.216	9.12[10]	2.18[10]	570.28	2.18[10]	5.54[-14]
$2s^22p3d$	$(^1S)\ ^3D_3$	$2s2p^23d$	$(^3P)\ ^3P_2^a$	3.74[13]	3.74[13]	7.736	1.52[11]	2.25[10]	556.96	2.25[10]	5.43[-14]
$2s^22p3d$	$(^1S)\ ^3P_2$	$2s2p^23d$	$(^3P)\ ^3D_3^a$	5.83[14]	5.83[14]	7.597	8.79[10]	2.45[10]	566.46	2.44[10]	5.99[-14]
$2s^22p3d$	$(^1S)\ ^3P_1$	$2s2p^23d$	$(^3P)\ ^3D_2^a$	5.85[14]	5.85[14]	7.592	6.40[10]	1.24[10]	566.95	1.24[10]	3.03[-14]

$2s^22p3d$	$(^1S)\ ^1F_3$	$2s2p^23d$	$(^3P)\ ^1F_3$	5.98[14]	5.98[14]	7.488	7.06[10]	2.10[10]	578.63	2.10[10]	5.19[-14]
$2s^22p3d$	$(^1S)\ ^1F_3$	$2s2p^24d$	$(^1D)\ ^1F_3$	1.76[14]	1.76[14]	8.200	1.70[11]	1.61[10]	560.00	1.61[10]	3.72[-14]

Low level		Upper level		A_a	ΣA_a	E_S	ΣgA_r	gA_r	λ	Q_d	$C_S^{\rm eff}$
Conf.	LSJ	Conf.	LSJ	s^{-1}	s^{-1}	eV	s^{-1}	s^{-1}	Å	s^{-1}	cm^3/s
$2s^22p3d$	$(^1S)\ ^1F_3$	$2s2p^23d$	$(^3P)\ ^1D_2$	5.13[14]	5.13[14]	8.375	1.33[11]	2.08[10]	555.61	2.08[10]	4.71[-14]
$2s^22p3d$	$(^1S)\ ^1P_1$	$2s2p^23d$	$(^3P)\ ^1D_2$	5.13[14]	5.13[14]	8.375	1.33[11]	1.75[10]	557.50	1.75[10]	3.97[-14]
$2s^22p4s$	$(^1S)\ ^3P_2$	$2s2p^24s$	$(^3P)\ ^3P_2^a$	4.71[13]	8.12[13]	11.554	4.68[10]	2.79[10]	558.12	1.62[10]	2.67[-14]
$2s^22p4s$	$(^1S)\ ^1P_1$	$2s2p^24s$	$(^3P)\ ^1P_1$	2.66[14]	2.86[14]	11.679	3.86[10]	2.27[10]	559.54	2.11[10]	3.43[-14]
$2s^22p4d$	$(^1S)\ ^3F_3$	$2s2p^24d$	$(^3P)\ ^3F_3^a$	1.09[14]	1.23[14]	13.915	5.99[10]	1.75[10]	563.21	1.54[10]	2.01[-14]
$2s^22p4d$	$(^1S)\ ^3F_4$	$2s2p^24d$	$(^3P)\ ^3F_4^a$	9.30[13]	1.24[14]	13.930	6.43[10]	3.01[10]	563.41	2.25[10]	2.92[-14]
$2s^22p4d$	$(^1S)\ ^3F_4$	$2s2p^24d$	$(^3P)\ ^3D_3^a$	8.71[13]	1.05[14]	14.088	5.43[10]	1.37[10]	559.41	1.14[10]	1.45[-14]
$2s^22p4d$	$(^1S)\ ^1F_3$	$2s2p^24d$	$(^3P)\ ^1F_3$	8.88[13]	1.45[14]	14.132	1.48[11]	2.16[10]	567.38	1.32[10]	1.69[-14]
$2s^22p5s$	$(^1S)\ ^1P_1$	$2s2p^25s$	$(^3P)\ ^1P_1$	1.66[14]	1.76[14]	15.948	2.94[10]	2.10[10]	559.18	1.98[10]	2.11[-14]
$2s^22p5d$	$(^1S)\ ^3F_2$	$2s2p^25d$	$(^3P)\ ^3F_2^a$	9.15[13]	1.11[14]	17.057	4.04[10]	1.46[10]	558.92	1.20[10]	1.14[-14]
$2s^22p5d$	$(^1S)\ ^3F_3$	$2s2p^25d$	$(^3P)\ ^3F_3^a$	9.17[13]	1.12[14]	17.066	5.72[10]	2.18[10]	559.21	1.79[10]	1.70[-14]
$2s^22p5d$	$(^1S)\ ^3F_3$	$2s2p^25d$	$(^3P)\ ^3D_2^a$	8.91[13]	9.58[13]	17.103	4.51[10]	1.49[10]	558.27	1.39[10]	1.31[-14]
$2s^22p5d$	$(^1S)\ ^3F_4$	$2s2p^25d$	$(^3P)\ ^3F_4^a$	9.12[13]	1.11[14]	17.083	7.30[10]	4.18[10]	559.42	3.42[10]	3.24[-14]
$2s^22p5d$	$(^1S)\ ^3F_4$	$2s2p^25d$	$(^3P)\ ^3D_3^a$	9.18[13]	9.70[13]	17.112	6.17[10]	1.89[10]	558.70	1.79[10]	1.69[-14]
$2s^22p5d$	$(^1S)\ ^3D_3$	$2s2p^25d$	$(^3P)\ ^3F_4^a$	9.12[13]	1.11[14]	17.083	7.30[10]	1.74[10]	561.02	1.43[10]	1.35[-14]
$2s^22p5d$	$(^1S)\ ^3P_2$	$2s2p^25d$	$(^3P)\ ^3D_3^a$	9.18[13]	9.70[13]	17.112	6.17[10]	1.64[10]	560.89	1.55[10]	1.46[-14]
$2s^22p5d$	$(^1S)\ ^1F_3$	$2s2p^25d$	$(^3P)\ ^1F_3$	1.26[14]	2.30[14]	17.211	8.93[10]	3.42[10]	560.62	1.87[10]	1.75[-14]
$2s^22p5g$	$(^1S)\ ^3G_4$	$2s2p^25g$	$(^3P)\ ^3H_5^a$	1.68[13]	1.72[13]	17.291	8.55[10]	3.02[10]	558.91	2.94[10]	2.73[-14]
$2s^22p5g$	$(^1S)\ ^3G_4$	$2s2p^25g$	$(^3P)\ ^3F_4^a$	2.65[12]	2.75[12]	17.292	7.09[10]	1.07[10]	558.89	1.03[10]	9.58[-15]
$2s^22p5g$	$(^1S)\ ^3G_3$	$2s2p^25g$	$(^3P)\ ^3H_4^a$	1.68[13]	1.72[13]	17.291	6.99[10]	2.40[10]	558.91	2.33[10]	2.17[-14]
$2s^22p5g$	$(^1S)\ ^3H_4$	$2s2p^25g$	$(^3P)\ ^3H_4^a$	1.68[13]	1.72[13]	17.291	6.99[10]	1.60[10]	558.95	1.56[10]	1.44[-14]
$2s^22p5g$	$(^1S)\ ^3H_4$	$2s2p^25g$	$(^3P)\ ^1F_3$	2.69[12]	2.79[12]	17.292	5.28[10]	2.56[10]	558.92	2.46[10]	2.28[-14]
$2s^22p5g$	$(^1S)\ ^3H_4$	$2s2p^25g$	$(^3P)\ ^1H_5$	1.75[13]	1.79[13]	17.319	8.56[10]	1.85[10]	558.23	1.80[10]	1.67[-14]
$2s^22p5g$	$(^1S)\ ^3H_5$	$2s2p^25g$	$(^3P)\ ^3H_5^a$	1.68[13]	1.72[13]	17.291	8.55[10]	1.97[10]	558.95	1.92[10]	1.78[-14]
$2s^22p5g$	$(^1S)\ ^3H_5$	$2s2p^25g$	$(^3P)\ ^3F_4^a$	2.65[12]	2.75[12]	17.292	7.09[10]	3.21[10]	558.92	3.08[10]	2.86[-14]
$2s^22p5g$	$(^1S)\ ^3H_5$	$2s2p^25g$	$(^3P)\ ^3H_6^a$	1.75[13]	1.79[13]	17.319	1.01[11]	2.23[10]	558.23	2.17[10]	2.01[-14]
$2s^22p5g$	$(^1S)\ ^1G_4$	$2s2p^25g$	$(^3P)\ ^3H_4^a$	1.68[13]	1.72[13]	17.291	6.99[10]	1.49[10]	560.02	1.45[10]	1.34[-14]
$2s^22p5g$	$(^1S)\ ^1G_4$	$2s2p^25g$	$(^3P)\ ^1H_5$	1.75[13]	1.79[13]	17.319	8.56[10]	1.36[10]	559.30	1.32[10]	1.22[-14]
$2s^22p5g$	$(^1S)\ ^1G_4$	$2s2p^25g$	$(^3P)\ ^3G_3^a$	1.10[13]	1.11[13]	17.331	5.28[10]	2.26[10]	559.01	2.25[10]	2.08[-14]
$2s^22p5g$	$(^1S)\ ^3G_5$	$2s2p^25g$	$(^3P)\ ^3H_5^a$	1.68[13]	1.72[13]	17.291	8.55[10]	1.82[10]	560.02	1.77[10]	1.65[-14]
$2s^22p5g$	$(^1S)\ ^3G_5$	$2s2p^25g$	$(^3P)\ ^3H_6^a$	1.75[13]	1.79[13]	17.319	1.01[11]	1.63[10]	559.30	1.58[10]	1.47[-14]
$2s^22p5g$	$(^1S)\ ^3G_5$	$2s2p^25g$	$(^3P)\ ^3G_4^a$	1.10[13]	1.11[13]	17.331	7.05[10]	2.83[10]	559.00	2.81[10]	2.60[-14]
$2s^22p5g$	$(^1S)\ ^3G_5$	$2s2p^25g$	$(^3P)\ ^3G_5^a$	1.41[13]	1.42[13]	17.333	8.59[10]	1.10[10]	558.95	1.09[10]	1.01[-14]
$2s^22p5g$	$(^1S)\ ^3F_4$	$2s2p^25g$	$(^3P)\ ^3F_4^a$	2.65[12]	2.75[12]	17.292	7.09[10]	1.27[10]	560.11	1.22[10]	1.14[-14]
$2s^22p5g$	$(^1S)\ ^3F_4$	$2s2p^25g$	$(^3P)\ ^3G_5^a$	1.41[13]	1.42[13]	17.333	8.59[10]	3.24[10]	559.06	3.21[10]	2.97[-14]
$2s^22p5g$	$(^1S)\ ^1F_3$	$2s2p^25g$	$(^3P)\ ^1G_4$	1.41[13]	1.43[13]	17.333	7.03[10]	2.57[10]	559.06	2.55[10]	2.36[-14]
$2s^22p5g$	$(^1S)\ ^3H_6$	$2s2p^25g$	$(^1D)\ ^3I_7$	9.51[12]	1.02[13]	11.000	1.85[10]	1.31[10]	782.81	1.23[10]	2.14[-14]
$2s^22p5g$	$(^1S)\ ^3H_6$	$2s2p^25g$	$(^1S)\ ^3G_5$	4.18[12]	4.99[12]	14.875	4.38[10]	1.56[10]	628.94	1.30[10]	1.54[-14]
$2s^22p5g$	$(^1S)\ ^3H_6$	$2s2p^25g$	$(^3P)\ ^3H_6^a$	1.75[13]	1.79[13]	17.319	1.01[11]	5.68[10]	559.56	5.52[10]	5.12[-14]
$2s^22p5g$	$(^1S)\ ^3H_6$	$2s2p^25g$	$(^3P)\ ^3G_5^a$	1.41[13]	1.42[13]	17.333	8.59[10]	3.08[10]	559.21	3.06[10]	2.83[-14]
$2s^22p5g$	$(^1S)\ ^1H_5$	$2s2p^25g$	$(^1D)\ ^1I_6$	9.50[12]	1.02[13]	11.000	1.61[10]	1.10[10]	782.81	1.02[10]	1.78[-14]
$2s^22p5g$	$(^1S)\ ^1H_5$	$2s2p^25g$	$(^3P)\ ^1H_5$	1.75[13]	1.79[13]	17.319	8.56[10]	4.80[10]	559.56	4.66[10]	4.32[-14]
$2s^22p5g$	$(^1S)\ ^1H_5$	$2s2p^25g$	$(^3P)\ ^1G_4$	1.41[13]	1.43[13]	17.333	7.03[10]	2.56[10]	559.21	2.54[10]	2.35[-14]
$2s^22p5g$	$(^1S)\ ^3F_2$	$2s2p^25g$	$(^3P)\ ^3G_3^a$	1.10[13]	1.11[13]	17.331	5.28[10]	2.16[10]	559.35	2.15[10]	1.99[-14]
$2s^22p5g$	$(^1S)\ ^3F_3$	$2s2p^25g$	$(^3P)\ ^3G_4^a$	1.10[13]	1.11[13]	17.331	7.05[10]	2.92[10]	559.35	2.90[10]	2.68[-14]
$2s^22p6d$	$(^1S)\ ^3F_2$	$2s2p^26d$	$(^3P)\ ^3F_2^a$	5.00[13]	6.20[13]	18.660	3.91[10]	1.45[10]	558.86	1.17[10]	9.46[-15]
$2s^22p6d$	$(^1S)\ ^3F_3$	$2s2p^26d$	$(^3P)\ ^3F_3^a$	5.14[13]	6.32[13]	18.668	5.52[10]	2.05[10]	559.11	1.66[10]	1.35[-14]
$2s^22p6d$	$(^1S)\ ^3F_3$	$2s2p^26d$	$(^3P)\ ^3D_2^a$	5.12[13]	6.19[13]	18.713	3.99[10]	1.34[10]	557.97	1.11[10]	8.94[-15]
$2s^22p6d$	$(^1S)\ ^3F_4$	$2s2p^26d$	$(^3P)\ ^3F_4^a$	5.05[13]	6.13[13]	18.687	7.04[10]	4.19[10]	559.37	3.46[10]	2.79[-14]
$2s^22p6d$	$(^1S)\ ^3F_4$	$2s2p^26d$	$(^3P)\ ^3D_3^a$	5.29[13]	6.04[13]	18.719	5.64[10]	1.77[10]	558.56	1.55[10]	1.25[-14]
$2s^22p6d$	$(^1S)\ ^3D_3$	$2s2p^26d$	$(^3P)\ ^3F_4^a$	5.05[13]	6.13[13]	18.687	7.04[10]	1.48[10]	560.21	1.22[10]	9.89[-15]

$2s^22p6d$	$(^1S)\ ^3P_2$	$2s2p^26d$	$(^3P)\ ^3D^a_3$	5.29[13]	6.04[13]	18.719	5.64[10]	1.32[10]	559.75	1.15[10]	9.27[-15]
$2s^22p6g$	$(^1S)\ ^3G_4$	$2s2p^26g$	$(^3P)\ ^3H^a_5$	3.12[12]	3.47[12]	18.792	8.35[10]	2.99[10]	558.91	2.68[10]	2.14[-14]
$2s^22p6g$	$(^1S)\ ^3G_3$	$2s2p^26g$	$(^3P)\ ^3H^a_4$	3.12[12]	3.47[12]	18.792	6.83[10]	2.37[10]	558.91	2.12[10]	1.70[-14]

Low level		Upper level		A_a	ΣA_a	E_S	ΣgA_r	gA_r	λ	Q_d	C_S^{eff}
Conf.	LSJ	Conf.	LSJ	s^{-1}	s^{-1}	eV	s^{-1}	s^{-1}	Å	s^{-1}	cm^3/s
$2s^22p6g$	$(^1S)\ ^3H_4$	$2s2p^26g$	$(^3P)\ ^3H^a_4$	3.12[12]	3.47[12]	18.792	6.83[10]	1.74[10]	558.92	1.56[10]	1.25[-14]
$2s^22p6g$	$(^1S)\ ^3H_4$	$2s2p^26g$	$(^3P)\ ^1F_3$	7.63[11]	8.63[11]	18.793	5.29[10]	2.59[10]	558.89	2.27[10]	1.81[-14]
$2s^22p6g$	$(^1S)\ ^3H_4$	$2s2p^26g$	$(^3P)\ ^1H_5$	3.23[12]	3.65[12]	18.821	8.34[10]	1.60[10]	558.18	1.41[10]	1.13[-14]
$2s^22p6g$	$(^1S)\ ^3H_5$	$2s2p^26g$	$(^3P)\ ^3H^a_5$	3.12[12]	3.47[12]	18.792	8.35[10]	2.15[10]	558.92	1.92[10]	1.54[-14]
$2s^22p6g$	$(^1S)\ ^3H_5$	$2s2p^26g$	$(^3P)\ ^3F^a_4$	7.53[11]	8.55[11]	18.793	6.98[10]	3.25[10]	558.89	2.83[10]	2.26[-14]
$2s^22p6g$	$(^1S)\ ^3H_5$	$2s2p^26g$	$(^3P)\ ^3H^a_6$	3.22[12]	3.64[12]	18.821	9.86[10]	1.93[10]	558.18	1.70[10]	1.36[-14]
$2s^22p6d$	$(^1S)\ ^1F_3$	$2s2p^26d$	$(^3P)\ ^1F_3$	7.79[13]	1.34[14]	18.755	7.50[10]	3.23[10]	560.00	1.88[10]	1.51[-14]
$2s^22p6g$	$(^1S)\ ^1G_4$	$2s2p^26g$	$(^3P)\ ^3H^a_4$	3.12[12]	3.47[12]	18.792	6.83[10]	1.13[10]	560.03	1.01[10]	8.08[-15]
$2s^22p6g$	$(^1S)\ ^1G_4$	$2s2p^26g$	$(^3P)\ ^1H_5$	3.23[12]	3.65[12]	18.821	8.34[10]	1.57[10]	559.29	1.39[10]	1.11[-14]
$2s^22p6g$	$(^1S)\ ^1G_4$	$2s2p^26g$	$(^3P)\ ^3G^a_3$	1.89[12]	1.96[12]	18.828	5.27[10]	2.38[10]	559.12	2.29[10]	1.83[-14]
$2s^22p6g$	$(^1S)\ ^3G_5$	$2s2p^26g$	$(^3P)\ ^3H^a_5$	3.12[12]	3.47[12]	18.792	8.35[10]	1.38[10]	560.03	1.24[10]	9.89[-15]
$2s^22p6g$	$(^1S)\ ^3G_5$	$2s2p^26g$	$(^3P)\ ^3H^a_6$	3.22[12]	3.64[12]	18.821	9.86[10]	1.89[10]	559.29	1.67[10]	1.33[-14]
$2s^22p6g$	$(^1S)\ ^3G_5$	$2s2p^26g$	$(^3P)\ ^3G^a_4$	1.90[12]	1.97[12]	18.828	6.94[10]	2.97[10]	559.12	2.85[10]	2.27[-14]
$2s^22p6g$	$(^1S)\ ^3G_5$	$2s2p^26g$	$(^3P)\ ^3G^a_5$	2.72[12]	2.82[12]	18.829	8.43[10]	1.18[10]	559.08	1.13[10]	9.02[-15]
$2s^22p6g$	$(^1S)\ ^3F_4$	$2s2p^26g$	$(^3P)\ ^3G^a_5$	2.72[12]	2.82[12]	18.829	8.43[10]	3.10[10]	559.14	2.97[10]	2.37[-14]
$2s^22p6g$	$(^1S)\ ^1F_3$	$2s2p^26g$	$(^3P)\ ^1G_4$	2.72[12]	2.83[12]	18.829	6.89[10]	2.46[10]	559.14	2.35[10]	1.87[-14]
$2s^22p6g$	$(^1S)\ ^3H_6$	$2s2p^26g$	$(^1D)\ ^3I_7$	9.04[12]	9.47[12]	12.495	1.62[10]	1.30[10]	782.95	1.24[10]	1.86[-14]
$2s^22p6g$	$(^1S)\ ^3H_6$	$2s2p^26g$	$(^1S)\ ^3G_5$	3.94[12]	4.56[12]	16.373	4.21[10]	1.57[10]	628.92	1.36[10]	1.38[-14]
$2s^22p6g$	$(^1S)\ ^3H_6$	$2s2p^26g$	$(^3P)\ ^3H^a_5$	3.12[12]	3.47[12]	18.792	8.35[10]	1.21[10]	560.20	1.08[10]	8.64[-15]
$2s^22p6g$	$(^1S)\ ^3H_6$	$2s2p^26g$	$(^3P)\ ^3H^a_6$	3.22[12]	3.64[12]	18.821	9.86[10]	5.67[10]	559.45	5.01[10]	3.99[-14]
$2s^22p6g$	$(^1S)\ ^3H_6$	$2s2p^26g$	$(^3P)\ ^3G^a_5$	2.72[12]	2.82[12]	18.829	8.43[10]	2.91[10]	559.25	2.79[10]	2.22[-14]
$2s^22p6g$	$(^1S)\ ^1H_5$	$2s2p^26g$	$(^1D)\ ^1I_6$	9.03[12]	9.47[12]	12.495	1.40[10]	1.08[10]	782.95	1.03[10]	1.54[-14]
$2s^22p6g$	$(^1S)\ ^1H_5$	$2s2p^26g$	$(^3P)\ ^1H_5$	3.23[12]	3.65[12]	18.821	8.34[10]	4.79[10]	559.45	4.23[10]	3.37[-14]
$2s^22p6g$	$(^1S)\ ^1H_5$	$2s2p^26g$	$(^3P)\ ^1G_4$	2.72[12]	2.83[12]	18.829	6.89[10]	2.42[10]	559.25	2.31[10]	1.84[-14]
$2s^22p6g$	$(^1S)\ ^3F_2$	$2s2p^26g$	$(^3P)\ ^3G^a_3$	1.89[12]	1.96[12]	18.828	5.27[10]	2.00[10]	559.32	1.93[10]	1.54[-14]
$2s^22p6g$	$(^1S)\ ^3F_3$	$2s2p^26g$	$(^3P)\ ^3G^a_4$	1.90[12]	1.97[12]	18.828	6.94[10]	2.70[10]	559.32	2.59[10]	2.07[-14]
$2s^22p7s$	$(^1S)\ ^1P_1$	$2s2p^27s$	$(^3P)\ ^1P_1$	2.43[13]	3.22[13]	19.289	2.37[10]	1.68[10]	558.46	1.27[10]	9.64[-15]
$2s^22p7d$	$(^1S)\ ^3F_4$	$2s2p^27d$	$(^3P)\ ^3F^a_4$	2.94[13]	3.57[13]	19.644	6.88[10]	3.46[10]	559.51	2.84[10]	2.09[-14]
$2s^22p7d$	$(^1S)\ ^3F_4$	$2s2p^27d$	$(^3P)\ ^3D^a_3$	3.13[13]	3.52[13]	19.659	5.63[10]	1.24[10]	559.13	1.10[10]	8.06[-15]
$2s^22p7d$	$(^1S)\ ^3D_3$	$2s2p^27d$	$(^3P)\ ^3D^a_3$	3.13[13]	3.52[13]	19.659	5.63[10]	1.36[10]	559.44	1.21[10]	8.87[-15]
$2s^22p7d$	$(^1S)\ ^3P_2$	$2s2p^27d$	$(^3P)\ ^3D^a_3$	3.13[13]	3.52[13]	19.659	5.63[10]	1.26[10]	559.65	1.12[10]	8.21[-15]
$2s^22p7g$	$(^1S)\ ^3G_3$	$2s2p^27g$	$(^3P)\ ^3H^a_4$	2.55[12]	2.82[12]	19.697	6.75[10]	2.37[10]	558.89	2.14[10]	1.56[-14]
$2s^22p7g$	$(^1S)\ ^3G_4$	$2s2p^27g$	$(^3P)\ ^3H^a_5$	2.55[12]	2.81[12]	19.697	8.25[10]	2.99[10]	558.89	2.70[10]	1.97[-14]
$2s^22p7g$	$(^1S)\ ^3G_4$	$2s2p^27g$	$(^3P)\ ^3F^a_4$	7.38[11]	8.22[11]	19.698	6.93[10]	1.13[10]	558.86	1.01[10]	7.35[-15]
$2s^22p7g$	$(^1S)\ ^3H_4$	$2s2p^27g$	$(^3P)\ ^3H^a_4$	2.55[12]	2.82[12]	19.697	6.75[10]	1.78[10]	558.90	1.61[10]	1.17[-14]
$2s^22p7g$	$(^1S)\ ^3H_4$	$2s2p^27g$	$(^3P)\ ^1F_3$	7.42[11]	8.23[11]	19.698	5.30[10]	2.62[10]	558.87	2.34[10]	1.71[-14]
$2s^22p7g$	$(^1S)\ ^3H_4$	$2s2p^27g$	$(^3P)\ ^1H_5$	2.65[12]	2.97[12]	19.727	8.23[10]	1.48[10]	558.14	1.31[10]	9.56[-15]
$2s^22p7g$	$(^1S)\ ^3H_5$	$2s2p^27g$	$(^3P)\ ^3H^a_5$	2.55[12]	2.81[12]	19.697	8.25[10]	2.19[10]	558.90	1.98[10]	1.45[-14]
$2s^22p7g$	$(^1S)\ ^3H_5$	$2s2p^27g$	$(^3P)\ ^3F^a_4$	7.38[11]	8.22[11]	19.698	6.93[10]	3.28[10]	558.87	2.92[10]	2.13[-14]
$2s^22p7g$	$(^1S)\ ^3H_5$	$2s2p^27g$	$(^3P)\ ^3H^a_6$	2.64[12]	2.97[12]	19.727	9.72[10]	1.78[10]	558.14	1.58[10]	1.15[-14]
$2s^22p7d$	$(^1S)\ ^1F_3$	$2s2p^27d$	$(^3P)\ ^1F_3$	4.97[13]	8.45[13]	19.685	6.80[10]	2.77[10]	559.34	1.63[10]	1.19[-14]
$2s^22p7i$	$(^1S)\ ^1H_5$	$2s2p^27i$	$(^3P)\ ^3K^a_6$	8.52[09]	1.29[10]	19.705	9.74[10]	3.80[10]	558.84	1.58[10]	1.16[-14]
$2s^22p7i$	$(^1S)\ ^3H_6$	$2s2p^27i$	$(^3P)\ ^3K^a_7$	8.52[09]	1.29[10]	19.705	1.12[11]	4.44[10]	558.84	1.85[10]	1.35[-14]
$2s^22p7i$	$(^1S)\ ^3K_6$	$2s2p^27i$	$(^3P)\ ^3K^a_6$	8.52[09]	1.29[10]	19.705	9.74[10]	2.46[10]	558.84	1.03[10]	7.49[-15]
$2s^22p7i$	$(^1S)\ ^3K_6$	$2s2p^27i$	$(^3P)\ ^3I^a_5$	2.83[09]	3.14[09]	19.705	8.32[10]	3.92[10]	558.84	1.04[10]	7.57[-15]
$2s^22p7i$	$(^1S)\ ^3K_7$	$2s2p^27i$	$(^3P)\ ^3K^a_7$	8.52[09]	1.29[10]	19.705	1.12[11]	2.85[10]	558.84	1.19[10]	8.65[-15]
$2s^22p7i$	$(^1S)\ ^3K_7$	$2s2p^27i$	$(^3P)\ ^3H^a_6$	2.83[09]	3.14[09]	19.705	9.84[10]	4.58[10]	558.84	1.21[10]	8.85[-15]
$2s^22p7g$	$(^1S)\ ^1G_4$	$2s2p^27g$	$(^3P)\ ^1H_5$	2.65[12]	2.97[12]	19.727	8.23[10]	1.68[10]	559.28	1.49[10]	1.09[-14]
$2s^22p7g$	$(^1S)\ ^1G_4$	$2s2p^27g$	$(^3P)\ ^3G^a_3$	1.48[12]	1.53[12]	19.732	5.28[10]	2.46[10]	559.17	2.36[10]	1.71[-14]
$2s^22p7g$	$(^1S)\ ^3G_5$	$2s2p^27g$	$(^3P)\ ^3H^a_5$	2.55[12]	2.81[12]	19.697	8.25[10]	1.16[10]	560.04	1.05[10]	7.66[-15]

$2s^22p7g$	$(^1S)\ ^3G_5$	$2s2p^27g$	$(^3P)\ ^3H_6^a$	2.64[12]	2.97[12]	19.727	9.72[10]	2.01[10]	559.28	1.79[10]	1.30[-14]
$2s^22p7g$	$(^1S)\ ^3G_5$	$2s2p^27g$	$(^3P)\ ^3G_4^a$	1.48[12]	1.54[12]	19.732	6.90[10]	3.06[10]	559.17	2.92[10]	2.12[-14]
$2s^22p7g$	$(^1S)\ ^3G_5$	$2s2p^27g$	$(^3P)\ ^3G_5^a$	2.28[12]	2.37[12]	19.732	8.35[10]	1.22[10]	559.15	1.17[10]	8.54[-15]
$2s^22p7g$	$(^1S)\ ^3F_4$	$2s2p^27g$	$(^3P)\ ^3G_5^a$	2.28[12]	2.37[12]	19.732	8.35[10]	3.03[10]	559.18	2.91[10]	2.12[-14]

Low level		Upper level		A_a	ΣA_a	E_S	ΣgA_r	gA_r	λ	Q_d	C_S^{eff}
Conf.	LSJ	Conf.	LSJ	s^{-1}	s^{-1}	eV	s^{-1}	s^{-1}	Å	s^{-1}	cm^3/s
$2s^22p7g$	$(^1S)\ ^1F_3$	$2s2p^27g$	$(^3P)\ ^1G_4$	2.28[12]	2.38[12]	19.733	6.83[10]	2.40[10]	559.18	2.30[10]	1.67[-14]
$2s^22p7g$	$(^1S)\ ^3H_6$	$2s2p^27g$	$(^1D)\ ^3I_7$	6.96[12]	7.22[12]	13.397	1.49[10]	1.28[10]	783.01	1.24[10]	1.70[-14]
$2s^22p7g$	$(^1S)\ ^3H_6$	$2s2p^27g$	$(^1S)\ ^3G_5$	3.54[12]	3.97[12]	17.277	4.13[10]	1.58[10]	628.91	1.41[10]	1.31[-14]
$2s^22p7g$	$(^1S)\ ^3H_6$	$2s2p^27g$	$(^3P)\ ^3H_5^a$	2.55[12]	2.81[12]	19.697	8.25[10]	1.36[10]	560.14	1.23[10]	9.00[-15]
$2s^22p7g$	$(^1S)\ ^3H_6$	$2s2p^27g$	$(^3P)\ ^3H_6^a$	2.64[12]	2.97[12]	19.727	9.72[10]	5.67[10]	559.38	5.04[10]	3.67[-14]
$2s^22p7g$	$(^1S)\ ^3H_6$	$2s2p^27g$	$(^3P)\ ^3G_5^a$	2.28[12]	2.37[12]	19.732	8.35[10]	2.79[10]	559.25	2.67[10]	1.94[-14]
$2s^22p7g$	$(^1S)\ ^1H_5$	$2s2p^27g$	$(^1D)\ ^1I_6$	6.96[12]	7.22[12]	13.397	1.29[10]	1.08[10]	783.01	1.04[10]	1.42[-14]
$2s^22p7g$	$(^1S)\ ^1H_5$	$2s2p^27g$	$(^3P)\ ^3H_4^a$	2.55[12]	2.82[12]	19.697	6.75[10]	1.13[10]	560.15	1.02[10]	7.42[-15]
$2s^22p7g$	$(^1S)\ ^1H_5$	$2s2p^27g$	$(^3P)\ ^1H_5$	2.65[12]	2.97[12]	19.727	8.23[10]	4.79[10]	559.38	4.26[10]	3.10[-14]
$2s^22p7g$	$(^1S)\ ^1H_5$	$2s2p^27g$	$(^3P)\ ^1G_4$	2.28[12]	2.38[12]	19.733	6.83[10]	2.32[10]	559.25	2.21[10]	1.61[-14]
$2s^22p7g$	$(^1S)\ ^3F_2$	$2s2p^27g$	$(^3P)\ ^3G_3^a$	1.48[12]	1.53[12]	19.732	5.28[10]	1.90[10]	559.30	1.82[10]	1.32[-14]
$2s^22p7g$	$(^1S)\ ^3F_3$	$2s2p^27g$	$(^3P)\ ^3G_4^a$	1.48[12]	1.54[12]	19.732	6.90[10]	2.56[10]	559.30	2.44[10]	1.78[-14]
$2s^22p7i$	$(^1S)\ ^1I_6$	$2s2p^27i$	$(^3P)\ ^1K_7$	8.86[09]	1.47[10]	19.736	1.12[11]	2.83[10]	559.23	1.13[10]	8.19[-15]
$2s^22p7i$	$(^1S)\ ^1I_6$	$2s2p^27i$	$(^3P)\ ^3I_5^a$	2.83[09]	3.14[09]	19.737	8.32[10]	3.86[10]	559.20	1.02[10]	7.44[-15]
$2s^22p7i$	$(^1S)\ ^3I_7$	$2s2p^27i$	$(^3P)\ ^3K_8^a$	8.86[09]	1.47[10]	19.736	1.27[11]	3.23[10]	559.23	1.29[10]	9.38[-15]
$2s^22p7i$	$(^1S)\ ^3I_7$	$2s2p^27i$	$(^3P)\ ^3H_6^a$	2.83[09]	3.14[09]	19.737	9.84[10]	4.52[10]	559.20	1.20[10]	8.69[-15]
$2s^22p7i$	$(^1S)\ ^3I_5$	$2s2p^27i$	$(^3P)\ ^1I_6$	7.99[09]	9.77[09]	19.737	9.78[10]	3.81[10]	559.20	1.76[10]	1.28[-14]
$2s^22p7i$	$(^1S)\ ^3I_6$	$2s2p^27i$	$(^3P)\ ^3I_7^a$	7.99[09]	9.77[09]	19.737	1.13[11]	4.45[10]	559.20	2.06[10]	1.50[-14]
$2s^22p7i$	$(^1S)\ ^3K_8$	$2s2p^27i$	$(^1D)\ ^3L_9$	2.12[11]	2.23[11]	13.400	1.80[10]	1.69[10]	783.07	1.59[10]	2.18[-14]
$2s^22p7i$	$(^1S)\ ^3K_8$	$2s2p^27i$	$(^1S)\ ^3I_7$	8.43[10]	9.41[10]	17.282	5.53[10]	2.04[10]	628.88	1.76[10]	1.64[-14]
$2s^22p7i$	$(^1S)\ ^3K_8$	$2s2p^27i$	$(^3P)\ ^3K_8^a$	8.86[09]	1.47[10]	19.736	1.27[11]	7.16[10]	559.26	2.85[10]	2.08[-14]
$2s^22p7i$	$(^1S)\ ^3K_8$	$2s2p^27i$	$(^3P)\ ^3I_7^a$	7.99[09]	9.77[09]	19.737	1.13[11]	3.60[10]	559.23	1.66[10]	1.21[-14]
$2s^22p7i$	$(^1S)\ ^1K_7$	$2s2p^27i$	$(^1D)\ ^1L_8$	2.12[11]	2.23[11]	13.400	1.61[10]	1.50[10]	783.07	1.41[10]	1.94[-14]
$2s^22p7i$	$(^1S)\ ^1K_7$	$2s2p^27i$	$(^1S)\ ^1I_6$	8.44[10]	9.42[10]	17.282	4.79[10]	1.79[10]	628.88	1.54[10]	1.43[-14]
$2s^22p7i$	$(^1S)\ ^1K_7$	$2s2p^27i$	$(^3P)\ ^1K_7$	8.86[09]	1.47[10]	19.736	1.12[11]	6.31[10]	559.26	2.52[10]	1.83[-14]
$2s^22p7i$	$(^1S)\ ^1K_7$	$2s2p^27i$	$(^3P)\ ^1I_6$	7.99[09]	9.77[09]	19.737	9.78[10]	3.14[10]	559.23	1.45[10]	1.06[-14]
$2s^22p7i$	$(^1S)\ ^3H_5$	$2s2p^27i$	$(^1S)\ ^3I_6$	8.04[10]	9.02[10]	17.282	4.80[10]	1.26[10]	628.88	1.08[10]	1.00[-14]
$2s^22p8s$	$(^1S)\ ^3P_2$	$2s2p^28s$	$(^3P)\ ^3P_2^a$	4.52[12]	7.41[12]	20.015	3.77[10]	2.63[10]	558.43	1.60[10]	1.13[-14]
$2s^22p8s$	$(^1S)\ ^1P_1$	$2s2p^28s$	$(^3P)\ ^1P_1$	1.76[13]	1.98[13]	20.020	2.40[10]	1.80[10]	558.86	1.60[10]	1.13[-14]
$2s^22p8d$	$(^1S)\ ^3F_2$	$2s2p^28d$	$(^3P)\ ^3F_2^a$	1.83[13]	2.27[13]	20.233	3.83[10]	1.24[10]	558.87	1.00[10]	6.93[-15]
$2s^22p8d$	$(^1S)\ ^3D_2$	$2s2p^28d$	$(^3P)\ ^3F_3^a$	2.02[13]	2.61[13]	20.238	5.56[10]	1.52[10]	559.12	1.18[10]	8.14[-15]
$2s^22p8d$	$(^1S)\ ^3F_3$	$2s2p^28d$	$(^3P)\ ^3F_3^a$	2.02[13]	2.61[13]	20.238	5.56[10]	1.35[10]	559.13	1.04[10]	7.20[-15]
$2s^22p8d$	$(^1S)\ ^3F_4$	$2s2p^28d$	$(^3P)\ ^3F_4^a$	1.79[13]	2.19[13]	20.261	6.81[10]	4.20[10]	559.30	3.43[10]	2.37[-14]
$2s^22p8d$	$(^1S)\ ^3F_4$	$2s2p^28d$	$(^3P)\ ^3D_3^a$	2.01[13]	2.28[13]	20.270	5.82[10]	1.26[10]	559.08	1.11[10]	7.63[-15]
$2s^22p8g$	$(^1S)\ ^3G_3$	$2s2p^28g$	$(^3P)\ ^3H_4^a$	1.96[12]	2.16[12]	20.285	6.70[10]	2.37[10]	558.88	2.14[10]	1.47[-14]
$2s^22p8g$	$(^1S)\ ^3G_4$	$2s2p^28g$	$(^3P)\ ^3H_5^a$	1.96[12]	2.16[12]	20.285	8.19[10]	2.97[10]	558.88	2.69[10]	1.85[-14]
$2s^22p8g$	$(^1S)\ ^3G_4$	$2s2p^28g$	$(^3P)\ ^3F_4^a$	6.32[11]	6.96[11]	20.286	6.95[10]	1.13[10]	558.85	1.01[10]	6.95[-15]
$2s^22p8g$	$(^1S)\ ^3H_4$	$2s2p^28g$	$(^3P)\ ^3H_4^a$	1.96[12]	2.16[12]	20.285	6.70[10]	1.78[10]	558.88	1.61[10]	1.11[-14]
$2s^22p8g$	$(^1S)\ ^3H_4$	$2s2p^28g$	$(^3P)\ ^1F_3$	9.95[11]	1.25[12]	20.286	5.36[10]	2.63[10]	558.86	2.07[10]	1.43[-14]
$2s^22p8g$	$(^1S)\ ^3H_4$	$2s2p^28g$	$(^3P)\ ^1H_5$	2.04[12]	2.28[12]	20.316	8.14[10]	1.40[10]	558.11	1.25[10]	8.56[-15]
$2s^22p8g$	$(^1S)\ ^3H_5$	$2s2p^28g$	$(^3P)\ ^3H_5^a$	1.96[12]	2.16[12]	20.285	8.19[10]	2.20[10]	558.88	2.00[10]	1.37[-14]
$2s^22p8g$	$(^1S)\ ^3H_5$	$2s2p^28g$	$(^3P)\ ^3F_4^a$	6.32[11]	6.96[11]	20.286	6.95[10]	3.33[10]	558.86	2.98[10]	2.05[-14]
$2s^22p8g$	$(^1S)\ ^3H_5$	$2s2p^28g$	$(^3P)\ ^3H_6^a$	2.03[12]	2.28[12]	20.316	9.62[10]	1.69[10]	558.11	1.50[10]	1.03[-14]
$2s^22p8i$	$(^1S)\ ^1H_5$	$2s2p^28i$	$(^3P)\ ^3K_6^a$	1.37[10]	1.92[10]	20.291	9.61[10]	3.68[10]	558.83	1.89[10]	1.30[-14]
$2s^22p8i$	$(^1S)\ ^3H_6$	$2s2p^28i$	$(^3P)\ ^3K_7^a$	1.37[10]	1.92[10]	20.291	1.11[11]	4.30[10]	558.83	2.21[10]	1.52[-14]
$2s^22p8i$	$(^1S)\ ^3K_7$	$2s2p^28i$	$(^3P)\ ^3K_7^a$	1.37[10]	1.92[10]	20.291	1.11[11]	2.84[10]	558.84	1.46[10]	1.00[-14]
$2s^22p8i$	$(^1S)\ ^3K_7$	$2s2p^28i$	$(^3P)\ ^3H_6^a$	4.71[09]	5.19[09]	20.291	9.93[10]	4.75[10]	558.83	1.74[10]	1.20[-14]
$2s^22p8i$	$(^1S)\ ^3K_7$	$2s2p^28i$	$(^3P)\ ^3K_8^a$	1.42[10]	2.16[10]	20.322	1.25[11]	2.08[10]	558.05	1.02[10]	7.00[-15]
$2s^22p8i$	$(^1S)\ ^3K_6$	$2s2p^28i$	$(^3P)\ ^3K_6^a$	1.37[10]	1.92[10]	20.291	9.61[10]	2.46[10]	558.84	1.26[10]	8.69[-15]

$2s^22p8i$	$(^1S)\ ^3K_6$	$2s2p^28i$	$(^3P)\ ^3I_5^a$	4.71[09]	5.19[09]	20.291	8.40[10]	4.06[10]	558.83	1.49[10]	1.03[-14]
$2s^22p8d$	$(^1S)\ ^3D_3$	$2s2p^28d$	$(^3P)\ ^3D_3^a$	2.01[13]	2.28[13]	20.270	5.82[10]	1.41[10]	559.38	1.24[10]	8.58[-15]
$2s^22p8d$	$(^1S)\ ^3P_2$	$2s2p^28d$	$(^3P)\ ^3D_3^a$	2.01[13]	2.28[13]	20.270	5.82[10]	1.19[10]	559.53	1.05[10]	7.25[-15]
$2s^22p8g$	$(^1S)\ ^1G_4$	$2s2p^28g$	$(^3P)\ ^1H_5$	2.04[12]	2.28[12]	20.316	8.14[10]	1.72[10]	559.27	1.53[10]	1.05[-14]
$2s^22p8g$	$(^1S)\ ^1G_4$	$2s2p^28g$	$(^3P)\ ^3G_3^a$	1.12[12]	1.16[12]	20.319	5.33[10]	2.53[10]	559.19	2.41[10]	1.65[-14]

Low level		Upper level		A_a	ΣA_a	E_S	ΣgA_r	gA_r	λ	Q_d	C_S^{eff}
Conf.	LSJ	Conf.	LSJ	s^{-1}	s^{-1}	eV	s^{-1}	s^{-1}	Å	s^{-1}	cm^3/s
$2s^22p8g$	$(^1S)\ ^3G_5$	$2s2p^28g$	$(^3P)\ ^3H_6^a$	2.03[12]	2.28[12]	20.316	9.62[10]	2.07[10]	559.27	1.84[10]	1.26[-14]
$2s^22p8g$	$(^1S)\ ^3G_5$	$2s2p^28g$	$(^3P)\ ^3G_4^a$	1.12[12]	1.17[12]	20.319	6.92[10]	3.13[10]	559.19	2.97[10]	2.04[-14]
$2s^22p8g$	$(^1S)\ ^3G_5$	$2s2p^28g$	$(^3P)\ ^3G_5^a$	1.79[12]	1.87[12]	20.319	8.34[10]	1.25[10]	559.18	1.20[10]	8.21[-15]
$2s^22p8g$	$(^1S)\ ^3F_4$	$2s2p^28g$	$(^3P)\ ^3G_5^a$	1.79[12]	1.87[12]	20.319	8.34[10]	2.99[10]	559.20	2.86[10]	1.96[-14]
$2s^22p8g$	$(^1S)\ ^1F_3$	$2s2p^28g$	$(^3P)\ ^1G_4$	1.79[12]	1.87[12]	20.319	6.83[10]	2.36[10]	559.20	2.25[10]	1.55[-14]
$2s^22p8g$	$(^1S)\ ^3H_6$	$2s2p^28g$	$(^1D)\ ^3I_7$	5.20[12]	5.36[12]	13.983	1.41[10]	1.27[10]	783.04	1.23[10]	1.59[-14]
$2s^22p8g$	$(^1S)\ ^3H_6$	$2s2p^28g$	$(^3P)\ ^3H_5^a$	1.96[12]	2.16[12]	20.285	8.19[10]	1.48[10]	560.11	1.34[10]	9.21[-15]
$2s^22p8g$	$(^1S)\ ^3H_6$	$2s2p^28g$	$(^3P)\ ^3H_6^a$	2.03[12]	2.28[12]	20.316	9.62[10]	5.67[10]	559.34	5.04[10]	3.46[-14]
$2s^22p8g$	$(^1S)\ ^3H_6$	$2s2p^28g$	$(^3P)\ ^3G_5^a$	1.79[12]	1.87[12]	20.319	8.34[10]	2.73[10]	559.25	2.61[10]	1.79[-14]
$2s^22p8g$	$(^1S)\ ^1H_5$	$2s2p^28g$	$(^1D)\ ^1I_6$	5.19[12]	5.36[12]	13.983	1.22[10]	1.07[10]	783.04	1.04[10]	1.35[-14]
$2s^22p8g$	$(^1S)\ ^1H_5$	$2s2p^28g$	$(^3P)\ ^3H_4^a$	1.96[12]	2.16[12]	20.285	6.70[10]	1.22[10]	560.11	1.10[10]	7.60[-15]
$2s^22p8g$	$(^1S)\ ^1H_5$	$2s2p^28g$	$(^3P)\ ^1H_5$	2.04[12]	2.28[12]	20.316	8.14[10]	4.79[10]	559.34	4.26[10]	2.93[-14]
$2s^22p8g$	$(^1S)\ ^1H_5$	$2s2p^28g$	$(^3P)\ ^1G_4$	1.79[12]	1.87[12]	20.319	6.83[10]	2.26[10]	559.25	2.16[10]	1.48[-14]
$2s^22p8g$	$(^1S)\ ^3F_2$	$2s2p^28g$	$(^3P)\ ^3G_3^a$	1.12[12]	1.16[12]	20.319	5.33[10]	1.83[10]	559.28	1.74[10]	1.19[-14]
$2s^22p8g$	$(^1S)\ ^3F_3$	$2s2p^28g$	$(^3P)\ ^3G_4^a$	1.12[12]	1.17[12]	20.319	6.92[10]	2.46[10]	559.28	2.33[10]	1.60[-14]
$2s^22p8i$	$(^1S)\ ^3I_7$	$2s2p^28i$	$(^3P)\ ^3K_8^a$	1.42[10]	2.16[10]	20.322	1.25[11]	3.14[10]	559.23	1.54[10]	1.06[-14]
$2s^22p8i$	$(^1S)\ ^3I_7$	$2s2p^28i$	$(^3P)\ ^3H_6^a$	4.71[09]	5.19[09]	20.323	9.93[10]	4.69[10]	559.21	1.72[10]	1.18[-14]
$2s^22p8i$	$(^1S)\ ^1I_6$	$2s2p^28i$	$(^3P)\ ^1K_7$	1.42[10]	2.16[10]	20.322	1.10[11]	2.74[10]	559.23	1.35[10]	9.24[-15]
$2s^22p8i$	$(^1S)\ ^1I_6$	$2s2p^28i$	$(^3P)\ ^3I_5^a$	4.71[09]	5.19[09]	20.323	8.40[10]	4.01[10]	559.21	1.47[10]	1.01[-14]
$2s^22p8i$	$(^1S)\ ^3I_5$	$2s2p^28i$	$(^3P)\ ^1I_6$	1.29[10]	1.53[10]	20.323	9.74[10]	3.68[10]	559.21	2.09[10]	1.43[-14]
$2s^22p8i$	$(^1S)\ ^3I_6$	$2s2p^28i$	$(^3P)\ ^3I_7^a$	1.29[10]	1.53[10]	20.323	1.12[11]	4.30[10]	559.21	2.44[10]	1.67[-14]
$2s^22p8i$	$(^1S)\ ^3K_8$	$2s2p^28i$	$(^1D)\ ^3L_9$	3.22[11]	3.36[11]	13.985	1.69[10]	1.61[10]	783.08	1.54[10]	1.99[-14]
$2s^22p8i$	$(^1S)\ ^3K_8$	$2s2p^28i$	$(^3P)\ ^3K_7^a$	1.37[10]	1.92[10]	20.291	1.11[11]	2.15[10]	560.04	1.10[10]	7.59[-15]
$2s^22p8i$	$(^1S)\ ^3K_8$	$2s2p^28i$	$(^3P)\ ^3K_8^a$	1.42[10]	2.16[10]	20.322	1.25[11]	7.15[10]	559.25	3.52[10]	2.41[-14]
$2s^22p8i$	$(^1S)\ ^3K_8$	$2s2p^28i$	$(^3P)\ ^3I_7^a$	1.29[10]	1.53[10]	20.323	1.12[11]	3.69[10]	559.23	2.09[10]	1.43[-14]
$2s^22p8i$	$(^1S)\ ^1K_7$	$2s2p^28i$	$(^1D)\ ^1L_8$	3.22[11]	3.36[11]	13.985	1.51[10]	1.43[10]	783.08	1.37[10]	1.76[-14]
$2s^22p8i$	$(^1S)\ ^1K_7$	$2s2p^28i$	$(^3P)\ ^1K_7$	1.42[10]	2.16[10]	20.322	1.10[11]	6.31[10]	559.25	3.10[10]	2.13[-14]
$2s^22p8i$	$(^1S)\ ^1K_7$	$2s2p^28i$	$(^3P)\ ^1I_6$	1.29[10]	1.53[10]	20.323	9.74[10]	3.22[10]	559.23	1.83[10]	1.25[-14]
$2s^22p8i$	$(^1S)\ ^3H_5$	$2s2p^28i$	$(^3P)\ ^3H_6^a$	4.71[09]	5.19[09]	20.323	9.93[10]	3.38[10]	559.24	1.24[10]	8.52[-15]
$2s^22p8i$	$(^1S)\ ^3H_4$	$2s2p^28i$	$(^3P)\ ^3I_5^a$	4.71[09]	5.19[09]	20.323	8.40[10]	2.81[10]	559.24	1.03[10]	7.08[-15]
$2s^22p8d$	$(^1S)\ ^1F_3$	$2s2p^28d$	$(^3P)\ ^1F_3$	3.44[13]	5.80[13]	20.287	6.84[10]	2.51[10]	560.93	1.49[10]	1.02[-14]

Table VIII: DR rate coefficients ($g_0\alpha_d$ in cm^3/s) for excited even-parity states of C-like oxygen.

T$_e$			$2s^22p^2$					$2p^4$		
eV	$^3P_0$	$^3P_1$	$^3P_2$	$^1D_2$	$^1S_0$	$^3P_0$	$^3P_1$	$^3P_2$	$^1D_2$	$^1S_0$
0.1000	1.13[-12]	3.69[-12]	7.14[-11]	3.04[-15]	4.44[-19]	4.17[-13]	2.54[-13]	8.83[-14]	9.98[-21]	9.59[-21]
0.1300	1.12[-12]	3.64[-12]	5.23[-11]	2.23[-15]	2.26[-17]	4.09[-13]	2.52[-13]	8.70[-14]	5.08[-19]	4.89[-19]
0.1690	1.01[-12]	3.29[-12]	3.80[-11]	1.62[-15]	4.24[-16]	3.73[-13]	2.30[-13]	7.90[-14]	9.55[-18]	9.18[-18]
0.2197	8.48[-13]	2.78[-12]	2.73[-11]	1.18[-15]	3.70[-15]	3.23[-13]	1.99[-13]	6.81[-14]	8.33[-17]	8.00[-17]
0.2856	6.80[-13]	2.23[-12]	1.94[-11]	9.21[-16]	1.79[-14]	2.74[-13]	1.68[-13]	5.71[-14]	4.03[-16]	3.86[-16]
0.3713	5.26[-13]	1.73[-12]	1.37[-11]	8.67[-16]	5.48[-14]	2.30[-13]	1.40[-13]	4.76[-14]	1.25[-15]	1.19[-15]
0.4827	3.99[-13]	1.31[-12]	9.60[-12]	1.06[-15]	1.18[-13]	1.93[-13]	1.17[-13]	3.97[-14]	2.86[-15]	2.56[-15]
0.6275	3.06[-13]	1.00[-12]	6.74[-12]	1.83[-15]	1.96[-13]	1.63[-13]	9.83[-14]	3.31[-14]	5.73[-15]	4.24[-15]
0.8157	2.45[-13]	7.94[-13]	4.78[-12]	5.02[-15]	2.63[-13]	1.38[-13]	8.34[-14]	2.80[-14]	1.14[-14]	5.71[-15]
1.0604	2.12[-13]	6.77[-13]	3.47[-12]	1.56[-14]	3.02[-13]	1.21[-13]	7.30[-14]	2.45[-14]	2.20[-14]	6.62[-15]
1.3786	1.97[-13]	6.19[-13]	2.62[-12]	3.97[-14]	3.07[-13]	1.11[-13]	6.64[-14]	2.22[-14]	3.82[-14]	6.90[-15]
1.7922	1.90[-13]	5.91[-13]	2.07[-12]	7.88[-14]	2.85[-13]	1.04[-13]	6.22[-14]	2.08[-14]	5.71[-14]	6.73[-15]
2.3298	1.85[-13]	5.66[-13]	1.67[-12]	1.26[-13]	2.46[-13]	9.73[-14]	5.84[-14]	1.95[-14]	7.40[-14]	6.36[-15]
3.0287	1.74[-13]	5.30[-13]	1.38[-12]	1.69[-13]	2.02[-13]	9.01[-14]	5.40[-14]	1.80[-14]	8.48[-14]	5.93[-15]
3.9374	1.58[-13]	4.79[-13]	1.13[-12]	1.99[-13]	1.60[-13]	8.16[-14]	4.88[-14]	1.62[-14]	8.82[-14]	5.54[-15]
5.1186	1.37[-13]	4.13[-13]	9.15[-13]	2.11[-13]	1.23[-13]	7.25[-14]	4.31[-14]	1.43[-14]	8.50[-14]	5.23[-15]
6.6542	1.13[-13]	3.44[-13]	7.25[-13]	2.04[-13]	9.29[-14]	6.33[-14]	3.74[-14]	1.23[-14]	7.73[-14]	5.00[-15]
8.6504	9.08[-14]	2.75[-13]	5.62[-13]	1.84[-13]	6.89[-14]	5.42[-14]	3.18[-14]	1.04[-14]	6.70[-14]	4.77[-15]
11.2455	7.04[-14]	2.13[-13]	4.25[-13]	1.57[-13]	5.04[-14]	4.53[-14]	2.64[-14]	8.57[-15]	5.58[-14]	4.48[-15]
14.6192	5.31[-14]	1.61[-13]	3.16[-13]	1.28[-13]	3.64[-14]	3.68[-14]	2.13[-14]	6.88[-15]	4.49[-14]	4.06[-15]
19.0049	3.91[-14]	1.18[-13]	2.30[-13]	1.00[-13]	2.60[-14]	2.91[-14]	1.68[-14]	5.38[-15]	3.50[-14]	3.53[-15]
24.7064	2.83[-14]	8.57[-14]	1.65[-13]	7.60[-14]	1.83[-14]	2.23[-14]	1.28[-14]	4.09[-15]	2.65[-14]	2.94[-15]
41.7539	1.42[-14]	4.30[-14]	8.18[-14]	4.07[-14]	8.94[-15]	1.23[-14]	7.00[-15]	2.23[-15]	1.43[-14]	1.82[-15]
54.2800	9.91[-15]	3.00[-14]	5.70[-14]	2.90[-14]	6.17[-15]	8.83[-15]	5.04[-15]	1.60[-15]	1.03[-14]	1.37[-15]
91.7332	4.72[-15]	1.43[-14]	2.70[-14]	1.43[-14]	2.90[-15]	4.41[-15]	2.51[-15]	7.94[-16]	5.08[-15]	7.28[-16]
119.2532	3.24[-15]	9.82[-15]	1.85[-14]	9.88[-15]	1.98[-15]	3.07[-15]	1.75[-15]	5.52[-16]	3.53[-15]	5.17[-16]

T$_e$						$2s^22p3p$				
eV	$^1P_1$	$^3D_1$	$^3D_2$	$^3D_3$	$^3S_1$	$^3P_0$	$^3P_1$	$^3P_2$	$^1D_2$	$^1S_0$
0.1000	1.34[-15]	3.44[-14]	5.26[-13]	3.88[-12]	2.06[-12]	2.13[-14]	6.22[-14]	4.45[-13]	1.30[-19]	9.51[-20]
0.1300	1.34[-15]	3.36[-14]	3.88[-13]	2.76[-12]	2.05[-12]	2.09[-14]	6.14[-14]	3.42[-13]	6.61[-18]	4.84[-18]
0.1690	1.40[-15]	3.05[-14]	2.84[-13]	1.94[-12]	1.86[-12]	1.89[-14]	5.57[-14]	2.59[-13]	1.24[-16]	9.10[-17]
0.2197	2.72[-15]	2.83[-14]	2.09[-13]	1.36[-12]	1.58[-12]	1.64[-14]	4.84[-14]	1.96[-13]	1.08[-15]	7.93[-16]
0.2856	9.13[-15]	3.29[-14]	1.67[-13]	9.71[-13]	1.27[-12]	1.49[-14]	4.39[-14]	1.52[-13]	5.22[-15]	3.83[-15]
0.3713	2.69[-14]	5.10[-14]	1.61[-13]	7.28[-13]	9.90[-13]	1.57[-14]	4.64[-14]	1.31[-13]	1.61[-14]	1.17[-14]
0.4827	6.00[-14]	8.57[-14]	1.93[-13]	6.10[-13]	7.53[-13]	1.99[-14]	5.85[-14]	1.33[-13]	3.52[-14]	2.54[-14]
0.6275	1.06[-13]	1.35[-13]	2.58[-13]	5.87[-13]	5.74[-13]	2.76[-14]	8.14[-14]	1.58[-13]	6.11[-14]	4.24[-14]
0.8157	1.54[-13]	1.95[-13]	3.45[-13]	6.30[-13]	4.55[-13]	3.90[-14]	1.15[-13]	2.05[-13]	9.23[-14]	5.83[-14]
1.0604	1.95[-13]	2.55[-13]	4.37[-13]	7.06[-13]	3.88[-13]	5.28[-14]	1.57[-13]	2.68[-13]	1.29[-13]	7.04[-14]
1.3786	2.21[-13]	3.01[-13]	5.09[-13]	7.71[-13]	3.54[-13]	6.60[-14]	1.97[-13]	3.30[-13]	1.70[-13]	7.83[-14]
1.7922	2.28[-13]	3.22[-13]	5.41[-13]	7.94[-13]	3.33[-13]	7.48[-14]	2.23[-13]	3.72[-13]	2.07[-13]	8.19[-14]
2.3298	2.18[-13]	3.16[-13]	5.29[-13]	7.63[-13]	3.08[-13]	7.71[-14]	2.31[-13]	3.84[-13]	2.31[-13]	8.12[-14]
3.0287	1.95[-13]	2.87[-13]	4.80[-13]	6.85[-13]	2.73[-13]	7.30[-14]	2.19[-13]	3.64[-13]	2.35[-13]	7.63[-14]
3.9374	1.66[-13]	2.45[-13]	4.09[-13]	5.81[-13]	2.32[-13]	6.44[-14]	1.93[-13]	3.21[-13]	2.21[-13]	6.79[-14]
5.1186	1.34[-13]	1.98[-13]	3.32[-13]	4.69[-13]	1.89[-13]	5.37[-14]	1.61[-13]	2.68[-13]	1.95[-13]	5.74[-14]
6.6542	1.05[-13]	1.54[-13]	2.58[-13]	3.65[-13]	1.47[-13]	4.27[-14]	1.28[-13]	2.13[-13]	1.62[-13]	4.65[-14]
8.6504	7.93[-14]	1.16[-13]	1.95[-13]	2.75[-13]	1.12[-13]	3.27[-14]	9.83[-14]	1.63[-13]	1.30[-13]	3.63[-14]
11.2455	5.86[-14]	8.57[-14]	1.43[-13]	2.02[-13]	8.26[-14]	2.44[-14]	7.32[-14]	1.22[-13]	1.00[-13]	2.74[-14]
14.6192	4.24[-14]	6.18[-14]	1.03[-13]	1.45[-13]	5.98[-14]	1.78[-14]	5.34[-14]	8.87[-14]	7.55[-14]	2.03[-14]
19.0049	3.02[-14]	4.39[-14]	7.34[-14]	1.03[-13]	4.26[-14]	1.27[-14]	3.82[-14]	6.35[-14]	5.55[-14]	1.47[-14]
24.7064	2.13[-14]	3.08[-14]	5.16[-14]	7.25[-14]	3.00[-14]	8.98[-15]	2.70[-14]	4.48[-14]	4.01[-14]	1.04[-14]
41.7539	1.03[-14]	1.48[-14]	2.48[-14]	3.49[-14]	1.45[-14]	4.35[-15]	1.31[-14]	2.17[-14]	2.01[-14]	5.12[-15]
54.2800	7.08[-15]	1.02[-14]	1.70[-14]	2.40[-14]	9.96[-15]	3.00[-15]	9.01[-15]	1.50[-14]	1.41[-14]	3.54[-15]
91.7332	3.31[-15]	4.76[-15]	7.95[-15]	1.12[-14]	4.66[-15]	1.40[-15]	4.22[-15]	7.02[-15]	6.71[-15]	1.67[-15]

119.2532	2.25[-15]	3.24[-15]	5.41[-15]	7.60[-15]	3.17[-15]	9.56[-16]	2.87[-15]	4.78[-15]	4.60[-15]	1.14[-15]

T$_e$				$2s2p^2(^3P)3s$				$2s2p^2(^1D)3s$		
eV	$^5P_1$	$^5P_2$	$^5P_3$	$^3P_0^b$	$^3P_1^b$	$^3P_2^b$	$^3D_1$	$^3D_2$	$^3D_2$	$^1D_2$
0.1000	2.23[-18]	5.01[-18]	4.49[-18]	1.94[-14]	6.52[-14]	1.26[-12]	9.04[-14]	3.01[-13]	1.44[-12]	2.12[-20]
0.1300	1.77[-17]	3.90[-17]	3.42[-17]	1.91[-14]	6.44[-14]	9.27[-13]	8.84[-14]	2.51[-13]	1.07[-12]	3.02[-19]
0.1690	7.95[-17]	1.73[-16]	1.49[-16]	1.72[-14]	5.83[-14]	6.75[-13]	7.93[-14]	2.04[-13]	7.84[-13]	3.07[-18]
0.2197	2.31[-16]	4.98[-16]	4.23[-16]	1.47[-14]	4.97[-14]	4.87[-13]	6.68[-14]	1.60[-13]	5.68[-13]	2.10[-17]
0.2856	4.92[-16]	1.04[-15]	8.75[-16]	1.21[-14]	4.08[-14]	3.48[-13]	5.36[-14]	1.23[-13]	4.08[-13]	9.27[-17]
0.3713	8.79[-16]	1.81[-15]	1.50[-15]	9.87[-15]	3.32[-14]	2.49[-13]	4.15[-14]	9.21[-14]	2.90[-13]	2.75[-16]
0.4827	1.53[-15]	2.98[-15]	2.44[-15]	8.36[-15]	2.78[-14]	1.79[-13]	3.13[-14]	6.79[-14]	2.05[-13]	6.07[-16]
0.6275	2.70[-15]	4.95[-15]	4.05[-15]	7.67[-15]	2.49[-14]	1.33[-13]	2.33[-14]	4.95[-14]	1.44[-13]	1.15[-15]
0.8157	4.50[-15]	7.92[-15]	6.53[-15]	7.79[-15]	2.47[-14]	1.03[-13]	1.73[-14]	3.61[-14]	1.01[-13]	2.14[-15]
1.0604	6.69[-15]	1.15[-14]	9.60[-15]	8.55[-15]	2.65[-14]	8.61[-14]	1.30[-14]	2.67[-14]	7.19[-14]	4.06[-15]
1.3786	8.74[-15]	1.49[-14]	1.26[-14]	9.58[-15]	2.93[-14]	7.71[-14]	1.02[-14]	2.04[-14]	5.21[-14]	7.32[-15]
1.7922	1.01[-14]	1.72[-14]	1.47[-14]	1.05[-14]	3.18[-14]	7.20[-14]	8.55[-15]	1.66[-14]	3.93[-14]	1.17[-14]
2.3298	1.06[-14]	1.80[-14]	1.56[-14]	1.09[-14]	3.29[-14]	6.76[-14]	7.74[-15]	1.45[-14]	3.12[-14]	1.64[-14]
3.0287	1.02[-14]	1.72[-14]	1.52[-14]	1.07[-14]	3.21[-14]	6.21[-14]	7.54[-15]	1.37[-14]	2.65[-14]	2.03[-14]
3.9374	9.16[-15]	1.54[-14]	1.38[-14]	9.81[-15]	2.95[-14]	5.50[-14]	7.70[-15]	1.36[-14]	2.38[-14]	2.26[-14]
5.1186	7.73[-15]	1.30[-14]	1.17[-14]	8.55[-15]	2.57[-14]	4.68[-14]	7.94[-15]	1.36[-14]	2.21[-14]	2.30[-14]
6.6542	6.23[-15]	1.05[-14]	9.54[-15]	7.10[-15]	2.14[-14]	3.83[-14]	7.96[-15]	1.34[-14]	2.06[-14]	2.17[-14]
8.6504	4.83[-15]	8.13[-15]	7.45[-15]	5.67[-15]	1.70[-14]	3.02[-14]	7.60[-15]	1.27[-14]	1.86[-14]	1.92[-14]
11.2455	3.63[-15]	6.11[-15]	5.63[-15]	4.37[-15]	1.31[-14]	2.31[-14]	6.86[-15]	1.13[-14]	1.62[-14]	1.61[-14]
14.6192	2.67[-15]	4.48[-15]	4.15[-15]	3.28[-15]	9.86[-15]	1.73[-14]	5.86[-15]	9.63[-15]	1.35[-14]	1.29[-14]
19.0049	1.92[-15]	3.23[-15]	3.00[-15]	2.40[-15]	7.23[-15]	1.26[-14]	4.78[-15]	7.82[-15]	1.08[-14]	9.94[-15]
24.7064	1.36[-15]	2.29[-15]	2.14[-15]	1.73[-15]	5.21[-15]	9.07[-15]	3.75[-15]	6.11[-15]	8.39[-15]	7.47[-15]
41.7539	6.65[-16]	1.12[-15]	1.05[-15]	8.63[-16]	2.60[-15]	4.51[-15]	2.10[-15]	3.42[-15]	4.64[-15]	3.94[-15]
54.2800	4.60[-16]	7.73[-16]	7.24[-16]	6.01[-16]	1.81[-15]	3.14[-15]	1.52[-15]	2.47[-15]	3.34[-15]	2.80[-15]
91.7332	2.16[-16]	3.63[-16]	3.41[-16]	2.85[-16]	8.59[-16]	1.49[-15]	7.65[-16]	1.24[-15]	1.67[-15]	1.37[-15]
119.2532	1.47[-16]	2.48[-16]	2.33[-16]	1.95[-16]	5.88[-16]	1.02[-15]	5.34[-16]	8.64[-16]	1.16[-15]	9.43[-16]

T$_e$				$2s^22p4p$						
eV	$^1P_1$	$^3D_1$	$^3D_2$	$^3D_3$	$^3S_1$	$^3P_0$	$^3P_1$	$^3P_2$	$^1D_2$	$^1S_0$
0.1000	1.28[-16]	2.99[-15]	1.45[-14]	5.58[-14]	1.23[-15]	2.51[-14]	8.04[-14]	8.61[-13]	1.53[-13]	1.63[-21]
0.1300	1.25[-16]	2.92[-15]	1.16[-14]	4.12[-14]	1.21[-15]	2.47[-14]	7.94[-14]	6.43[-13]	1.14[-13]	8.31[-20]
0.1690	1.13[-16]	2.61[-15]	9.11[-15]	3.01[-14]	1.10[-15]	2.23[-14]	7.17[-14]	4.75[-13]	8.46[-14]	1.56[-18]
0.2197	9.59[-17]	2.19[-15]	6.98[-15]	2.17[-14]	9.74[-16]	1.88[-14]	6.07[-14]	3.47[-13]	6.19[-14]	1.36[-17]
0.2856	7.90[-17]	1.75[-15]	5.23[-15]	1.55[-14]	9.40[-16]	1.51[-14]	4.88[-14]	2.50[-13]	4.47[-14]	6.57[-17]
0.3713	6.74[-17]	1.35[-15]	3.84[-15]	1.10[-14]	1.11[-15]	1.17[-14]	3.77[-14]	1.79[-13]	3.19[-14]	2.02[-16]
0.4827	6.81[-17]	1.01[-15]	2.79[-15]	7.74[-15]	1.49[-15]	8.81[-15]	2.85[-14]	1.27[-13]	2.27[-14]	4.37[-16]
0.6275	1.22[-16]	7.91[-16]	2.07[-15]	5.51[-15]	1.98[-15]	6.67[-15]	2.15[-14]	8.95[-14]	1.61[-14]	7.30[-16]
0.8157	4.61[-16]	9.13[-16]	2.04[-15]	4.61[-15]	2.59[-15]	5.28[-15]	1.69[-14]	6.43[-14]	1.20[-14]	1.04[-15]
1.0604	1.75[-15]	2.00[-15]	3.67[-15]	6.29[-15]	3.74[-15]	4.73[-15]	1.49[-14]	4.89[-14]	1.07[-14]	1.40[-15]
1.3786	4.92[-15]	4.83[-15]	8.24[-15]	1.22[-14]	6.29[-15]	5.07[-15]	1.57[-14]	4.18[-14]	1.28[-14]	1.97[-15]
1.7922	1.02[-14]	9.65[-15]	1.61[-14]	2.29[-14]	1.08[-14]	6.17[-15]	1.89[-14]	4.12[-14]	1.82[-14]	2.87[-15]
2.3298	1.67[-14]	1.57[-14]	2.61[-14]	3.66[-14]	1.68[-14]	7.64[-15]	2.31[-14]	4.44[-14]	2.55[-14]	4.04[-15]
3.0287	2.26[-14]	2.18[-14]	3.61[-14]	5.04[-14]	2.33[-14]	8.98[-15]	2.71[-14]	4.84[-14]	3.25[-14]	5.26[-15]
3.9374	2.64[-14]	2.64[-14]	4.39[-14]	6.12[-14]	2.86[-14]	9.80[-15]	2.95[-14]	5.07[-14]	3.71[-14]	6.21[-15]
5.1186	2.74[-14]	2.87[-14]	4.78[-14]	6.67[-14]	3.15[-14]	9.92[-15]	2.98[-14]	5.02[-14]	3.86[-14]	6.69[-15]
6.6542	2.60[-14]	2.85[-14]	4.75[-14]	6.64[-14]	3.16[-14]	9.35[-15]	2.81[-14]	4.67[-14]	3.69[-14]	6.61[-15]
8.6504	2.29[-14]	2.62[-14]	4.38[-14]	6.12[-14]	2.93[-14]	8.27[-15]	2.48[-14]	4.10[-14]	3.29[-14]	6.07[-15]
11.2455	1.91[-14]	2.26[-14]	3.78[-14]	5.29[-14]	2.54[-14]	6.94[-15]	2.08[-14]	3.43[-14]	2.77[-14]	5.23[-15]
14.6192	1.52[-14]	1.85[-14]	3.10[-14]	4.34[-14]	2.09[-14]	5.57[-15]	1.67[-14]	2.74[-14]	2.22[-14]	4.28[-15]
19.0049	1.16[-14]	1.45[-14]	2.44[-14]	3.41[-14]	1.65[-14]	4.30[-15]	1.29[-14]	2.11[-14]	1.72[-14]	3.36[-15]
24.7064	8.67[-15]	1.10[-14]	1.85[-14]	2.59[-14]	1.25[-14]	3.23[-15]	9.70[-15]	1.58[-14]	1.29[-14]	2.55[-15]
32.1184	6.32[-15]	8.15[-15]	1.37[-14]	1.92[-14]	9.28[-15]	2.37[-15]	7.11[-15]	1.16[-14]	9.46[-15]	1.89[-15]
41.7539	4.52[-15]	5.91[-15]	9.93[-15]	1.39[-14]	6.73[-15]	1.71[-15]	5.12[-15]	8.35[-15]	6.81[-15]	1.37[-15]
54.2800	3.20[-15]	4.21[-15]	7.08[-15]	9.92[-15]	4.81[-15]	1.21[-15]	3.63[-15]	5.92[-15]	4.83[-15]	9.77[-16]

91.7332	1.55[-15]	2.07[-15]	3.48[-15]	4.88[-15]	2.36[-15]	5.90[-16]	1.77[-15]	2.89[-15]	2.36[-15]	4.80[-16]
119.2532	1.07[-15]	1.43[-15]	2.41[-15]	3.37[-15]	1.64[-15]	4.07[-16]	1.22[-15]	1.99[-15]	1.63[-15]	3.32[-16]

T_e	$2s^22p5p$									
eV	$^1P_1$	$^3S_1$	$^1D_2$	$^3D_1$	$^3D_2$	$^3D_3$	$^3P_0$	$^3P_1$	$^3P_2$	$^1S_0$
0.1000	5.04[-16]	9.98[-16]	2.92[-14]	4.23[-14]	4.96[-14]	4.26[-13]	5.60[-15]	1.78[-14]	3.23[-13]	7.86[-22]
0.1300	4.91[-16]	1.01[-15]	2.89[-14]	4.15[-14]	4.47[-14]	3.21[-13]	5.51[-15]	1.74[-14]	2.36[-13]	4.01[-20]
0.1690	4.40[-16]	9.26[-16]	2.62[-14]	3.73[-14]	3.84[-14]	2.40[-13]	4.98[-15]	1.58[-14]	1.71[-13]	7.53[-19]
0.2197	3.71[-16]	8.11[-16]	2.23[-14]	3.16[-14]	3.15[-14]	1.77[-13]	4.24[-15]	1.34[-14]	1.23[-13]	6.56[-18]
0.2856	3.01[-16]	7.25[-16]	1.82[-14]	2.55[-14]	2.50[-14]	1.29[-13]	3.47[-15]	1.11[-14]	8.80[-14]	3.17[-17]
0.3713	2.42[-16]	7.31[-16]	1.44[-14]	2.01[-14]	1.95[-14]	9.36[-14]	2.77[-15]	8.94[-15]	6.32[-14]	9.72[-17]
0.4827	2.02[-16]	8.37[-16]	1.12[-14]	1.55[-14]	1.50[-14]	6.76[-14]	2.18[-15]	7.17[-15]	4.56[-14]	2.10[-16]
0.6275	1.79[-16]	9.93[-16]	8.71[-15]	1.19[-14]	1.15[-14]	4.88[-14]	1.71[-15]	5.73[-15]	3.31[-14]	3.48[-16]
0.8157	1.72[-16]	1.12[-15]	6.86[-15]	9.08[-15]	8.89[-15]	3.54[-14]	1.37[-15]	4.63[-15]	2.42[-14]	4.69[-16]
1.0604	1.85[-16]	1.19[-15]	5.64[-15]	7.07[-15]	7.11[-15]	2.60[-14]	1.13[-15]	3.85[-15]	1.79[-14]	5.43[-16]
1.3786	2.30[-16]	1.23[-15]	5.04[-15]	5.74[-15]	6.10[-15]	1.97[-14]	1.00[-15]	3.38[-15]	1.37[-14]	5.67[-16]
1.7922	3.49[-16]	1.46[-15]	5.10[-15]	5.00[-15]	5.82[-15]	1.57[-14]	9.71[-16]	3.21[-15]	1.10[-14]	5.73[-16]
2.3298	6.30[-16]	2.32[-15]	5.93[-15]	4.85[-15]	6.36[-15]	1.39[-14]	1.06[-15]	3.42[-15]	9.73[-15]	6.21[-16]
3.0287	1.15[-15]	4.40[-15]	7.60[-15]	5.43[-15]	7.81[-15]	1.42[-14]	1.30[-15]	4.18[-15]	1.00[-14]	7.76[-16]
3.9374	1.90[-15]	7.92[-15]	9.90[-15]	6.79[-15]	1.00[-14]	1.66[-14]	1.72[-15]	5.55[-15]	1.19[-14]	1.05[-15]
5.1186	2.69[-15]	1.22[-14]	1.23[-14]	8.60[-15]	1.25[-14]	2.02[-14]	2.24[-15]	7.26[-15]	1.48[-14]	1.38[-15]
6.6542	3.31[-15]	1.61[-14]	1.40[-14]	1.02[-14]	1.44[-14]	2.36[-14]	2.68[-15]	8.74[-15]	1.74[-14]	1.66[-15]
8.6504	3.59[-15]	1.83[-14]	1.45[-14]	1.10[-14]	1.51[-14]	2.53[-14]	2.90[-15]	9.52[-15]	1.88[-14]	1.79[-15]
11.2455	3.52[-15]	1.86[-14]	1.38[-14]	1.09[-14]	1.46[-14]	2.48[-14]	2.86[-15]	9.43[-15]	1.86[-14]	1.75[-15]
14.6192	3.18[-15]	1.73[-14]	1.23[-14]	9.91[-15]	1.30[-14]	2.26[-14]	2.61[-15]	8.61[-15]	1.70[-14]	1.59[-15]
19.0049	2.69[-15]	1.49[-14]	1.03[-14]	8.46[-15]	1.10[-14]	1.92[-14]	2.22[-15]	7.36[-15]	1.45[-14]	1.35[-15]
24.7064	2.16[-15]	1.22[-14]	8.22[-15]	6.85[-15]	8.80[-15]	1.56[-14]	1.80[-15]	5.97[-15]	1.18[-14]	1.09[-15]
41.7539	1.25[-15]	7.20[-15]	4.72[-15]	4.01[-15]	5.08[-15]	9.11[-15]	1.05[-15]	3.50[-15]	6.89[-15]	6.33[-16]
54.2800	9.14[-16]	5.30[-15]	3.44[-15]	2.95[-15]	3.72[-15]	6.69[-15]	7.73[-16]	2.57[-15]	5.06[-15]	4.64[-16]
91.7332	4.64[-16]	2.72[-15]	1.75[-15]	1.51[-15]	1.89[-15]	3.42[-15]	3.95[-16]	1.31[-15]	2.59[-15]	2.36[-16]
119.2532	3.25[-16]	1.91[-15]	1.22[-15]	1.06[-15]	1.32[-15]	2.40[-15]	2.77[-16]	9.21[-16]	1.82[-15]	1.66[-16]

T_e	$2s^22p6p$									
eV	$^1P_1$	$^3D_1$	$^3D_2$	$^3S_1$	$^3D_3$	$^3P_0$	$^3P_1$	$^3P_2$	$^1D_2$	$^1S_0$
0.1000	7.57[-16]	3.18[-15]	8.45[-15]	1.94[-15]	7.38[-15]	3.24[-15]	1.04[-14]	1.86[-13]	1.03[-15]	6.50[-22]
0.1300	7.43[-16]	3.15[-15]	7.53[-15]	1.94[-15]	7.16[-15]	3.19[-15]	1.02[-14]	1.36[-13]	7.61[-16]	3.31[-20]
0.1690	6.70[-16]	2.85[-15]	6.40[-15]	1.76[-15]	6.43[-15]	2.87[-15]	9.17[-15]	9.92[-14]	5.60[-16]	6.23[-19]
0.2197	5.66[-16]	2.42[-15]	5.20[-15]	1.51[-15]	5.43[-15]	2.42[-15]	7.73[-15]	7.14[-14]	4.07[-16]	5.43[-18]
0.2856	4.60[-16]	1.96[-15]	4.07[-15]	1.26[-15]	4.37[-15]	1.94[-15]	6.20[-15]	5.09[-14]	2.94[-16]	2.62[-17]
0.3713	3.70[-16]	1.54[-15]	3.09[-15]	1.08[-15]	3.38[-15]	1.50[-15]	4.78[-15]	3.59[-14]	2.14[-16]	8.04[-17]
0.4827	3.05[-16]	1.21[-15]	2.29[-15]	9.90[-16]	2.55[-15]	1.13[-15]	3.60[-15]	2.52[-14]	1.61[-16]	1.74[-16]
0.6275	2.64[-16]	9.65[-16]	1.68[-15]	9.66[-16]	1.89[-15]	8.36[-16]	2.68[-15]	1.75[-14]	1.38[-16]	2.88[-16]
0.8157	2.41[-16]	7.85[-16]	1.23[-15]	9.60[-16]	1.40[-15]	6.25[-16]	2.01[-15]	1.22[-14]	1.75[-16]	3.88[-16]
1.0604	2.32[-16]	6.55[-16]	9.22[-16]	9.36[-16]	1.07[-15]	4.82[-16]	1.54[-15]	8.59[-15]	3.43[-16]	4.50[-16]
1.3786	2.42[-16]	5.80[-16]	7.62[-16]	8.97[-16]	9.01[-16]	3.95[-16]	1.25[-15]	6.17[-15]	7.58[-16]	4.71[-16]
1.7922	2.93[-16]	6.12[-16]	8.36[-16]	8.97[-16]	1.04[-15]	3.56[-16]	1.11[-15]	4.61[-15]	1.60[-15]	4.77[-16]
2.3298	4.40[-16]	8.62[-16]	1.33[-15]	1.05[-15]	1.76[-15]	3.60[-16]	1.12[-15]	3.73[-15]	3.10[-15]	5.20[-16]
3.0287	7.37[-16]	1.42[-15]	2.36[-15]	1.47[-15]	3.25[-15]	4.14[-16]	1.28[-15]	3.39[-15]	5.31[-15]	6.54[-16]
3.9374	1.19[-15]	2.23[-15]	3.82[-15]	2.16[-15]	5.34[-15]	5.13[-16]	1.60[-15]	3.50[-15]	7.91[-15]	8.97[-16]
5.1186	1.70[-15]	3.09[-15]	5.29[-15]	2.97[-15]	7.46[-15]	6.31[-16]	1.98[-15]	3.84[-15]	1.03[-14]	1.20[-15]
6.6542	2.14[-15]	3.73[-15]	6.35[-15]	3.63[-15]	9.00[-15]	7.28[-16]	2.31[-15]	4.16[-15]	1.18[-14]	1.47[-15]
8.6504	2.38[-15]	4.01[-15]	6.76[-15]	3.97[-15]	9.59[-15]	7.71[-16]	2.45[-15]	4.27[-15]	1.21[-14]	1.63[-15]
11.2455	2.38[-15]	3.90[-15]	6.51[-15]	3.94[-15]	9.26[-15]	7.50[-16]	2.40[-15]	4.08[-15]	1.14[-14]	1.64[-15]
14.6192	2.19[-15]	3.50[-15]	5.80[-15]	3.59[-15]	8.26[-15]	6.78[-16]	2.17[-15]	3.64[-15]	1.01[-14]	1.51[-15]
19.0049	1.88[-15]	2.95[-15]	4.85[-15]	3.07[-15]	6.92[-15]	5.75[-16]	1.84[-15]	3.07[-15]	8.34[-15]	1.30[-15]
24.7064	1.53[-15]	2.36[-15]	3.87[-15]	2.48[-15]	5.52[-15]	4.64[-16]	1.49[-15]	2.47[-15]	6.61[-15]	1.07[-15]
32.1184	1.20[-15]	1.82[-15]	2.97[-15]	1.93[-15]	4.25[-15]	3.60[-16]	1.16[-15]	1.91[-15]	5.05[-15]	8.34[-16]
41.7539	9.04[-16]	1.36[-15]	2.22[-15]	1.46[-15]	3.17[-15]	2.70[-16]	8.71[-16]	1.43[-15]	3.76[-15]	6.32[-16]

54.2800	6.66[-16]	9.96[-16]	1.62[-15]	1.07[-15]	2.31[-15]	1.98[-16]	6.39[-16]	1.05[-15]	2.73[-15]	4.66[-16]
91.7332	3.41[-16]	5.06[-16]	8.17[-16]	5.47[-16]	1.17[-15]	1.01[-16]	3.26[-16]	5.35[-16]	1.38[-15]	2.40[-16]
119.2532	2.40[-16]	3.54[-16]	5.71[-16]	3.83[-16]	8.17[-16]	7.10[-17]	2.29[-16]	3.75[-16]	9.63[-16]	1.68[-16]

T_e					$2s^22p7p$					
eV	$^1P_1$	$^3D_1$	$^3D_2$	$^3S_1$	$^3P_0$	$^3D_3$	$^3P_1$	$^3P_2$	$^1D_2$	$^1S_0$
0.1000	1.57[-15]	3.18[-15]	1.54[-14]	1.84[-15]	1.57[-15]	6.36[-15]	5.35[-15]	1.33[-13]	2.14[-15]	7.45[-22]
0.1300	1.56[-15]	3.16[-15]	1.23[-14]	1.82[-15]	1.55[-15]	6.41[-15]	5.23[-15]	9.65[-14]	1.57[-15]	3.80[-20]
0.1690	1.41[-15]	2.88[-15]	9.67[-15]	1.65[-15]	1.40[-15]	5.89[-15]	4.70[-15]	6.94[-14]	1.14[-15]	7.13[-19]
0.2197	1.20[-15]	2.45[-15]	7.42[-15]	1.41[-15]	1.18[-15]	5.04[-15]	3.96[-15]	4.94[-14]	8.24[-16]	6.22[-18]
0.2856	9.99[-16]	2.02[-15]	5.57[-15]	1.17[-15]	9.46[-16]	4.09[-15]	3.18[-15]	3.49[-14]	5.88[-16]	3.00[-17]
0.3713	8.47[-16]	1.66[-15]	4.11[-15]	1.02[-15]	7.35[-16]	3.19[-15]	2.48[-15]	2.44[-14]	4.16[-16]	9.21[-17]
0.4827	7.65[-16]	1.41[-15]	2.99[-15]	9.51[-16]	5.62[-16]	2.43[-15]	1.92[-15]	1.71[-14]	2.92[-16]	1.99[-16]
0.6275	7.35[-16]	1.26[-15]	2.16[-15]	9.49[-16]	4.29[-16]	1.82[-15]	1.50[-15]	1.19[-14]	2.10[-16]	3.30[-16]
0.8157	7.24[-16]	1.15[-15]	1.57[-15]	9.62[-16]	3.31[-16]	1.38[-15]	1.19[-15]	8.26[-15]	1.71[-16]	4.46[-16]
1.0604	7.09[-16]	1.07[-15]	1.17[-15]	9.56[-16]	2.61[-16]	1.06[-15]	9.58[-16]	5.77[-15]	2.03[-16]	5.20[-16]
1.3786	6.87[-16]	9.80[-16]	9.09[-16]	9.25[-16]	2.15[-16]	8.74[-16]	7.97[-16]	4.09[-15]	3.55[-16]	5.46[-16]
1.7922	6.87[-16]	9.38[-16]	8.30[-16]	9.07[-16]	1.91[-16]	8.72[-16]	7.07[-16]	2.99[-15]	7.55[-16]	5.45[-16]
2.3298	8.04[-16]	1.06[-15]	1.08[-15]	1.02[-15]	2.03[-16]	1.26[-15]	7.43[-16]	2.44[-15]	1.64[-15]	5.58[-16]
3.0287	1.18[-15]	1.55[-15]	1.88[-15]	1.44[-15]	2.78[-16]	2.32[-15]	1.02[-15]	2.56[-15]	3.21[-15]	6.35[-16]
3.9374	1.93[-15]	2.54[-15]	3.37[-15]	2.34[-15]	4.36[-16]	4.14[-15]	1.65[-15]	3.49[-15]	5.34[-15]	7.98[-16]
5.1186	2.97[-15]	3.91[-15]	5.31[-15]	3.63[-15]	6.58[-16]	6.40[-15]	2.56[-15]	5.10[-15]	7.50[-15]	1.01[-15]
6.6542	4.02[-15]	5.30[-15]	7.17[-15]	4.98[-15]	8.82[-16]	8.47[-15]	3.52[-15]	6.91[-15]	9.08[-15]	1.21[-15]
8.6504	4.76[-15]	6.29[-15]	8.43[-15]	5.97[-15]	1.04[-15]	9.77[-15]	4.22[-15]	8.28[-15]	9.73[-15]	1.32[-15]
11.2455	5.01[-15]	6.63[-15]	8.80[-15]	6.34[-15]	1.09[-15]	1.01[-14]	4.50[-15]	8.83[-15]	9.43[-15]	1.32[-15]
14.6192	4.79[-15]	6.34[-15]	8.35[-15]	6.11[-15]	1.04[-15]	9.43[-15]	4.34[-15]	8.54[-15]	8.44[-15]	1.22[-15]
19.0049	4.25[-15]	5.62[-15]	7.34[-15]	5.44[-15]	9.21[-16]	8.22[-15]	3.86[-15]	7.63[-15]	7.09[-15]	1.05[-15]
24.7064	3.54[-15]	4.68[-15]	6.09[-15]	4.55[-15]	7.66[-16]	6.77[-15]	3.23[-15]	6.39[-15]	5.67[-15]	8.61[-16]
41.7539	2.15[-15]	2.85[-15]	3.67[-15]	2.78[-15]	4.65[-16]	4.05[-15]	1.97[-15]	3.92[-15]	3.26[-15]	5.11[-16]
54.2800	1.60[-15]	2.12[-15]	2.73[-15]	2.07[-15]	3.45[-16]	2.99[-15]	1.47[-15]	2.92[-15]	2.38[-15]	3.77[-16]
91.7332	8.32[-16]	1.10[-15]	1.41[-15]	1.08[-15]	1.79[-16]	1.54[-15]	7.67[-16]	1.53[-15]	1.21[-15]	1.94[-16]
119.2532	5.87[-16]	7.76[-16]	9.95[-16]	7.62[-16]	1.27[-16]	1.09[-15]	5.41[-16]	1.08[-15]	8.45[-16]	1.37[-16]

T_e					$2s^22p8p$					
eV	$^3S_1$	$^3D_1$	$^3D_2$	$^1P_1$	$^3P_0$	$^3P_1$	$^3D_3$	$^3P_2$	$^1D_2$	$^1S_0$
0.1000	9.71[-16]	6.71[-15]	3.57[-14]	1.45[-15]	1.64[-16]	1.89[-15]	1.98[-14]	1.10[-13]	2.74[-15]	1.44[-21]
0.1300	9.73[-16]	6.56[-15]	2.86[-14]	1.43[-15]	1.61[-16]	1.84[-15]	1.97[-14]	7.89[-14]	2.08[-15]	7.32[-20]
0.1690	9.26[-16]	5.88[-15]	2.24[-14]	1.29[-15]	1.46[-16]	1.64[-15]	1.79[-14]	5.59[-14]	1.56[-15]	1.37[-18]
0.2197	1.03[-15]	4.95[-15]	1.72[-14]	1.12[-15]	1.25[-16]	1.38[-15]	1.53[-14]	3.92[-14]	1.15[-15]	1.19[-17]
0.2856	1.77[-15]	3.97[-15]	1.29[-14]	1.01[-15]	1.10[-16]	1.13[-15]	1.24[-14]	2.74[-14]	8.39[-16]	5.75[-17]
0.3713	3.64[-15]	3.10[-15]	9.53[-15]	1.06[-15]	1.08[-16]	9.36[-16]	9.65[-15]	1.90[-14]	6.07[-16]	1.76[-16]
0.4827	6.62[-15]	2.40[-15]	6.98[-15]	1.28[-15]	1.21[-16]	8.16[-16]	7.37[-15]	1.33[-14]	4.40[-16]	3.81[-16]
0.6275	9.98[-15]	1.86[-15]	5.11[-15]	1.57[-15]	1.44[-16]	7.54[-16]	5.58[-15]	9.34[-15]	3.32[-16]	6.34[-16]
0.8157	1.27[-14]	1.48[-15]	3.79[-15]	1.82[-15]	1.67[-16]	7.23[-16]	4.25[-15]	6.65[-15]	3.02[-16]	8.68[-16]
1.0604	1.42[-14]	1.21[-15]	2.88[-15]	1.95[-15]	1.83[-16]	7.02[-16]	3.32[-15]	4.81[-15]	3.96[-16]	1.04[-15]
1.3786	1.43[-14]	1.04[-15]	2.28[-15]	1.95[-15]	1.92[-16]	6.85[-16]	2.71[-15]	3.56[-15]	6.60[-16]	1.14[-15]
1.7922	1.33[-14]	9.57[-16]	1.95[-15]	1.86[-15]	1.99[-16]	6.81[-16]	2.41[-15]	2.73[-15]	1.16[-15]	1.17[-15]
2.3298	1.18[-14]	1.01[-15]	1.96[-15]	1.76[-15]	2.16[-16]	7.27[-16]	2.50[-15]	2.31[-15]	2.06[-15]	1.16[-15]
3.0287	1.03[-14]	1.30[-15]	2.45[-15]	1.78[-15]	2.65[-16]	8.98[-16]	3.18[-15]	2.41[-15]	3.57[-15]	1.14[-15]
3.9374	9.23[-15]	1.92[-15]	3.51[-15]	2.05[-15]	3.62[-16]	1.26[-15]	4.51[-15]	3.24[-15]	5.65[-15]	1.15[-15]
5.1186	8.67[-15]	2.81[-15]	4.98[-15]	2.60[-15]	5.01[-16]	1.80[-15]	6.24[-15]	4.73[-15]	7.87[-15]	1.21[-15]
6.6542	8.43[-15]	3.73[-15]	6.45[-15]	3.26[-15]	6.42[-16]	2.38[-15]	7.84[-15]	6.48[-15]	9.61[-15]	1.29[-15]
8.6504	8.19[-15]	4.41[-15]	7.45[-15]	3.78[-15]	7.41[-16]	2.80[-15]	8.83[-15]	7.90[-15]	1.04[-14]	1.34[-15]
11.2455	7.68[-15]	4.66[-15]	7.73[-15]	3.98[-15]	7.71[-16]	2.96[-15]	8.98[-15]	8.56[-15]	1.03[-14]	1.31[-15]
14.6192	6.87[-15]	4.48[-15]	7.34[-15]	3.84[-15]	7.33[-16]	2.85[-15]	8.39[-15]	8.38[-15]	9.32[-15]	1.21[-15]
19.0049	5.84[-15]	3.98[-15]	6.46[-15]	3.43[-15]	6.48[-16]	2.54[-15]	7.30[-15]	7.56[-15]	7.92[-15]	1.05[-15]
24.7064	4.75[-15]	3.33[-15]	5.37[-15]	2.88[-15]	5.39[-16]	2.12[-15]	6.01[-15]	6.40[-15]	6.40[-15]	8.63[-16]
32.1184	3.71[-15]	2.66[-15]	4.25[-15]	2.31[-15]	4.28[-16]	1.69[-15]	4.73[-15]	5.14[-15]	4.97[-15]	6.82[-16]

41.7539	2.81[-15]	2.04[-15]	3.25[-15]	1.78[-15]	3.28[-16]	1.30[-15]	3.59[-15]	3.97[-15]	3.73[-15]	5.20[-16]
54.2800	2.08[-15]	1.52[-15]	2.42[-15]	1.33[-15]	2.44[-16]	9.71[-16]	2.66[-15]	2.97[-15]	2.74[-15]	3.86[-16]
91.7332	1.07[-15]	7.92[-16]	1.25[-15]	6.95[-16]	1.27[-16]	5.07[-16]	1.37[-15]	1.56[-15]	1.40[-15]	2.00[-16]
119.2532	7.53[-16]	5.60[-16]	8.85[-16]	4.91[-16]	8.95[-17]	3.58[-16]	9.66[-16]	1.10[-15]	9.80[-16]	1.41[-16]

T_e	$2s2p^2(^1S)3s$		$2s2p^2(^3P)3d$							
eV	$^3S_1$	$^1S_0$	$^5F_1$	$^5F_2$	$^5F_3$	$^5F_4$	$^5F_5$	$^5D_1$	$^5D_2$	$^5D_3$
0.1000	2.00[-14]	6.09[-21]	5.07[-16]	5.83[-16]	7.45[-16]	7.77[-16]	5.15[-16]	8.34[-17]	2.91[-16]	5.63[-16]
0.1300	1.99[-14]	3.10[-19]	4.08[-15]	4.75[-15]	6.20[-15]	6.60[-15]	4.50[-15]	7.47[-16]	2.60[-15]	4.88[-15]
0.1690	1.81[-14]	5.83[-18]	1.85[-14]	2.19[-14]	2.89[-14]	3.13[-14]	2.18[-14]	3.71[-15]	1.29[-14]	2.37[-14]
0.2197	1.58[-14]	5.08[-17]	5.42[-14]	6.46[-14]	8.65[-14]	9.46[-14]	6.70[-14]	1.17[-14]	4.05[-14]	7.34[-14]
0.2856	1.43[-14]	2.45[-16]	1.13[-13]	1.36[-13]	1.84[-13]	2.02[-13]	1.45[-13]	2.58[-14]	8.94[-14]	1.61[-13]
0.3713	1.50[-14]	7.53[-16]	1.82[-13]	2.20[-13]	2.99[-13]	3.32[-13]	2.40[-13]	4.34[-14]	1.50[-13]	2.68[-13]
0.4827	1.79[-14]	1.63[-15]	2.40[-13]	2.91[-13]	3.98[-13]	4.45[-13]	3.24[-13]	5.92[-14]	2.05[-13]	3.65[-13]
0.6275	2.19[-14]	2.70[-15]	2.72[-13]	3.32[-13]	4.55[-13]	5.10[-13]	3.73[-13]	6.90[-14]	2.39[-13]	4.23[-13]
0.8157	2.50[-14]	3.65[-15]	2.76[-13]	3.39[-13]	4.65[-13]	5.21[-13]	3.83[-13]	7.17[-14]	2.48[-13]	4.37[-13]
1.0604	2.62[-14]	4.25[-15]	2.59[-13]	3.20[-13]	4.38[-13]	4.91[-13]	3.62[-13]	6.84[-14]	2.36[-13]	4.14[-13]
1.3786	2.52[-14]	4.45[-15]	2.29[-13]	2.87[-13]	3.89[-13]	4.35[-13]	3.23[-13]	6.16[-14]	2.12[-13]	3.70[-13]
1.7922	2.26[-14]	4.34[-15]	1.95[-13]	2.48[-13]	3.32[-13]	3.70[-13]	2.75[-13]	5.33[-14]	1.82[-13]	3.16[-13]
2.3298	1.93[-14]	4.06[-15]	1.61[-13]	2.08[-13]	2.75[-13]	3.04[-13]	2.28[-13]	4.46[-14]	1.51[-13]	2.61[-13]
3.0287	1.60[-14]	3.72[-15]	1.29[-13]	1.69[-13]	2.21[-13]	2.43[-13]	1.83[-13]	3.62[-14]	1.21[-13]	2.10[-13]
3.9374	1.33[-14]	3.37[-15]	1.01[-13]	1.34[-13]	1.73[-13]	1.89[-13]	1.43[-13]	2.86[-14]	9.52[-14]	1.64[-13]
5.1186	1.13[-14]	3.01[-15]	7.69[-14]	1.04[-13]	1.32[-13]	1.44[-13]	1.09[-13]	2.20[-14]	7.29[-14]	1.25[-13]
6.6542	9.88[-15]	2.64[-15]	5.74[-14]	7.82[-14]	9.90[-14]	1.07[-13]	8.18[-14]	1.66[-14]	5.46[-14]	9.36[-14]
8.6504	8.76[-15]	2.26[-15]	4.21[-14]	5.78[-14]	7.27[-14]	7.82[-14]	6.00[-14]	1.22[-14]	4.01[-14]	6.86[-14]
11.2455	7.69[-15]	1.86[-15]	3.04[-14]	4.20[-14]	5.25[-14]	5.63[-14]	4.33[-14]	8.87[-15]	2.89[-14]	4.94[-14]
14.6192	6.56[-15]	1.49[-15]	2.16[-14]	3.00[-14]	3.73[-14]	3.99[-14]	3.08[-14]	6.33[-15]	2.06[-14]	3.52[-14]
19.0049	5.40[-15]	1.16[-15]	1.52[-14]	2.12[-14]	2.63[-14]	2.80[-14]	2.17[-14]	4.47[-15]	1.45[-14]	2.47[-14]
24.7064	4.29[-15]	8.74[-16]	1.06[-14]	1.48[-14]	1.83[-14]	1.95[-14]	1.51[-14]	3.12[-15]	1.01[-14]	1.72[-14]
41.7539	2.47[-15]	4.67[-16]	5.04[-15]	7.09[-15]	8.74[-15]	9.29[-15]	7.21[-15]	1.49[-15]	4.82[-15]	8.21[-15]
54.2800	1.81[-15]	3.33[-16]	3.46[-15]	4.87[-15]	5.99[-15]	6.36[-15]	4.94[-15]	1.02[-15]	3.31[-15]	5.63[-15]
91.7332	9.25[-16]	1.64[-16]	1.61[-15]	2.27[-15]	2.79[-15]	2.95[-15]	2.30[-15]	4.77[-16]	1.54[-15]	2.62[-15]
119.2532	6.49[-16]	1.13[-16]	1.09[-15]	1.54[-15]	1.89[-15]	2.01[-15]	1.56[-15]	3.24[-16]	1.04[-15]	1.78[-15]

T_e	$2s2p^2(^3P)3d$									
eV	$^5D_3$	$^5D_4$	$^5P_3$	$^5P_2$	$^5P_1$	$^3P^b_2$	$^3P^b_1$	$^3P^b_0$	$^3F^b_2$	$^3F^b_3$
0.1000	4.68[-16]	2.53[-16]	9.63[-16]	1.05[-15]	4.84[-16]	2.66[-13]	1.41[-13]	4.79[-14]	7.66[-15]	2.53[-13]
0.1300	4.02[-15]	2.26[-15]	7.48[-15]	8.29[-15]	3.86[-15]	2.60[-13]	1.43[-13]	4.84[-14]	1.07[-14]	1.85[-13]
0.1690	1.95[-14]	1.12[-14]	3.32[-14]	3.71[-14]	1.74[-14]	2.62[-13]	1.47[-13]	4.91[-14]	3.02[-14]	1.60[-13]
0.2197	6.03[-14]	3.54[-14]	9.54[-14]	1.08[-13]	5.07[-14]	2.97[-13]	1.68[-13]	5.57[-14]	8.24[-14]	1.95[-13]
0.2856	1.32[-13]	7.85[-14]	1.97[-13]	2.23[-13]	1.05[-13]	3.73[-13]	2.13[-13]	7.04[-14]	1.71[-13]	2.94[-13]
0.3713	2.21[-13]	1.33[-13]	3.14[-13]	3.57[-13]	1.69[-13]	4.69[-13]	2.71[-13]	8.92[-14]	2.78[-13]	4.28[-13]
0.4827	3.00[-13]	1.82[-13]	4.12[-13]	4.68[-13]	2.22[-13]	5.47[-13]	3.18[-13]	1.05[-13]	3.70[-13]	5.48[-13]
0.6275	3.49[-13]	2.13[-13]	4.65[-13]	5.29[-13]	2.51[-13]	5.79[-13]	3.39[-13]	1.12[-13]	4.22[-13]	6.17[-13]
0.8157	3.61[-13]	2.22[-13]	4.70[-13]	5.34[-13]	2.54[-13]	5.63[-13]	3.31[-13]	1.10[-13]	4.30[-13]	6.25[-13]
1.0604	3.43[-13]	2.15[-13]	4.38[-13]	4.96[-13]	2.36[-13]	5.11[-13]	3.02[-13]	1.00[-13]	4.03[-13]	5.84[-13]
1.3786	3.09[-13]	1.97[-13]	3.87[-13]	4.35[-13]	2.08[-13]	4.40[-13]	2.61[-13]	8.67[-14]	3.57[-13]	5.16[-13]
1.7922	2.66[-13]	1.73[-13]	3.28[-13]	3.65[-13]	1.75[-13]	3.65[-13]	2.17[-13]	7.22[-14]	3.03[-13]	4.37[-13]
2.3298	2.22[-13]	1.48[-13]	2.69[-13]	2.97[-13]	1.42[-13]	2.94[-13]	1.75[-13]	5.84[-14]	2.50[-13]	3.59[-13]
3.0287	1.80[-13]	1.23[-13]	2.15[-13]	2.35[-13]	1.13[-13]	2.31[-13]	1.38[-13]	4.60[-14]	2.00[-13]	2.87[-13]
3.9374	1.42[-13]	9.93[-14]	1.68[-13]	1.81[-13]	8.71[-14]	1.78[-13]	1.06[-13]	3.54[-14]	1.57[-13]	2.24[-13]
5.1186	1.09[-13]	7.79[-14]	1.28[-13]	1.37[-13]	6.59[-14]	1.34[-13]	8.02[-14]	2.67[-14]	1.20[-13]	1.70[-13]
6.6542	8.20[-14]	5.95[-14]	9.54[-14]	1.01[-13]	4.88[-14]	9.92[-14]	5.94[-14]	1.98[-14]	8.99[-14]	1.27[-13]
8.6504	6.05[-14]	4.44[-14]	6.98[-14]	7.38[-14]	3.56[-14]	7.23[-14]	4.32[-14]	1.44[-14]	6.61[-14]	9.34[-14]
11.2455	4.38[-14]	3.25[-14]	5.03[-14]	5.29[-14]	2.55[-14]	5.19[-14]	3.10[-14]	1.03[-14]	4.78[-14]	6.74[-14]
14.6192	3.13[-14]	2.34[-14]	3.58[-14]	3.75[-14]	1.81[-14]	3.68[-14]	2.20[-14]	7.33[-15]	3.41[-14]	4.80[-14]
19.0049	2.21[-14]	1.66[-14]	2.51[-14]	2.63[-14]	1.27[-14]	2.59[-14]	1.55[-14]	5.15[-15]	2.40[-14]	3.38[-14]
24.7064	1.54[-14]	1.16[-14]	1.75[-14]	1.83[-14]	8.82[-15]	1.80[-14]	1.08[-14]	3.59[-15]	1.68[-14]	2.36[-14]

32.1184	1.07[-14]	8.10[-15]	1.21[-14]	1.26[-14]	6.10[-15]	1.25[-14]	7.45[-15]	2.48[-15]	1.16[-14]	1.64[-14]
41.7539	7.37[-15]	5.60[-15]	8.35[-15]	8.67[-15]	4.19[-15]	8.58[-15]	5.13[-15]	1.71[-15]	8.02[-15]	1.13[-14]
54.2800	5.05[-15]	3.85[-15]	5.72[-15]	5.94[-15]	2.87[-15]	5.88[-15]	3.51[-15]	1.17[-15]	5.50[-15]	7.73[-15]
91.7332	2.35[-15]	1.80[-15]	2.66[-15]	2.76[-15]	1.33[-15]	2.73[-15]	1.63[-15]	5.43[-16]	2.56[-15]	3.60[-15]
119.2532	1.60[-15]	1.22[-15]	1.81[-15]	1.87[-15]	9.04[-16]	1.86[-15]	1.11[-15]	3.69[-16]	1.74[-15]	2.45[-15]

T$_e$	$2s2p^2(^3P)3d$				$2s2p^2(^3P)4s$					
eV	$^3F_4^b$	$^3D_1^b$	$^3D_2^b$	$^3D_3^b$	$^5P_1$	$^5P_2$	$^5P_3$	$^3P_0^b$	$^3P_1^b$	$^3P_2^b$
0.1000	3.20[-12]	1.72[-13]	3.56[-13]	1.07[-12]	6.11[-19]	1.34[-18]	1.17[-18]	2.65[-14]	8.22[-14]	7.88[-13]
0.1300	2.26[-12]	1.70[-13]	3.32[-13]	8.65[-13]	4.84[-18]	1.05[-17]	8.90[-18]	2.60[-14]	8.11[-14]	5.97[-13]
0.1690	1.61[-12]	1.61[-13]	3.03[-13]	7.03[-13]	2.18[-17]	4.63[-17]	3.87[-17]	2.35[-14]	7.34[-14]	4.47[-13]
0.2197	1.21[-12]	1.62[-13]	2.94[-13]	6.05[-13]	6.33[-17]	1.33[-16]	1.10[-16]	1.98[-14]	6.21[-14]	3.30[-13]
0.2856	1.02[-12]	1.81[-13]	3.20[-13]	5.83[-13]	1.34[-16]	2.78[-16]	2.27[-16]	1.59[-14]	4.99[-14]	2.40[-13]
0.3713	9.59[-13]	2.15[-13]	3.73[-13]	6.17[-13]	2.35[-16]	4.77[-16]	3.84[-16]	1.23[-14]	3.88[-14]	1.73[-13]
0.4827	9.57[-13]	2.48[-13]	4.26[-13]	6.66[-13]	3.94[-16]	7.62[-16]	6.07[-16]	9.39[-15]	2.95[-14]	1.24[-13]
0.6275	9.42[-13]	2.66[-13]	4.55[-13]	6.90[-13]	6.66[-16]	1.22[-15]	9.73[-16]	7.16[-15]	2.24[-14]	8.84[-14]
0.8157	8.87[-13]	2.64[-13]	4.49[-13]	6.70[-13]	1.09[-15]	1.91[-15]	1.53[-15]	5.61[-15]	1.75[-14]	6.40[-14]
1.0604	7.95[-13]	2.44[-13]	4.15[-13]	6.14[-13]	1.61[-15]	2.77[-15]	2.24[-15]	4.66[-15]	1.45[-14]	4.77[-14]
1.3786	6.83[-13]	2.14[-13]	3.64[-13]	5.35[-13]	2.12[-15]	3.60[-15]	2.95[-15]	4.12[-15]	1.27[-14]	3.72[-14]
1.7922	5.67[-13]	1.80[-13]	3.07[-13]	4.50[-13]	2.48[-15]	4.19[-15]	3.48[-15]	3.83[-15]	1.17[-14]	3.04[-14]
2.3298	4.58[-13]	1.47[-13]	2.51[-13]	3.67[-13]	2.63[-15]	4.43[-15]	3.71[-15]	3.61[-15]	1.10[-14]	2.56[-14]
3.0287	3.61[-13]	1.18[-13]	2.00[-13]	2.92[-13]	2.56[-15]	4.28[-15]	3.62[-15]	3.35[-15]	1.02[-14]	2.19[-14]
3.9374	2.79[-13]	9.16[-14]	1.56[-13]	2.27[-13]	2.30[-15]	3.86[-15]	3.28[-15]	3.01[-15]	9.11[-15]	1.85[-14]
5.1186	2.11[-13]	7.00[-14]	1.19[-13]	1.73[-13]	1.96[-15]	3.27[-15]	2.80[-15]	2.60[-15]	7.86[-15]	1.54[-14]
6.6542	1.57[-13]	5.25[-14]	8.93[-14]	1.29[-13]	1.58[-15]	2.64[-15]	2.27[-15]	2.17[-15]	6.55[-15]	1.26[-14]
8.6504	1.14[-13]	3.87[-14]	6.58[-14]	9.50[-14]	1.23[-15]	2.05[-15]	1.77[-15]	1.75[-15]	5.29[-15]	9.99[-15]
11.2455	8.21[-14]	2.82[-14]	4.78[-14]	6.88[-14]	9.24[-16]	1.54[-15]	1.33[-15]	1.37[-15]	4.14[-15]	7.77[-15]
14.6192	5.83[-14]	2.02[-14]	3.43[-14]	4.92[-14]	6.79[-16]	1.13[-15]	9.81[-16]	1.04[-15]	3.16[-15]	5.91[-15]
19.0049	4.10[-14]	1.43[-14]	2.43[-14]	3.48[-14]	4.89[-16]	8.16[-16]	7.08[-16]	7.75[-16]	2.36[-15]	4.41[-15]
24.7064	2.86[-14]	1.01[-14]	1.71[-14]	2.44[-14]	3.47[-16]	5.79[-16]	5.03[-16]	5.67[-16]	1.73[-15]	3.23[-15]
41.7539	1.36[-14]	4.86[-15]	8.22[-15]	1.17[-14]	1.70[-16]	2.83[-16]	2.46[-16]	2.90[-16]	8.87[-16]	1.66[-15]
54.2800	9.32[-15]	3.35[-15]	5.66[-15]	8.04[-15]	1.17[-16]	1.95[-16]	1.70[-16]	2.03[-16]	6.24[-16]	1.17[-15]
91.7332	4.33[-15]	1.57[-15]	2.65[-15]	3.75[-15]	5.51[-17]	9.18[-17]	8.00[-17]	9.79[-17]	3.01[-16]	5.65[-16]
119.2532	2.94[-15]	1.07[-15]	1.80[-15]	2.55[-15]	3.76[-17]	6.26[-17]	5.45[-17]	6.73[-17]	2.07[-16]	3.89[-16]

T$_e$	$2s^22p4f$									
eV	$^3F_2$	$^3F_3$	$^3F_4$	$^3G_3$	$^3G_4$	$^3D_3$	$^3G_5$	$^3D_2$	$^1G_4$	$^3D_1$
0.1000	1.02[-19]	6.04[-20]	7.76[-16]	9.11[-21]	1.44[-20]	1.32[-15]	2.15[-43]	6.13[-16]	3.98[-44]	6.48[-16]
0.1300	8.51[-19]	5.17[-19]	5.47[-16]	7.80[-20]	1.29[-19]	1.33[-15]	4.96[-37]	6.06[-16]	1.10[-37]	6.32[-16]
0.1690	3.98[-18]	2.46[-18]	3.86[-16]	3.71[-19]	6.33[-19]	1.22[-15]	7.14[-32]	5.50[-16]	3.81[-32]	5.68[-16]
0.2197	1.20[-17]	7.48[-18]	2.80[-16]	1.13[-18]	1.97[-18]	1.05[-15]	1.97[-27]	4.70[-16]	1.52[-27]	4.80[-16]
0.2856	2.60[-17]	1.61[-17]	2.17[-16]	2.42[-18]	4.32[-18]	8.78[-16]	6.54[-24]	3.94[-16]	5.30[-24]	3.94[-16]
0.3713	4.43[-17]	2.69[-17]	1.86[-16]	4.04[-18]	7.33[-18]	7.32[-16]	3.17[-21]	3.40[-16]	2.60[-21]	3.26[-16]
0.4827	6.48[-17]	3.89[-17]	1.74[-16]	5.93[-18]	1.09[-17]	6.32[-16]	3.40[-19]	3.18[-16]	2.80[-19]	2.78[-16]
0.6275	9.41[-17]	6.15[-17]	1.89[-16]	1.51[-17]	2.43[-17]	5.76[-16]	1.13[-17]	3.23[-16]	9.35[-18]	2.52[-16]
0.8157	1.99[-16]	1.88[-16]	3.49[-16]	1.12[-16]	1.51[-16]	6.32[-16]	1.55[-16]	4.00[-16]	1.28[-16]	2.74[-16]
1.0604	7.12[-16]	8.82[-16]	1.24[-15]	7.15[-16]	9.28[-16]	1.22[-15]	1.07[-15]	8.45[-16]	8.85[-16]	5.23[-16]
1.3786	2.48[-15]	3.34[-15]	4.40[-15]	2.95[-15]	3.81[-15]	3.49[-15]	4.49[-15]	2.48[-15]	3.72[-15]	1.48[-15]
1.7922	6.62[-15]	9.25[-15]	1.20[-14]	8.63[-15]	1.11[-14]	9.13[-15]	1.32[-14]	6.51[-15]	1.10[-14]	3.85[-15]
2.3298	1.38[-14]	1.99[-14]	2.56[-14]	1.95[-14]	2.52[-14]	1.95[-14]	3.01[-14]	1.40[-14]	2.51[-14]	8.17[-15]
3.0287	2.35[-14]	3.48[-14]	4.49[-14]	3.61[-14]	4.66[-14]	3.46[-14]	5.58[-14]	2.47[-14]	4.66[-14]	1.44[-14]
3.9374	3.37[-14]	5.14[-14]	6.63[-14]	5.59[-14]	7.21[-14]	5.19[-14]	8.68[-14]	3.70[-14]	7.25[-14]	2.14[-14]
5.1186	4.19[-14]	6.55[-14]	8.46[-14]	7.40[-14]	9.56[-14]	6.70[-14]	1.15[-13]	4.77[-14]	9.65[-14]	2.74[-14]
6.6542	4.62[-14]	7.36[-14]	9.52[-14]	8.56[-14]	1.11[-13]	7.61[-14]	1.34[-13]	5.42[-14]	1.12[-13]	3.10[-14]
8.6504	4.60[-14]	7.44[-14]	9.63[-14]	8.85[-14]	1.14[-13]	7.76[-14]	1.38[-13]	5.52[-14]	1.16[-13]	3.14[-14]
11.2455	4.22[-14]	6.90[-14]	8.94[-14]	8.34[-14]	1.08[-13]	7.24[-14]	1.30[-13]	5.15[-14]	1.09[-13]	2.93[-14]
14.6192	3.62[-14]	5.97[-14]	7.74[-14]	7.30[-14]	9.44[-14]	6.29[-14]	1.14[-13]	4.48[-14]	9.58[-14]	2.54[-14]
19.0049	2.95[-14]	4.89[-14]	6.34[-14]	6.03[-14]	7.80[-14]	5.17[-14]	9.45[-14]	3.68[-14]	7.92[-14]	2.08[-14]

24.7064	2.30[-14]	3.83[-14]	4.97[-14]	4.76[-14]	6.15[-14]	4.07[-14]	7.46[-14]	2.89[-14]	6.26[-14]	1.64[-14]
32.1184	1.74[-14]	2.90[-14]	3.77[-14]	3.62[-14]	4.69[-14]	3.09[-14]	5.69[-14]	2.20[-14]	4.77[-14]	1.24[-14]
41.7539	1.28[-14]	2.14[-14]	2.78[-14]	2.68[-14]	3.47[-14]	2.28[-14]	4.21[-14]	1.62[-14]	3.53[-14]	9.18[-15]
54.2800	9.22[-15]	1.55[-14]	2.01[-14]	1.95[-14]	2.52[-14]	1.65[-14]	3.06[-14]	1.17[-14]	2.56[-14]	6.64[-15]
91.7332	4.60[-15]	7.76[-15]	1.01[-14]	9.78[-15]	1.27[-14]	8.29[-15]	1.54[-14]	5.89[-15]	1.29[-14]	3.33[-15]
119.2532	3.20[-15]	5.40[-15]	7.02[-15]	6.82[-15]	8.82[-15]	5.78[-15]	1.07[-14]	4.10[-15]	8.99[-15]	2.32[-15]
T_e					$2s^22p5f$					
eV	$^3F_2$	$^3F_3$	$^3F_4$	$^3G_3$	$^3G_4$	$^3D_3$	$^3D_2$	$^3G_5$	$^3D_1$	$^1G_4$
0.1000	8.35[-16]	9.14[-16]	2.55[-15]	2.55[-19]	1.00[-15]	5.63[-14]	1.88[-14]	2.36[-48]	2.41[-14]	2.24[-20]
0.1300	8.39[-16]	7.14[-16]	1.81[-15]	2.24[-18]	7.10[-16]	4.67[-14]	1.77[-14]	2.45[-40]	2.37[-14]	2.00[-19]
0.1690	8.16[-16]	5.78[-16]	1.32[-15]	1.10[-17]	5.20[-16]	3.85[-14]	1.61[-14]	3.29[-34]	2.22[-14]	9.83[-19]
0.2197	8.48[-16]	5.30[-16]	1.07[-15]	3.39[-17]	4.31[-16]	3.28[-14]	1.50[-14]	1.56[-29]	2.12[-14]	3.06[-18]
0.2856	9.81[-16]	5.76[-16]	1.04[-15]	7.41[-17]	4.35[-16]	3.02[-14]	1.51[-14]	5.69[-26]	2.21[-14]	6.68[-18]
0.3713	1.19[-15]	6.83[-16]	1.16[-15]	1.24[-16]	4.96[-16]	3.01[-14]	1.63[-14]	2.97[-23]	2.44[-14]	1.11[-17]
0.4827	1.38[-15]	7.90[-16]	1.30[-15]	1.68[-16]	5.67[-16]	3.09[-14]	1.76[-14]	3.98[-21]	2.68[-14]	1.51[-17]
0.6275	1.48[-15]	8.50[-16]	1.38[-15]	1.95[-16]	6.07[-16]	3.08[-14]	1.81[-14]	2.18[-19]	2.79[-14]	1.77[-17]
0.8157	1.47[-15]	8.48[-16]	1.37[-15]	2.06[-16]	6.09[-16]	2.93[-14]	1.75[-14]	5.78[-18]	2.72[-14]	2.26[-17]
1.0604	1.39[-15]	8.26[-16]	1.32[-15]	2.36[-16]	6.21[-16]	2.65[-14]	1.60[-14]	7.61[-17]	2.49[-14]	7.69[-17]
1.3786	1.36[-15]	9.67[-16]	1.47[-15]	4.65[-16]	8.91[-16]	2.30[-14]	1.40[-14]	5.42[-16]	2.17[-14]	4.47[-16]
1.7922	1.67[-15]	1.79[-15]	2.50[-15]	1.42[-15]	2.14[-15]	1.98[-14]	1.21[-14]	2.37[-15]	1.84[-14]	1.93[-15]
2.3298	2.80[-15]	4.15[-15]	5.55[-15]	3.96[-15]	5.58[-15]	1.77[-14]	1.10[-14]	7.08[-15]	1.56[-14]	5.85[-15]
3.0287	5.16[-15]	8.79[-15]	1.16[-14]	8.76[-15]	1.22[-14]	1.78[-14]	1.13[-14]	1.57[-14]	1.37[-14]	1.33[-14]
3.9374	8.63[-15]	1.55[-14]	2.03[-14]	1.55[-14]	2.17[-14]	2.02[-14]	1.32[-14]	2.76[-14]	1.29[-14]	2.39[-14]
5.1186	1.24[-14]	2.28[-14]	2.98[-14]	2.26[-14]	3.20[-14]	2.41[-14]	1.62[-14]	3.99[-14]	1.28[-14]	3.52[-14]
6.6542	1.54[-14]	2.86[-14]	3.73[-14]	2.81[-14]	4.02[-14]	2.75[-14]	1.88[-14]	4.92[-14]	1.29[-14]	4.42[-14]
8.6504	1.68[-14]	3.15[-14]	4.11[-14]	3.07[-14]	4.43[-14]	2.91[-14]	2.01[-14]	5.34[-14]	1.25[-14]	4.87[-14]
11.2455	1.65[-14]	3.11[-14]	4.07[-14]	3.02[-14]	4.38[-14]	2.84[-14]	1.98[-14]	5.23[-14]	1.16[-14]	4.82[-14]
14.6192	1.50[-14]	2.83[-14]	3.70[-14]	2.73[-14]	3.99[-14]	2.57[-14]	1.80[-14]	4.71[-14]	1.01[-14]	4.39[-14]
19.0049	1.27[-14]	2.41[-14]	3.15[-14]	2.32[-14]	3.39[-14]	2.18[-14]	1.53[-14]	3.98[-14]	8.40[-15]	3.74[-14]
24.7064	1.02[-14]	1.95[-14]	2.55[-14]	1.87[-14]	2.74[-14]	1.76[-14]	1.24[-14]	3.20[-14]	6.68[-15]	3.02[-14]
41.7539	5.95[-15]	1.13[-14]	1.48[-14]	1.08[-14]	1.60[-14]	1.03[-14]	7.26[-15]	1.85[-14]	3.83[-15]	1.76[-14]
54.2800	4.36[-15]	8.30[-15]	1.09[-14]	7.93[-15]	1.17[-14]	7.54[-15]	5.33[-15]	1.35[-14]	2.79[-15]	1.29[-14]
91.7332	2.22[-15]	4.23[-15]	5.54[-15]	4.04[-15]	5.97[-15]	3.85[-15]	2.73[-15]	6.88[-15]	1.42[-15]	6.57[-15]
119.2532	1.55[-15]	2.97[-15]	3.88[-15]	2.83[-15]	4.18[-15]	2.70[-15]	1.91[-15]	4.82[-15]	9.90[-16]	4.61[-15]
T_e					$2s^22p6f$					
eV	$^3F_2$	$^3F_3$	$^3F_4$	$^3G_3$	$^3G_4$	$^3D_3$	$^3D_2$	$^3G_5$	$^1G_4$	$^3D_1$
0.1000	9.58[-21]	1.26[-20]	5.03[-16]	1.75[-29]	6.12[-16]	4.31[-16]	1.75[-16]	2.65[-48]	5.87[-44]	3.04[-16]
0.1300	8.20[-20]	1.06[-19]	3.54[-16]	2.18[-26]	4.31[-16]	4.34[-16]	1.72[-16]	2.78[-40]	1.75[-37]	2.97[-16]
0.1690	3.91[-19]	5.19[-19]	2.48[-16]	5.13[-24]	3.01[-16]	4.00[-16]	1.56[-16]	3.78[-34]	1.55[-32]	2.67[-16]
0.2197	1.19[-18]	1.75[-18]	1.72[-16]	3.34[-22]	2.10[-16]	3.45[-16]	1.33[-16]	1.81[-29]	9.89[-29]	2.26[-16]
0.2856	2.56[-18]	4.55[-18]	1.21[-16]	7.98[-21]	1.46[-16]	2.86[-16]	1.11[-16]	6.57[-26]	1.02[-25]	1.84[-16]
0.3713	4.32[-18]	9.69[-18]	8.57[-17]	8.69[-20]	1.03[-16]	2.34[-16]	9.48[-17]	3.29[-23]	2.87[-23]	1.48[-16]
0.4827	6.43[-18]	1.75[-17]	6.28[-17]	5.14[-19]	7.54[-17]	1.92[-16]	8.68[-17]	3.63[-21]	2.55[-21]	1.20[-16]
0.6275	9.45[-18]	2.78[-17]	4.94[-17]	1.92[-18]	5.88[-17]	1.61[-16]	8.54[-17]	1.32[-19]	8.73[-20]	9.82[-17]
0.8157	1.49[-17]	3.97[-17]	4.50[-17]	5.68[-18]	5.31[-17]	1.40[-16]	8.73[-17]	2.39[-18]	1.61[-18]	8.23[-17]
1.0604	3.27[-17]	5.56[-17]	6.11[-17]	2.12[-17]	6.84[-17]	1.29[-16]	9.20[-17]	2.81[-17]	2.03[-17]	7.13[-17]
1.3786	1.34[-16]	1.05[-16]	1.90[-16]	1.15[-16]	1.93[-16]	1.61[-16]	1.19[-16]	2.21[-16]	1.66[-16]	7.51[-17]
1.7922	6.06[-16]	3.26[-16]	8.09[-16]	5.57[-16]	7.94[-16]	3.94[-16]	2.70[-16]	1.14[-15]	8.67[-16]	1.49[-16]
2.3298	2.10[-15]	1.05[-15]	2.75[-15]	1.96[-15]	2.73[-15]	1.28[-15]	8.09[-16]	4.04[-15]	3.03[-15]	4.62[-16]
3.0287	5.42[-15]	2.75[-15]	6.99[-15]	5.07[-15]	7.10[-15]	3.53[-15]	2.12[-15]	1.05[-14]	7.65[-15]	1.31[-15]
3.9374	1.08[-14]	5.59[-15]	1.37[-14]	1.01[-14]	1.43[-14]	7.61[-15]	4.39[-15]	2.09[-14]	1.48[-14]	2.90[-15]
5.1186	1.73[-14]	9.14[-15]	2.16[-14]	1.62[-14]	2.32[-14]	1.30[-14]	7.30[-15]	3.36[-14]	2.30[-14]	5.08[-15]
6.6542	2.31[-14]	1.24[-14]	2.86[-14]	2.17[-14]	3.13[-14]	1.84[-14]	1.00[-14]	4.51[-14]	3.01[-14]	7.26[-15]
8.6504	2.68[-14]	1.45[-14]	3.28[-14]	2.51[-14]	3.65[-14]	2.21[-14]	1.18[-14]	5.23[-14]	3.42[-14]	8.82[-15]
11.2455	2.75[-14]	1.50[-14]	3.35[-14]	2.58[-14]	3.77[-14]	2.34[-14]	1.24[-14]	5.40[-14]	3.46[-14]	9.39[-15]
14.6192	2.58[-14]	1.42[-14]	3.12[-14]	2.42[-14]	3.55[-14]	2.23[-14]	1.17[-14]	5.07[-14]	3.21[-14]	9.03[-15]

19.0049	2.24[-14]	1.24[-14]	2.70[-14]	2.11[-14]	3.10[-14]	1.97[-14]	1.03[-14]	4.42[-14]	2.77[-14]	8.01[-15]
24.7064	1.84[-14]	1.02[-14]	2.21[-14]	1.73[-14]	2.55[-14]	1.64[-14]	8.47[-15]	3.64[-14]	2.26[-14]	6.67[-15]
32.1184	1.45[-14]	8.04[-15]	1.73[-14]	1.36[-14]	2.01[-14]	1.30[-14]	6.68[-15]	2.86[-14]	1.77[-14]	5.30[-15]
41.7539	1.10[-14]	6.11[-15]	1.31[-14]	1.03[-14]	1.53[-14]	9.93[-15]	5.09[-15]	2.17[-14]	1.34[-14]	4.05[-15]
54.2800	8.11[-15]	4.52[-15]	9.69[-15]	7.63[-15]	1.13[-14]	7.37[-15]	3.77[-15]	1.61[-14]	9.84[-15]	3.01[-15]
91.7332	4.18[-15]	2.33[-15]	4.98[-15]	3.93[-15]	5.84[-15]	3.82[-15]	1.95[-15]	8.29[-15]	5.05[-15]	1.56[-15]
119.2532	2.94[-15]	1.64[-15]	3.50[-15]	2.77[-15]	4.11[-15]	2.69[-15]	1.37[-15]	5.83[-15]	3.55[-15]	1.10[-15]

T_e				$2s^22p7f$						
eV	$^3G_3$	$^3F_3$	$^3F_2$	$^3G_4$	$^3F_4$	$^3D_3$	$^3D_2$	$^3G_5$	$^1G_4$	$^3D_1$
0.1000	2.32[-36]	2.87[-16]	4.62[-23]	1.04[-15]	1.78[-15]	9.95[-16]	2.20[-16]	3.38[-48]	6.24[-32]	4.34[-16]
0.1300	8.96[-32]	2.90[-16]	2.36[-21]	7.31[-16]	1.25[-15]	8.67[-16]	2.17[-16]	3.58[-40]	2.00[-28]	4.23[-16]
0.1690	2.76[-28]	2.66[-16]	4.43[-20]	5.10[-16]	8.75[-16]	7.27[-16]	1.95[-16]	4.89[-34]	9.12[-26]	3.79[-16]
0.2197	1.22[-25]	2.28[-16]	3.87[-19]	3.53[-16]	6.06[-16]	5.86[-16]	1.65[-16]	2.35[-29]	9.23[-24]	3.19[-16]
0.2856	1.21[-23]	1.85[-16]	1.88[-18]	2.43[-16]	4.17[-16]	4.57[-16]	1.34[-16]	8.56[-26]	2.94[-22]	2.55[-16]
0.3713	3.96[-22]	1.45[-16]	5.89[-18]	1.66[-16]	2.86[-16]	3.47[-16]	1.08[-16]	4.30[-23]	3.89[-21]	1.97[-16]
0.4827	7.03[-21]	1.12[-16]	1.33[-17]	1.14[-16]	1.96[-16]	2.60[-16]	9.10[-17]	4.71[-21]	2.93[-20]	1.49[-16]
0.6275	1.06[-19]	8.90[-17]	2.39[-17]	8.07[-17]	1.38[-16]	1.96[-16]	8.16[-17]	1.62[-19]	2.16[-19]	1.13[-16]
0.8157	1.24[-18]	7.55[-17]	3.60[-17]	6.19[-17]	1.05[-16]	1.51[-16]	7.80[-17]	2.44[-18]	1.95[-18]	8.61[-17]
1.0604	1.08[-17]	7.34[-17]	4.94[-17]	6.38[-17]	9.77[-17]	1.24[-16]	7.85[-17]	2.24[-17]	1.62[-17]	6.79[-17]
1.3786	7.44[-17]	1.04[-16]	7.78[-17]	1.43[-16]	1.60[-16]	1.28[-16]	9.28[-17]	1.53[-16]	1.14[-16]	6.04[-17]
1.7922	3.90[-16]	2.85[-16]	1.98[-16]	5.63[-16]	5.18[-16]	2.53[-16]	1.84[-16]	7.81[-16]	6.06[-16]	8.71[-17]
2.3298	1.50[-15]	9.81[-16]	6.44[-16]	2.05[-15]	1.83[-15]	8.13[-16]	5.57[-16]	2.94[-15]	2.36[-15]	2.28[-16]
3.0287	4.26[-15]	2.87[-15]	1.84[-15]	5.76[-15]	5.25[-15]	2.44[-15]	1.60[-15]	8.26[-15]	6.77[-15]	6.37[-16]
3.9374	9.30[-15]	6.56[-15]	4.13[-15]	1.25[-14]	1.17[-14]	5.77[-15]	3.67[-15]	1.79[-14]	1.49[-14]	1.45[-15]
5.1186	1.61[-14]	1.18[-14]	7.35[-15]	2.17[-14]	2.08[-14]	1.07[-14]	6.64[-15]	3.11[-14]	2.60[-14]	2.62[-15]
6.6542	2.31[-14]	1.74[-14]	1.07[-14]	3.11[-14]	3.03[-14]	1.60[-14]	9.81[-15]	4.44[-14]	3.72[-14]	3.85[-15]
8.6504	2.81[-14]	2.16[-14]	1.32[-14]	3.78[-14]	3.74[-14]	2.02[-14]	1.22[-14]	5.41[-14]	4.55[-14]	4.78[-15]
11.2455	3.01[-14]	2.35[-14]	1.43[-14]	4.05[-14]	4.05[-14]	2.22[-14]	1.33[-14]	5.80[-14]	4.88[-14]	5.20[-15]
14.6192	2.91[-14]	2.30[-14]	1.39[-14]	3.92[-14]	3.95[-14]	2.18[-14]	1.30[-14]	5.61[-14]	4.72[-14]	5.08[-15]
19.0049	2.59[-14]	2.06[-14]	1.25[-14]	3.49[-14]	3.54[-14]	1.97[-14]	1.17[-14]	5.01[-14]	4.21[-14]	4.56[-15]
24.7064	2.17[-14]	1.74[-14]	1.05[-14]	2.93[-14]	2.98[-14]	1.66[-14]	9.86[-15]	4.20[-14]	3.53[-14]	3.84[-15]
41.7539	1.33[-14]	1.07[-14]	6.46[-15]	1.79[-14]	1.83[-14]	1.03[-14]	6.08[-15]	2.57[-14]	2.16[-14]	2.36[-15]
54.2800	9.89[-15]	8.00[-15]	4.82[-15]	1.33[-14]	1.37[-14]	7.70[-15]	4.54[-15]	1.92[-14]	1.61[-14]	1.76[-15]
91.7332	5.16[-15]	4.18[-15]	2.52[-15]	6.95[-15]	7.15[-15]	4.03[-15]	2.38[-15]	1.00[-14]	8.41[-15]	9.22[-16]
119.2532	3.64[-15]	2.96[-15]	1.78[-15]	4.91[-15]	5.05[-15]	2.85[-15]	1.68[-15]	7.06[-15]	5.94[-15]	6.52[-16]

T_e				$2s^22p8f$						
eV	$^3G_3$	$^3D_3$	$^3G_4$	$^3F_2$	$^3F_4$	$^3F_3$	$^3G_5$	$^3D_2$	$^1G_4$	$^3D_1$
0.1000	1.41[-29]	7.63[-16]	2.43[-15]	1.73[-16]	5.00[-15]	2.36[-15]	3.93[-21]	5.81[-16]	5.90[-30]	9.14[-16]
0.1300	1.70[-26]	7.68[-16]	1.71[-15]	1.70[-16]	3.52[-15]	1.98[-15]	4.05[-20]	5.75[-16]	7.43[-27]	8.92[-16]
0.1690	3.79[-24]	7.06[-16]	1.20[-15]	1.53[-16]	2.46[-15]	1.62[-15]	2.22[-19]	5.21[-16]	1.70[-24]	8.00[-16]
0.2197	2.31[-22]	6.04[-16]	8.28[-16]	1.30[-16]	1.70[-15]	1.28[-15]	7.52[-19]	4.41[-16]	1.06[-22]	6.72[-16]
0.2856	5.19[-21]	4.90[-16]	5.69[-16]	1.07[-16]	1.17[-15]	9.88[-16]	1.75[-18]	3.57[-16]	2.39[-21]	5.37[-16]
0.3713	5.35[-20]	3.82[-16]	3.90[-16]	9.24[-17]	8.02[-16]	7.42[-16]	3.08[-18]	2.84[-16]	2.48[-20]	4.14[-16]
0.4827	3.04[-19]	2.92[-16]	2.68[-16]	8.81[-17]	5.50[-16]	5.48[-16]	4.35[-18]	2.29[-16]	1.49[-19]	3.11[-16]
0.6275	1.20[-18]	2.24[-16]	1.87[-16]	9.41[-17]	3.84[-16]	4.04[-16]	5.51[-18]	1.92[-16]	7.66[-19]	2.32[-16]
0.8157	4.72[-18]	1.79[-16]	1.39[-16]	1.06[-16]	2.82[-16]	3.05[-16]	9.83[-18]	1.72[-16]	4.66[-18]	1.74[-16]
1.0604	2.15[-17]	1.57[-16]	1.28[-16]	1.22[-16]	2.37[-16]	2.43[-16]	3.82[-17]	1.62[-16]	2.74[-17]	1.35[-16]
1.3786	9.88[-17]	1.68[-16]	2.06[-16]	1.49[-16]	2.76[-16]	2.23[-16]	1.82[-16]	1.69[-16]	1.38[-16]	1.12[-16]
1.7922	4.12[-16]	2.85[-16]	5.92[-16]	2.47[-16]	5.72[-16]	3.08[-16]	7.76[-16]	2.42[-16]	5.97[-16]	1.19[-16]
2.3298	1.43[-15]	7.53[-16]	1.90[-15]	6.07[-16]	1.67[-15]	7.36[-16]	2.73[-15]	5.49[-16]	2.15[-15]	2.09[-16]
3.0287	3.91[-15]	2.05[-15]	5.19[-15]	1.59[-15]	4.60[-15]	2.01[-15]	7.63[-15]	1.43[-15]	6.14[-15]	4.91[-16]
3.9374	8.46[-15]	4.62[-15]	1.13[-14]	3.54[-15]	1.04[-14]	4.68[-15]	1.69[-14]	3.22[-15]	1.38[-14]	1.07[-15]
5.1186	1.47[-14]	8.38[-15]	1.99[-14]	6.36[-15]	1.88[-14]	8.72[-15]	3.00[-14]	5.87[-15]	2.48[-14]	1.91[-15]
6.6542	2.11[-14]	1.24[-14]	2.88[-14]	9.40[-15]	2.80[-14]	1.32[-14]	4.38[-14]	8.77[-15]	3.66[-14]	2.82[-15]
8.6504	2.59[-14]	1.56[-14]	3.56[-14]	1.18[-14]	3.52[-14]	1.69[-14]	5.45[-14]	1.11[-14]	4.57[-14]	3.53[-15]
11.2455	2.79[-14]	1.71[-14]	3.86[-14]	1.29[-14]	3.86[-14]	1.87[-14]	5.94[-14]	1.22[-14]	4.99[-14]	3.85[-15]

14.6192	2.72[-14]	1.68[-14]	3.77[-14]	1.26[-14]	3.81[-14]	1.85[-14]	5.82[-14]	1.20[-14]	4.91[-14]	3.78[-15]
19.0049	2.43[-14]	1.52[-14]	3.39[-14]	1.14[-14]	3.44[-14]	1.68[-14]	5.25[-14]	1.09[-14]	4.43[-14]	3.41[-15]
24.7064	2.05[-14]	1.29[-14]	2.85[-14]	9.64[-15]	2.92[-14]	1.43[-14]	4.43[-14]	9.22[-15]	3.74[-14]	2.88[-15]
32.1184	1.64[-14]	1.03[-14]	2.29[-14]	7.74[-15]	2.35[-14]	1.15[-14]	3.56[-14]	7.42[-15]	3.01[-14]	2.31[-15]
41.7539	1.26[-14]	7.98[-15]	1.76[-14]	5.98[-15]	1.81[-14]	8.92[-15]	2.74[-14]	5.73[-15]	2.32[-14]	1.78[-15]
54.2800	9.40[-15]	5.97[-15]	1.32[-14]	4.47[-15]	1.36[-14]	6.69[-15]	2.05[-14]	4.29[-15]	1.74[-14]	1.33[-15]
91.7332	4.91[-15]	3.13[-15]	6.89[-15]	2.34[-15]	7.13[-15]	3.52[-15]	1.08[-14]	2.25[-15]	9.11[-15]	6.99[-16]
119.2532	3.47[-15]	2.22[-15]	4.87[-15]	1.66[-15]	5.04[-15]	2.49[-15]	7.61[-15]	1.59[-15]	6.45[-15]	4.94[-16]

T_e	$2s^22p4f$		$2s^22p5f$		$2s^22p6f$		$2s^22p7f$		$2s^22p8f$	
eV	$^1F_3$	$^1D_2$	$^1F_3$	$^1D_2$	$^1F_3$	$^1D_2$	$^1F_3$	$^1D_2$	$^1F_3$	$^1D_2$
0.1000	4.63[-20]	4.24[-16]	6.62[-15]	1.74[-14]	1.56[-16]	1.50[-16]	2.33[-29]	2.26[-16]	5.77[-29]	6.43[-16]
0.1300	3.99[-19]	4.20[-16]	5.40[-15]	1.63[-14]	1.57[-16]	1.48[-16]	2.83[-26]	2.22[-16]	6.94[-26]	6.36[-16]
0.1690	1.93[-18]	3.81[-16]	4.39[-15]	1.48[-14]	1.45[-16]	1.34[-16]	6.41[-24]	2.00[-16]	1.53[-23]	5.76[-16]
0.2197	6.06[-18]	3.26[-16]	3.66[-15]	1.39[-14]	1.25[-16]	1.15[-16]	3.99[-22]	1.70[-16]	9.22[-22]	4.89[-16]
0.2856	1.37[-17]	2.77[-16]	3.26[-15]	1.42[-14]	1.04[-16]	9.83[-17]	9.14[-21]	1.40[-16]	2.04[-20]	4.01[-16]
0.3713	2.45[-17]	2.52[-16]	3.15[-15]	1.56[-14]	8.48[-17]	9.07[-17]	9.58[-20]	1.19[-16]	2.06[-19]	3.30[-16]
0.4827	3.79[-17]	2.57[-16]	3.14[-15]	1.71[-14]	7.02[-17]	9.40[-17]	5.48[-19]	1.10[-16]	1.14[-18]	2.86[-16]
0.6275	6.24[-17]	2.87[-16]	3.08[-15]	1.78[-14]	5.99[-17]	1.04[-16]	2.00[-18]	1.10[-16]	4.05[-18]	2.66[-16]
0.8157	1.92[-16]	3.82[-16]	2.90[-15]	1.73[-14]	5.40[-17]	1.15[-16]	5.64[-18]	1.13[-16]	1.10[-17]	2.56[-16]
1.0604	8.96[-16]	8.34[-16]	2.63[-15]	1.59[-14]	5.78[-17]	1.22[-16]	1.71[-17]	1.15[-16]	2.88[-17]	2.47[-16]
1.3786	3.37[-15]	2.45[-15]	2.44[-15]	1.39[-14]	1.18[-16]	1.37[-16]	7.33[-17]	1.20[-16]	8.96[-17]	2.40[-16]
1.7922	9.22[-15]	6.44[-15]	2.75[-15]	1.20[-14]	4.37[-16]	2.32[-16]	3.41[-16]	1.81[-16]	3.25[-16]	2.74[-16]
2.3298	1.94[-14]	1.37[-14]	4.25[-15]	1.08[-14]	1.52[-15]	6.21[-16]	1.29[-15]	4.90[-16]	1.12[-15]	4.82[-16]
3.0287	3.32[-14]	2.43[-14]	7.57[-15]	1.10[-14]	4.09[-15]	1.66[-15]	3.71[-15]	1.45[-15]	3.15[-15]	1.13[-15]
3.9374	4.78[-14]	3.62[-14]	1.26[-14]	1.30[-14]	8.46[-15]	3.60[-15]	8.20[-15]	3.50[-15]	7.06[-15]	2.48[-15]
5.1186	5.97[-14]	4.65[-14]	1.82[-14]	1.62[-14]	1.40[-14]	6.20[-15]	1.44[-14]	6.59[-15]	1.26[-14]	4.49[-15]
6.6542	6.59[-14]	5.26[-14]	2.27[-14]	1.94[-14]	1.92[-14]	8.77[-15]	2.06[-14]	9.98[-15]	1.85[-14]	6.68[-15]
8.6504	6.57[-14]	5.35[-14]	2.49[-14]	2.11[-14]	2.25[-14]	1.05[-14]	2.53[-14]	1.27[-14]	2.31[-14]	8.41[-15]
11.2455	6.03[-14]	4.99[-14]	2.47[-14]	2.11[-14]	2.35[-14]	1.12[-14]	2.72[-14]	1.39[-14]	2.52[-14]	9.24[-15]
14.6192	5.18[-14]	4.33[-14]	2.25[-14]	1.94[-14]	2.22[-14]	1.07[-14]	2.63[-14]	1.38[-14]	2.47[-14]	9.11[-15]
19.0049	4.21[-14]	3.55[-14]	1.91[-14]	1.67[-14]	1.95[-14]	9.43[-15]	2.35[-14]	1.24[-14]	2.23[-14]	8.24[-15]
24.7064	3.29[-14]	2.79[-14]	1.55[-14]	1.36[-14]	1.61[-14]	7.83[-15]	1.97[-14]	1.05[-14]	1.88[-14]	6.98[-15]
41.7539	1.83[-14]	1.57[-14]	9.00[-15]	8.01[-15]	9.65[-15]	4.74[-15]	1.21[-14]	6.53[-15]	1.16[-14]	4.33[-15]
54.2800	1.32[-14]	1.13[-14]	6.60[-15]	5.89[-15]	7.15[-15]	3.52[-15]	9.01[-15]	4.88[-15]	8.71[-15]	3.24[-15]
91.7332	6.58[-15]	5.68[-15]	3.36[-15]	3.02[-15]	3.69[-15]	1.82[-15]	4.70[-15]	2.56[-15]	4.56[-15]	1.70[-15]
119.2532	4.58[-15]	3.96[-15]	2.36[-15]	2.12[-15]	2.60[-15]	1.28[-15]	3.32[-15]	1.81[-15]	3.23[-15]	1.20[-15]

T_e					$2s^22p6h$					
eV	$^3I_5$	$^3I_6$	$^1H_5$	$^3H_6$	$^3G_5$	$^1G_4$	$^1I_6$	$^3I_7$	$^3G_3$	$^3G_4$
0.1000	6.19[-51]	7.23[-51]	8.25[-51]	1.06[-50]	4.01[-51]	3.32[-65]	1.02[-50]	1.23[-50]	2.43[-65]	3.11[-65]
0.1300	6.77[-43]	7.96[-43]	7.76[-43]	9.94[-43]	3.49[-43]	7.39[-53]	1.12[-42]	1.35[-42]	5.37[-53]	6.86[-53]
0.1690	9.45[-37]	1.12[-36]	9.71[-37]	1.24[-36]	4.08[-37]	2.13[-43]	1.57[-36]	1.88[-36]	1.55[-43]	1.98[-43]
0.2197	4.60[-32]	5.44[-32]	4.37[-32]	5.56[-32]	1.74[-32]	3.69[-36]	7.67[-32]	9.16[-32]	2.69[-36]	3.43[-36]
0.2856	1.71[-28]	2.03[-28]	1.54[-28]	1.95[-28]	5.91[-29]	1.25[-30]	2.85[-28]	3.40[-28]	9.11[-31]	1.16[-30]
0.3713	1.12[-25]	1.33[-25]	1.00[-25]	1.25[-25]	5.18[-26]	2.04[-26]	1.75[-25]	2.07[-25]	1.49[-26]	1.90[-26]
0.4827	5.21[-23]	6.16[-23]	5.01[-23]	5.99[-23]	4.25[-23]	3.24[-23]	6.66[-23]	7.74[-23]	2.38[-23]	3.03[-23]
0.6275	1.16[-20]	1.38[-20]	1.15[-20]	1.36[-20]	1.06[-20]	8.61[-21]	1.40[-20]	1.62[-20]	6.32[-21]	8.06[-21]
0.8157	7.66[-19]	9.06[-19]	7.58[-19]	8.96[-19]	7.10[-19]	5.79[-19]	9.16[-19]	1.06[-18]	4.25[-19]	5.43[-19]
1.0604	1.81[-17]	2.14[-17]	1.79[-17]	2.11[-17]	1.67[-17]	1.37[-17]	2.16[-17]	2.49[-17]	1.01[-17]	1.28[-17]
1.3786	1.96[-16]	2.31[-16]	1.93[-16]	2.29[-16]	1.80[-16]	1.47[-16]	2.33[-16]	2.69[-16]	1.09[-16]	1.39[-16]
1.7922	1.19[-15]	1.41[-15]	1.18[-15]	1.40[-15]	1.09[-15]	8.88[-16]	1.42[-15]	1.64[-15]	6.56[-16]	8.38[-16]
2.3298	4.75[-15]	5.61[-15]	4.72[-15]	5.58[-15]	4.25[-15]	3.47[-15]	5.63[-15]	6.50[-15]	2.57[-15]	3.28[-15]
3.0287	1.35[-14]	1.60[-14]	1.35[-14]	1.60[-14]	1.19[-14]	9.70[-15]	1.60[-14]	1.85[-14]	7.18[-15]	9.18[-15]
3.9374	2.91[-14]	3.44[-14]	2.93[-14]	3.46[-14]	2.51[-14]	2.05[-14]	3.45[-14]	3.98[-14]	1.52[-14]	1.95[-14]
5.1186	4.97[-14]	5.87[-14]	5.02[-14]	5.94[-14]	4.21[-14]	3.45[-14]	5.88[-14]	6.79[-14]	2.56[-14]	3.27[-14]
6.6542	6.98[-14]	8.24[-14]	7.08[-14]	8.37[-14]	5.85[-14]	4.79[-14]	8.27[-14]	9.54[-14]	3.55[-14]	4.55[-14]
8.6504	8.36[-14]	9.89[-14]	8.52[-14]	1.01[-13]	6.96[-14]	5.70[-14]	9.92[-14]	1.14[-13]	4.22[-14]	5.41[-14]

11.2455	8.84[-14]	1.04[-13]	9.02[-14]	1.07[-13]	7.31[-14]	5.98[-14]	1.05[-13]	1.21[-13]	4.44[-14]	5.68[-14]
14.6192	8.45[-14]	9.98[-14]	8.64[-14]	1.02[-13]	6.95[-14]	5.69[-14]	1.00[-13]	1.16[-13]	4.22[-14]	5.41[-14]
19.0049	7.47[-14]	8.82[-14]	7.64[-14]	9.03[-14]	6.12[-14]	5.02[-14]	8.86[-14]	1.02[-13]	3.72[-14]	4.76[-14]
24.7064	6.21[-14]	7.33[-14]	6.36[-14]	7.52[-14]	5.08[-14]	4.16[-14]	7.37[-14]	8.50[-14]	3.08[-14]	3.95[-14]
32.1184	4.92[-14]	5.81[-14]	5.04[-14]	5.96[-14]	4.02[-14]	3.29[-14]	5.84[-14]	6.74[-14]	2.44[-14]	3.13[-14]
41.7539	3.76[-14]	4.44[-14]	3.86[-14]	4.56[-14]	3.06[-14]	2.51[-14]	4.46[-14]	5.15[-14]	1.86[-14]	2.38[-14]
54.2800	2.79[-14]	3.30[-14]	2.86[-14]	3.39[-14]	2.27[-14]	1.86[-14]	3.32[-14]	3.83[-14]	1.38[-14]	1.77[-14]
91.7332	1.45[-14]	1.71[-14]	1.49[-14]	1.76[-14]	1.18[-14]	9.65[-15]	1.72[-14]	1.98[-14]	7.15[-15]	9.16[-15]
119.2532	1.02[-14]	1.21[-14]	1.05[-14]	1.24[-14]	8.30[-15]	6.80[-15]	1.21[-14]	1.40[-14]	5.04[-15]	6.45[-15]
T_e					$2s^22p7h$					
eV	$^3I_5$	$^3I_6$	$^1H_5$	$^3H_6$	$^1G_4$	$^3G_5$	$^1I_6$	$^3I_7$	$^3G_3$	$^3G_4$
0.1000	1.92[-50]	2.34[-50]	1.78[-50]	2.29[-50]	8.24[-51]	9.02[-51]	2.20[-50]	2.67[-50]	2.90[-67]	3.89[-67]
0.1300	1.98[-42]	2.41[-42]	1.67[-42]	2.14[-42]	7.18[-43]	7.86[-43]	2.42[-42]	2.92[-42]	2.79[-55]	3.70[-55]
0.1690	2.66[-36]	3.22[-36]	2.08[-36]	2.66[-36]	8.40[-37]	9.19[-37]	3.40[-36]	4.08[-36]	1.03[-45]	1.34[-45]
0.2197	1.26[-31]	1.52[-31]	9.34[-32]	1.19[-31]	3.57[-32]	3.91[-32]	1.66[-31]	1.99[-31]	4.67[-38]	6.00[-38]
0.2856	4.55[-28]	5.51[-28]	3.24[-28]	4.12[-28]	1.18[-28]	1.30[-28]	6.13[-28]	7.32[-28]	3.90[-32]	5.00[-32]
0.3713	2.29[-25]	2.77[-25]	1.59[-25]	2.02[-25]	5.71[-26]	6.27[-26]	3.13[-25]	3.73[-25]	1.31[-27]	1.68[-27]
0.4827	3.13[-23]	3.77[-23]	2.33[-23]	2.90[-23]	1.08[-23]	1.24[-23]	4.21[-23]	4.97[-23]	3.65[-24]	4.67[-24]
0.6275	3.55[-21]	4.22[-21]	3.28[-21]	3.92[-21]	2.26[-21]	2.73[-21]	4.39[-21]	5.11[-21]	1.49[-21]	1.91[-21]
0.8157	2.66[-19]	3.15[-19]	2.63[-19]	3.11[-19]	1.97[-19]	2.40[-19]	3.19[-19]	3.69[-19]	1.40[-19]	1.79[-19]
1.0604	7.87[-18]	9.31[-18]	7.84[-18]	9.27[-18]	5.93[-18]	7.25[-18]	9.37[-18]	1.08[-17]	4.26[-18]	5.47[-18]
1.3786	1.03[-16]	1.22[-16]	1.03[-16]	1.22[-16]	7.76[-17]	9.49[-17]	1.23[-16]	1.41[-16]	5.60[-17]	7.18[-17]
1.7922	7.34[-16]	8.68[-16]	7.33[-16]	8.66[-16]	5.43[-16]	6.65[-16]	8.70[-16]	1.00[-15]	3.93[-16]	5.05[-16]
2.3298	3.30[-15]	3.90[-15]	3.29[-15]	3.89[-15]	2.38[-15]	2.92[-15]	3.90[-15]	4.50[-15]	1.73[-15]	2.23[-15]
3.0287	1.03[-14]	1.22[-14]	1.03[-14]	1.22[-14]	7.22[-15]	8.89[-15]	1.22[-14]	1.41[-14]	5.26[-15]	6.81[-15]
3.9374	2.39[-14]	2.83[-14]	2.40[-14]	2.84[-14]	1.63[-14]	2.01[-14]	2.83[-14]	3.26[-14]	1.19[-14]	1.55[-14]
5.1186	4.31[-14]	5.10[-14]	4.34[-14]	5.13[-14]	2.88[-14]	3.56[-14]	5.11[-14]	5.89[-14]	2.11[-14]	2.74[-14]
6.6542	6.33[-14]	7.48[-14]	6.38[-14]	7.54[-14]	4.16[-14]	5.15[-14]	7.50[-14]	8.65[-14]	3.05[-14]	3.97[-14]
8.6504	7.84[-14]	9.27[-14]	7.92[-14]	9.37[-14]	5.10[-14]	6.31[-14]	9.30[-14]	1.07[-13]	3.74[-14]	4.87[-14]
11.2455	8.50[-14]	1.00[-13]	8.60[-14]	1.02[-13]	5.48[-14]	6.79[-14]	1.01[-13]	1.16[-13]	4.02[-14]	5.24[-14]
14.6192	8.28[-14]	9.79[-14]	8.39[-14]	9.92[-14]	5.30[-14]	6.58[-14]	9.83[-14]	1.13[-13]	3.89[-14]	5.08[-14]
19.0049	7.43[-14]	8.78[-14]	7.53[-14]	8.91[-14]	4.74[-14]	5.88[-14]	8.83[-14]	1.02[-13]	3.47[-14]	4.54[-14]
24.7064	6.25[-14]	7.39[-14]	6.34[-14]	7.49[-14]	3.97[-14]	4.93[-14]	7.42[-14]	8.57[-14]	2.91[-14]	3.81[-14]
41.7539	3.84[-14]	4.54[-14]	3.90[-14]	4.61[-14]	2.43[-14]	3.02[-14]	4.57[-14]	5.27[-14]	1.78[-14]	2.33[-14]
54.2800	2.87[-14]	3.39[-14]	2.91[-14]	3.44[-14]	1.81[-14]	2.25[-14]	3.41[-14]	3.94[-14]	1.33[-14]	1.74[-14]
91.7332	1.50[-14]	1.77[-14]	1.52[-14]	1.80[-14]	9.44[-15]	1.17[-14]	1.78[-14]	2.06[-14]	6.93[-15]	9.07[-15]
119.2532	1.06[-14]	1.25[-14]	1.08[-14]	1.27[-14]	6.67[-15]	8.28[-15]	1.26[-14]	1.45[-14]	4.89[-15]	6.40[-15]
T_e					$2s^22p8h$					
eV	$^3I_5$	$^3I_6$	$^1H_5$	$^3H_6$	$^3G_5$	$^1G_4$	$^3I_7$	$^1I_6$	$^3G_3$	$^3G_4$
0.1000	8.22[-50]	9.98[-50]	8.48[-50]	1.03[-49]	5.74[-50]	3.71[-50]	3.59[-72]	9.42[-50]	8.93[-51]	1.19[-50]
0.1300	8.49[-42]	1.03[-41]	7.96[-42]	9.65[-42]	5.01[-42]	3.27[-42]	2.51[-58]	1.04[-41]	7.97[-43]	1.06[-42]
0.1690	1.14[-35]	1.38[-35]	9.95[-36]	1.21[-35]	5.87[-36]	3.86[-36]	1.02[-47]	1.45[-35]	9.50[-37]	1.27[-36]
0.2197	5.41[-31]	6.54[-31]	4.47[-31]	5.43[-31]	2.50[-31]	1.65[-31]	1.35[-39]	7.11[-31]	4.10[-32]	5.47[-32]
0.2856	1.96[-27]	2.36[-27]	1.55[-27]	1.89[-27]	8.31[-28]	5.53[-28]	2.19[-33]	2.62[-27]	1.38[-28]	1.84[-28]
0.3713	9.77[-25]	1.18[-24]	7.52[-25]	9.16[-25]	3.89[-25]	2.60[-25]	1.19[-28]	1.33[-24]	6.50[-26]	8.69[-26]
0.4827	1.08[-22]	1.31[-22]	8.20[-23]	9.99[-23]	4.20[-23]	2.85[-23]	4.78[-25]	1.49[-22]	7.85[-24]	1.04[-23]
0.6275	4.68[-21]	5.62[-21]	3.75[-21]	4.53[-21]	2.32[-21]	1.71[-21]	2.58[-22]	6.28[-21]	8.20[-22]	1.07[-21]
0.8157	1.75[-19]	2.08[-19]	1.62[-19]	1.93[-19]	1.35[-19]	1.08[-19]	2.99[-20]	2.18[-19]	7.23[-20]	9.31[-20]
1.0604	4.82[-18]	5.71[-18]	4.76[-18]	5.63[-18]	4.31[-18]	3.51[-18]	1.05[-18]	5.79[-18]	2.50[-18]	3.21[-18]
1.3786	6.77[-17]	8.00[-17]	6.77[-17]	8.00[-17]	6.21[-17]	5.06[-17]	1.50[-17]	8.05[-17]	3.64[-17]	4.69[-17]
1.7922	5.16[-16]	6.10[-16]	5.17[-16]	6.11[-16]	4.70[-16]	3.82[-16]	1.06[-16]	6.12[-16]	2.75[-16]	3.56[-16]
2.3298	2.45[-15]	2.90[-15]	2.45[-15]	2.90[-15]	2.18[-15]	1.77[-15]	4.38[-16]	2.91[-15]	1.27[-15]	1.66[-15]
3.0287	8.04[-15]	9.50[-15]	8.03[-15]	9.49[-15]	6.97[-15]	5.62[-15]	1.20[-15]	9.56[-15]	4.03[-15]	5.28[-15]
3.9374	1.94[-14]	2.29[-14]	1.93[-14]	2.29[-14]	1.64[-14]	1.32[-14]	2.41[-15]	2.31[-14]	9.42[-15]	1.24[-14]
5.1186	3.61[-14]	4.27[-14]	3.61[-14]	4.26[-14]	3.00[-14]	2.39[-14]	3.79[-15]	4.32[-14]	1.71[-14]	2.26[-14]
6.6542	5.45[-14]	6.44[-14]	5.43[-14]	6.42[-14]	4.46[-14]	3.54[-14]	4.92[-15]	6.52[-14]	2.52[-14]	3.35[-14]

8.6504	6.90[-14]	8.15[-14]	6.88[-14]	8.13[-14]	5.58[-14]	4.43[-14]	5.53[-15]	8.27[-14]	3.15[-14]	4.20[-14]
11.2455	7.60[-14]	8.99[-14]	7.59[-14]	8.97[-14]	6.11[-14]	4.83[-14]	5.53[-15]	9.13[-14]	3.43[-14]	4.59[-14]
14.6192	7.51[-14]	8.88[-14]	7.50[-14]	8.86[-14]	6.00[-14]	4.74[-14]	5.07[-15]	9.03[-14]	3.36[-14]	4.50[-14]
19.0049	6.81[-14]	8.05[-14]	6.80[-14]	8.03[-14]	5.41[-14]	4.27[-14]	4.33[-15]	8.19[-14]	3.03[-14]	4.06[-14]
24.7064	5.77[-14]	6.82[-14]	5.76[-14]	6.81[-14]	4.58[-14]	3.61[-14]	3.51[-15]	6.95[-14]	2.56[-14]	3.43[-14]
32.1184	4.65[-14]	5.49[-14]	4.64[-14]	5.48[-14]	3.67[-14]	2.90[-14]	2.73[-15]	5.59[-14]	2.05[-14]	2.75[-14]
41.7539	3.59[-14]	4.24[-14]	3.58[-14]	4.24[-14]	2.83[-14]	2.23[-14]	2.05[-15]	4.32[-14]	1.58[-14]	2.13[-14]
54.2800	2.69[-14]	3.18[-14]	2.69[-14]	3.17[-14]	2.12[-14]	1.67[-14]	1.50[-15]	3.24[-14]	1.18[-14]	1.59[-14]
91.7332	1.41[-14]	1.67[-14]	1.41[-14]	1.67[-14]	1.11[-14]	8.75[-15]	7.68[-16]	1.70[-14]	6.20[-15]	8.33[-15]
119.2532	1.00[-14]	1.18[-14]	9.98[-15]	1.18[-14]	7.86[-15]	6.19[-15]	5.39[-16]	1.20[-14]	4.38[-15]	5.89[-15]
T_e	$2s^22p8k$									
eV	$^3L_8$	$^3L_7$	$^3K_8$	$^1K_7$	$^3I_7$	$^1I_6$	$^3I_6$	$^3L_9$	$^1L_8$	$^3I_5$
0.1000	3.43[-70]	3.00[-70]	1.84[-71]	1.62[-71]	9.77[-72]	8.46[-72]	1.14[-49]	5.26[-70]	4.68[-70]	3.04[-72]
0.1300	2.14[-57]	1.89[-57]	1.28[-57]	1.13[-57]	6.82[-58]	5.91[-58]	1.25[-41]	2.83[-57]	2.52[-57]	2.12[-58]
0.1690	5.97[-47]	5.27[-47]	5.23[-47]	4.61[-47]	2.78[-47]	2.41[-47]	1.75[-35]	7.22[-47]	6.46[-47]	8.64[-48]
0.2197	7.66[-39]	6.76[-39]	6.92[-39]	6.11[-39]	3.68[-39]	3.19[-39]	8.51[-31]	9.18[-39]	8.22[-39]	1.14[-39]
0.2856	1.23[-32]	1.09[-32]	1.12[-32]	9.86[-33]	5.94[-33]	5.14[-33]	3.13[-27]	1.48[-32]	1.32[-32]	1.85[-33]
0.3713	6.71[-28]	5.92[-28]	6.09[-28]	5.37[-28]	3.23[-28]	2.80[-28]	1.59[-24]	8.04[-28]	7.19[-28]	1.01[-28]
0.4827	2.70[-24]	2.38[-24]	2.44[-24]	2.16[-24]	1.30[-24]	1.12[-24]	1.77[-22]	3.23[-24]	2.89[-24]	4.05[-25]
0.6275	1.46[-21]	1.29[-21]	1.32[-21]	1.17[-21]	7.01[-22]	6.08[-22]	7.42[-21]	1.74[-21]	1.56[-21]	2.19[-22]
0.8157	1.68[-19]	1.49[-19]	1.53[-19]	1.35[-19]	8.10[-20]	7.02[-20]	2.54[-19]	2.02[-19]	1.80[-19]	2.53[-20]
1.0604	5.94[-18]	5.24[-18]	5.38[-18]	4.75[-18]	2.86[-18]	2.48[-18]	6.70[-18]	7.11[-18]	6.36[-18]	8.92[-19]
1.3786	8.42[-17]	7.43[-17]	7.63[-17]	6.74[-17]	4.06[-17]	3.52[-17]	9.29[-17]	1.01[-16]	9.03[-17]	1.27[-17]
1.7922	5.93[-16]	5.23[-16]	5.38[-16]	4.74[-16]	2.86[-16]	2.48[-16]	7.06[-16]	7.11[-16]	6.36[-16]	8.96[-17]
2.3298	2.44[-15]	2.15[-15]	2.22[-15]	1.95[-15]	1.18[-15]	1.02[-15]	3.36[-15]	2.94[-15]	2.63[-15]	3.71[-16]
3.0287	6.66[-15]	5.88[-15]	6.05[-15]	5.34[-15]	3.24[-15]	2.81[-15]	1.10[-14]	8.04[-15]	7.19[-15]	1.02[-15]
3.9374	1.32[-14]	1.17[-14]	1.20[-14]	1.06[-14]	6.49[-15]	5.62[-15]	2.67[-14]	1.61[-14]	1.44[-14]	2.04[-15]
5.1186	2.06[-14]	1.82[-14]	1.88[-14]	1.66[-14]	1.02[-14]	8.82[-15]	4.99[-14]	2.52[-14]	2.25[-14]	3.20[-15]
6.6542	2.66[-14]	2.35[-14]	2.43[-14]	2.14[-14]	1.32[-14]	1.15[-14]	7.53[-14]	3.26[-14]	2.92[-14]	4.16[-15]
8.6504	2.97[-14]	2.62[-14]	2.71[-14]	2.39[-14]	1.48[-14]	1.29[-14]	9.55[-14]	3.66[-14]	3.27[-14]	4.68[-15]
11.2455	2.96[-14]	2.61[-14]	2.70[-14]	2.39[-14]	1.49[-14]	1.29[-14]	1.05[-13]	3.66[-14]	3.27[-14]	4.68[-15]
14.6192	2.69[-14]	2.38[-14]	2.47[-14]	2.18[-14]	1.36[-14]	1.18[-14]	1.04[-13]	3.35[-14]	3.00[-14]	4.29[-15]
19.0049	2.29[-14]	2.02[-14]	2.10[-14]	1.85[-14]	1.16[-14]	1.01[-14]	9.45[-14]	2.86[-14]	2.56[-14]	3.67[-15]
24.7064	1.85[-14]	1.63[-14]	1.70[-14]	1.50[-14]	9.42[-15]	8.16[-15]	8.02[-14]	2.32[-14]	2.07[-14]	2.97[-15]
41.7539	1.08[-14]	9.51[-15]	9.89[-15]	8.73[-15]	5.51[-15]	4.77[-15]	4.99[-14]	1.35[-14]	1.21[-14]	1.74[-15]
54.2800	7.90[-15]	6.97[-15]	7.25[-15]	6.40[-15]	4.04[-15]	3.50[-15]	3.74[-14]	9.93[-15]	8.88[-15]	1.27[-15]
91.7332	4.02[-15]	3.55[-15]	3.70[-15]	3.26[-15]	2.06[-15]	1.79[-15]	1.96[-14]	5.07[-15]	4.53[-15]	6.50[-16]
119.2532	2.82[-15]	2.49[-15]	2.59[-15]	2.28[-15]	1.45[-15]	1.25[-15]	1.39[-14]	3.55[-15]	3.18[-15]	4.56[-16]
T_e	$2s^22p6h$		$2s^22p7h$		$2s^22p8h$		$2s^22p8k$			
eV	$^3H_5$	$^3H_4$	$^3H_4$	$^3H_5$	$^3H_4$	$^3H_5$	$^3K_7$	$^3K_6$		
0.1000	4.20[-51]	3.29[-65]	7.54[-51]	8.58[-51]	3.49[-50]	4.43[-50]	8.76[-72]	7.60[-72]		
0.1300	3.65[-43]	7.31[-53]	6.56[-43]	7.47[-43]	3.05[-42]	3.88[-42]	6.12[-58]	5.30[-58]		
0.1690	4.27[-37]	2.11[-43]	7.68[-37]	8.74[-37]	3.57[-36]	4.56[-36]	2.49[-47]	2.16[-47]		
0.2197	1.82[-32]	3.65[-36]	3.26[-32]	3.71[-32]	1.52[-31]	1.94[-31]	3.30[-39]	2.86[-39]		
0.2856	6.18[-29]	1.23[-30]	1.08[-28]	1.23[-28]	5.05[-28]	6.46[-28]	5.33[-33]	4.62[-33]		
0.3713	5.28[-26]	2.02[-26]	5.23[-26]	5.97[-26]	2.37[-25]	3.03[-25]	2.90[-28]	2.51[-28]		
0.4827	4.22[-23]	3.21[-23]	1.02[-23]	1.20[-23]	2.59[-23]	3.31[-23]	1.16[-24]	1.01[-24]		
0.6275	1.05[-20]	8.53[-21]	2.21[-21]	2.68[-21]	1.61[-21]	2.02[-21]	6.29[-22]	5.45[-22]		
0.8157	7.03[-19]	5.74[-19]	1.93[-19]	2.36[-19]	1.06[-19]	1.30[-19]	7.27[-20]	6.30[-20]		
1.0604	1.66[-17]	1.36[-17]	5.86[-18]	7.16[-18]	3.47[-18]	4.24[-18]	2.57[-18]	2.22[-18]		
1.3786	1.80[-16]	1.47[-16]	7.72[-17]	9.43[-17]	5.04[-17]	6.17[-17]	3.64[-17]	3.16[-17]		
1.7922	1.10[-15]	8.97[-16]	5.48[-16]	6.70[-16]	3.86[-16]	4.73[-16]	2.58[-16]	2.23[-16]		
2.3298	4.35[-15]	3.56[-15]	2.45[-15]	3.00[-15]	1.82[-15]	2.24[-15]	1.07[-15]	9.25[-16]		
3.0287	1.23[-14]	1.01[-14]	7.61[-15]	9.32[-15]	5.92[-15]	7.28[-15]	2.94[-15]	2.55[-15]		
3.9374	2.64[-14]	2.16[-14]	1.75[-14]	2.15[-14]	1.42[-14]	1.74[-14]	5.92[-15]	5.13[-15]		
5.1186	4.49[-14]	3.67[-14]	3.14[-14]	3.86[-14]	2.62[-14]	3.23[-14]	9.34[-15]	8.10[-15]		

6.6542	6.28[-14]	5.14[-14]	4.59[-14]	5.64[-14]	3.92[-14]	4.85[-14]	1.22[-14]	1.06[-14]
8.6504	7.51[-14]	6.15[-14]	5.67[-14]	6.97[-14]	4.95[-14]	6.12[-14]	1.38[-14]	1.20[-14]
11.2455	7.92[-14]	6.48[-14]	6.13[-14]	7.54[-14]	5.44[-14]	6.73[-14]	1.39[-14]	1.20[-14]
14.6192	7.55[-14]	6.18[-14]	5.97[-14]	7.33[-14]	5.36[-14]	6.63[-14]	1.28[-14]	1.11[-14]
19.0049	6.67[-14]	5.46[-14]	5.35[-14]	6.57[-14]	4.85[-14]	6.01[-14]	1.10[-14]	9.50[-15]
24.7064	5.54[-14]	4.53[-14]	4.49[-14]	5.52[-14]	4.10[-14]	5.09[-14]	8.90[-15]	7.72[-15]
41.7539	3.35[-14]	2.74[-14]	2.76[-14]	3.39[-14]	2.55[-14]	3.16[-14]	5.23[-15]	4.53[-15]
54.2800	2.49[-14]	2.04[-14]	2.06[-14]	2.53[-14]	1.91[-14]	2.37[-14]	3.84[-15]	3.33[-15]
91.7332	1.29[-14]	1.06[-14]	1.07[-14]	1.32[-14]	1.00[-14]	1.24[-14]	1.97[-15]	1.70[-15]
119.2532	9.08[-15]	7.44[-15]	7.59[-15]	9.33[-15]	7.08[-15]	8.78[-15]	1.38[-15]	1.20[-15]

Table IX: DR rate coefficients ($g_0\alpha_d$ in cm^3/s) for excited odd-parity states of C-like oxygen.

T$_e$	$2s2p^3(^4S)$		$2s2p^3(^2D)$				$2s2p^3(^2P)$			
eV	$^5S_2$	$^3S_1$	$^3D_1$	$^3D_2$	$^3D_3$	$^1D_2$	$^3P_0$	$^3P_1$	$^3P_2$	$^1P_1$
0.1000	6.25[-14]	2.76[-12]	4.28[-13]	6.51[-13]	7.86[-13]	1.41[-14]	2.13[-13]	6.02[-13]	8.83[-13]	1.19[-14]
0.1300	2.57[-13]	4.47[-12]	7.65[-13]	1.20[-12]	1.53[-12]	7.73[-14]	3.43[-13]	9.81[-13]	1.48[-12]	6.01[-14]
0.1690	7.00[-13]	5.93[-12]	1.27[-12]	2.04[-12]	2.71[-12]	2.88[-13]	4.72[-13]	1.36[-12]	2.10[-12]	2.00[-13]
0.2197	1.38[-12]	6.77[-12]	2.09[-12]	3.42[-12]	4.65[-12]	7.75[-13]	6.06[-13]	1.76[-12]	2.77[-12]	4.68[-13]
0.2856	2.14[-12]	6.86[-12]	3.35[-12]	5.52[-12]	7.61[-12]	1.60[-12]	7.71[-13]	2.26[-12]	3.61[-12]	8.37[-13]
0.3713	2.73[-12]	6.37[-12]	4.92[-12]	8.13[-12]	1.13[-11]	2.70[-12]	9.77[-13]	2.89[-12]	4.67[-12]	1.23[-12]
0.4827	3.02[-12]	5.51[-12]	6.39[-12]	1.06[-11]	1.47[-11]	3.83[-12]	1.19[-12]	3.54[-12]	5.77[-12]	1.58[-12]
0.6275	3.00[-12]	4.51[-12]	7.35[-12]	1.22[-11]	1.70[-11]	4.74[-12]	1.35[-12]	4.03[-12]	6.63[-12]	1.83[-12]
0.8157	2.77[-12]	3.55[-12]	7.61[-12]	1.26[-11]	1.76[-11]	5.22[-12]	1.42[-12]	4.25[-12]	7.02[-12]	1.94[-12]
1.0604	2.46[-12]	2.72[-12]	7.23[-12]	1.20[-11]	1.68[-11]	5.24[-12]	1.40[-12]	4.19[-12]	6.95[-12]	1.94[-12]
1.3786	2.14[-12]	2.08[-12]	6.45[-12]	1.07[-11]	1.49[-11]	4.89[-12]	1.31[-12]	3.93[-12]	6.53[-12]	1.84[-12]
1.7922	1.90[-12]	1.65[-12]	5.50[-12]	9.14[-12]	1.27[-11]	4.35[-12]	1.19[-12]	3.57[-12]	5.93[-12]	1.71[-12]
2.3298	1.70[-12]	1.41[-12]	4.55[-12]	7.57[-12]	1.06[-11]	3.77[-12]	1.06[-12]	3.17[-12]	5.27[-12]	1.57[-12]
3.0287	1.52[-12]	1.27[-12]	3.69[-12]	6.15[-12]	8.61[-12]	3.24[-12]	9.20[-13]	2.76[-12]	4.59[-12]	1.43[-12]
3.9374	1.32[-12]	1.18[-12]	2.96[-12]	4.93[-12]	6.88[-12]	2.77[-12]	7.83[-13]	2.35[-12]	3.91[-12]	1.28[-12]
5.1186	1.12[-12]	1.09[-12]	2.33[-12]	3.88[-12]	5.43[-12]	2.33[-12]	6.52[-13]	1.95[-12]	3.26[-12]	1.14[-12]
6.6542	9.19[-13]	9.74[-13]	1.81[-12]	3.01[-12]	4.21[-12]	1.95[-12]	5.28[-13]	1.58[-12]	2.64[-12]	9.72[-13]
8.6504	7.28[-13]	8.36[-13]	1.37[-12]	2.29[-12]	3.20[-12]	1.59[-12]	4.16[-13]	1.25[-12]	2.08[-12]	8.09[-13]
11.2455	5.58[-13]	6.90[-13]	1.03[-12]	1.71[-12]	2.39[-12]	1.26[-12]	3.19[-13]	9.58[-13]	1.60[-12]	6.52[-13]
14.6192	4.18[-13]	5.49[-13]	7.54[-13]	1.26[-12]	1.76[-12]	9.83[-13]	2.40[-13]	7.20[-13]	1.20[-12]	5.11[-13]
19.0049	3.05[-13]	4.24[-13]	5.46[-13]	9.12[-13]	1.27[-12]	7.45[-13]	1.77[-13]	5.30[-13]	8.85[-13]	3.89[-13]
24.7064	2.20[-13]	3.18[-13]	3.90[-13]	6.51[-13]	9.11[-13]	5.54[-13]	1.28[-13]	3.83[-13]	6.41[-13]	2.90[-13]
41.7539	1.09[-13]	1.69[-13]	1.92[-13]	3.22[-13]	4.51[-13]	2.90[-13]	6.42[-14]	1.92[-13]	3.22[-13]	1.52[-13]
54.2800	7.57[-14]	1.20[-13]	1.34[-13]	2.23[-13]	3.13[-13]	2.05[-13]	4.48[-14]	1.34[-13]	2.25[-13]	1.07[-13]
91.7332	3.59[-14]	5.88[-14]	6.33[-14]	1.06[-13]	1.48[-13]	9.98[-14]	2.14[-14]	6.42[-14]	1.07[-13]	5.25[-14]
119.2532	2.46[-14]	4.07[-14]	4.33[-14]	7.23[-14]	1.01[-13]	6.90[-14]	1.47[-14]	4.40[-14]	7.37[-14]	3.63[-14]

T$_e$	$2s^22p3s$				$2s^22p4s$				$2s^22p3d$	
eV	$^3P_0$	$^3P_1$	$^3P_2$	$^1P_2$	$^3P_0$	$^3P_1$	$^3P_2$	$^1P_2$	$^1F_3$	$^1P_1$
0.1000	9.20[-13]	2.65[-12]	4.00[-12]	1.48[-14]	5.32[-19]	1.61[-18]	2.70[-18]	3.26[-18]	3.60[-17]	2.03[-17]
0.1300	1.45[-12]	4.22[-12]	6.55[-12]	6.84[-14]	3.06[-18]	9.18[-18]	1.53[-17]	1.80[-17]	4.44[-16]	1.00[-16]
0.1690	1.89[-12]	5.53[-12]	8.74[-12]	2.22[-13]	1.13[-17]	3.39[-17]	5.64[-17]	6.14[-17]	3.52[-15]	3.64[-16]
0.2197	2.11[-12]	6.21[-12]	9.96[-12]	5.11[-13]	2.98[-17]	8.88[-17]	1.48[-16]	1.44[-16]	1.70[-14]	1.25[-15]
0.2856	2.10[-12]	6.21[-12]	1.01[-11]	8.92[-13]	6.02[-17]	1.79[-16]	2.98[-16]	2.56[-16]	5.36[-14]	4.30[-15]
0.3713	1.91[-12]	5.67[-12]	9.28[-12]	1.25[-12]	1.01[-16]	3.00[-16]	5.01[-16]	3.69[-16]	1.20[-13]	1.25[-14]
0.4827	1.62[-12]	4.84[-12]	7.96[-12]	1.49[-12]	1.63[-16]	4.82[-16]	8.03[-16]	4.71[-16]	2.05[-13]	2.82[-14]
0.6275	1.31[-12]	3.91[-12]	6.47[-12]	1.56[-12]	3.28[-16]	9.73[-16]	1.62[-15]	6.73[-16]	2.84[-13]	5.01[-14]
0.8157	1.01[-12]	3.04[-12]	5.04[-12]	1.48[-12]	8.59[-16]	2.55[-15]	4.23[-15]	1.44[-15]	3.36[-13]	7.30[-14]
1.0604	7.62[-13]	2.28[-12]	3.80[-12]	1.30[-12]	2.14[-15]	6.37[-15]	1.05[-14]	3.65[-15]	3.56[-13]	9.28[-14]
1.3786	5.59[-13]	1.68[-12]	2.80[-12]	1.08[-12]	4.40[-15]	1.31[-14]	2.16[-14]	8.10[-15]	3.55[-13]	1.09[-13]
1.7922	4.03[-13]	1.21[-12]	2.02[-12]	8.53[-13]	7.49[-15]	2.23[-14]	3.68[-14]	1.52[-14]	3.51[-13]	1.22[-13]
2.3298	2.86[-13]	8.59[-13]	1.44[-12]	6.52[-13]	1.10[-14]	3.27[-14]	5.40[-14]	2.48[-14]	3.49[-13]	1.34[-13]
3.0287	2.01[-13]	6.04[-13]	1.01[-12]	4.86[-13]	1.43[-14]	4.26[-14]	7.04[-14]	3.59[-14]	3.47[-13]	1.41[-13]
3.9374	1.40[-13]	4.21[-13]	7.06[-13]	3.54[-13]	1.69[-14]	5.00[-14]	8.27[-14]	4.62[-14]	3.36[-13]	1.41[-13]
5.1186	9.70[-14]	2.92[-13]	4.89[-13]	2.55[-13]	1.80[-14]	5.33[-14]	8.84[-14]	5.30[-14]	3.11[-13]	1.32[-13]
6.6542	6.69[-14]	2.01[-13]	3.38[-13]	1.81[-13]	1.77[-14]	5.23[-14]	8.68[-14]	5.50[-14]	2.73[-13]	1.17[-13]
8.6504	4.60[-14]	1.38[-13]	2.32[-13]	1.28[-13]	1.61[-14]	4.76[-14]	7.91[-14]	5.22[-14]	2.28[-13]	9.78[-14]
11.2455	3.15[-14]	9.48[-14]	1.59[-13]	8.95[-14]	1.38[-14]	4.07[-14]	6.77[-14]	4.61[-14]	1.83[-13]	7.84[-14]
14.6192	2.16[-14]	6.49[-14]	1.09[-13]	6.24[-14]	1.12[-14]	3.31[-14]	5.51[-14]	3.84[-14]	1.42[-13]	6.06[-14]
19.0049	1.47[-14]	4.43[-14]	7.45[-14]	4.32[-14]	8.75[-15]	2.59[-14]	4.31[-14]	3.05[-14]	1.06[-13]	4.55[-14]
24.7064	1.00[-14]	3.02[-14]	5.08[-14]	2.98[-14]	6.62[-15]	1.96[-14]	3.26[-14]	2.34[-14]	7.81[-14]	3.33[-14]
41.7539	4.64[-15]	1.40[-14]	2.35[-14]	1.40[-14]	3.53[-15]	1.04[-14]	1.74[-14]	1.27[-14]	3.99[-14]	1.70[-14]
54.2800	3.15[-15]	9.47[-15]	1.60[-14]	9.59[-15]	2.51[-15]	7.42[-15]	1.24[-14]	9.07[-15]	2.80[-14]	1.19[-14]
91.7332	1.45[-15]	4.35[-15]	7.32[-15]	4.44[-15]	1.23[-15]	3.63[-15]	6.06[-15]	4.47[-15]	1.35[-14]	5.72[-15]

119.2532	9.79[-16]	2.94[-15]	4.96[-15]	3.02[-15]	8.49[-16]	2.51[-15]	4.19[-15]	3.10[-15]	9.26[-15]	3.92[-15]
T_e	$2s^22p3d$									
eV	$^3F_2$	$^3F_3$	$^1D_2$	$^3F_4$	$^3D_1$	$^3D_2$	$^3D_3$	$^3P_2$	$^3P_1$	$^3P_0$
0.1000	4.75[-15]	8.56[-15]	1.72[-15]	1.02[-14]	1.27[-14]	2.01[-14]	2.61[-14]	4.48[-16]	2.01[-16]	4.70[-17]
0.1300	1.63[-14]	2.94[-14]	6.23[-15]	3.60[-14]	3.64[-14]	5.86[-14]	7.87[-14]	2.08[-15]	1.08[-15]	3.10[-16]
0.1690	4.33[-14]	7.77[-14]	1.86[-14]	9.67[-14]	7.94[-14]	1.29[-13]	1.77[-13]	7.85[-15]	4.36[-15]	1.36[-15]
0.2197	9.65[-14]	1.69[-13]	4.73[-14]	2.13[-13]	1.40[-13]	2.30[-13]	3.18[-13]	2.32[-14]	1.33[-14]	4.28[-15]
0.2856	1.81[-13]	3.09[-13]	1.00[-13]	3.92[-13]	2.08[-13]	3.45[-13]	4.80[-13]	5.42[-14]	3.17[-14]	1.03[-14]
0.3713	2.85[-13]	4.74[-13]	1.76[-13]	6.03[-13]	2.73[-13]	4.52[-13]	6.33[-13]	1.03[-13]	6.07[-14]	2.00[-14]
0.4827	3.83[-13]	6.21[-13]	2.60[-13]	7.91[-13]	3.19[-13]	5.30[-13]	7.41[-13]	1.62[-13]	9.62[-14]	3.18[-14]
0.6275	4.50[-13]	7.10[-13]	3.31[-13]	9.05[-13]	3.38[-13]	5.61[-13]	7.86[-13]	2.18[-13]	1.30[-13]	4.29[-14]
0.8157	4.73[-13]	7.28[-13]	3.72[-13]	9.28[-13]	3.30[-13]	5.48[-13]	7.67[-13]	2.57[-13]	1.53[-13]	5.07[-14]
1.0604	4.60[-13]	6.92[-13]	3.85[-13]	8.82[-13]	3.03[-13]	5.03[-13]	7.05[-13]	2.76[-13]	1.65[-13]	5.46[-14]
1.3786	4.30[-13]	6.33[-13]	3.78[-13]	8.07[-13]	2.70[-13]	4.50[-13]	6.29[-13]	2.83[-13]	1.69[-13]	5.60[-14]
1.7922	4.00[-13]	5.76[-13]	3.66[-13]	7.35[-13]	2.42[-13]	4.03[-13]	5.63[-13]	2.87[-13]	1.71[-13]	5.67[-14]
2.3298	3.73[-13]	5.31[-13]	3.53[-13]	6.77[-13]	2.21[-13]	3.67[-13]	5.13[-13]	2.89[-13]	1.73[-13]	5.73[-14]
3.0287	3.48[-13]	4.89[-13]	3.37[-13]	6.24[-13]	2.03[-13]	3.38[-13]	4.72[-13]	2.87[-13]	1.71[-13]	5.69[-14]
3.9374	3.17[-13]	4.42[-13]	3.13[-13]	5.65[-13]	1.84[-13]	3.06[-13]	4.28[-13]	2.74[-13]	1.64[-13]	5.44[-14]
5.1186	2.78[-13]	3.86[-13]	2.78[-13]	4.95[-13]	1.61[-13]	2.69[-13]	3.76[-13]	2.49[-13]	1.49[-13]	4.95[-14]
6.6542	2.35[-13]	3.25[-13]	2.37[-13]	4.16[-13]	1.36[-13]	2.27[-13]	3.17[-13]	2.14[-13]	1.28[-13]	4.27[-14]
8.6504	1.90[-13]	2.63[-13]	1.94[-13]	3.37[-13]	1.11[-13]	1.84[-13]	2.58[-13]	1.77[-13]	1.06[-13]	3.52[-14]
11.2455	1.49[-13]	2.05[-13]	1.52[-13]	2.64[-13]	8.66[-14]	1.44[-13]	2.02[-13]	1.40[-13]	8.36[-14]	2.79[-14]
14.6192	1.13[-13]	1.56[-13]	1.16[-13]	2.00[-13]	6.58[-14]	1.10[-13]	1.54[-13]	1.07[-13]	6.40[-14]	2.13[-14]
19.0049	8.38[-14]	1.15[-13]	8.64[-14]	1.49[-13]	4.88[-14]	8.14[-14]	1.14[-13]	7.95[-14]	4.76[-14]	1.59[-14]
24.7064	6.09[-14]	8.38[-14]	6.29[-14]	1.08[-13]	3.54[-14]	5.92[-14]	8.30[-14]	5.79[-14]	3.47[-14]	1.16[-14]
41.7539	3.07[-14]	4.22[-14]	3.18[-14]	5.45[-14]	1.79[-14]	2.99[-14]	4.19[-14]	2.93[-14]	1.75[-14]	5.85[-15]
54.2800	2.14[-14]	2.95[-14]	2.22[-14]	3.81[-14]	1.25[-14]	2.09[-14]	2.93[-14]	2.05[-14]	1.23[-14]	4.09[-15]
91.7332	1.02[-14]	1.41[-14]	1.06[-14]	1.82[-14]	5.96[-15]	9.96[-15]	1.40[-14]	9.78[-15]	5.86[-15]	1.95[-15]
119.2532	7.02[-15]	9.66[-15]	7.29[-15]	1.25[-14]	4.08[-15]	6.83[-15]	9.60[-15]	6.71[-15]	4.02[-15]	1.34[-15]
T_e	$2s2p^2(^3P)3p$									
eV	$^3S_1^b$	$^5D_0$	$^5D_1$	$^5D_2$	$^5D_3$	$^5D_4$	$^5P_1$	$^5P_2$	$^5P_3$	$^3D_1^b$
0.1000	1.04[-14]	6.53[-16]	1.12[-14]	2.36[-14]	3.01[-14]	1.52[-14]	3.85[-15]	6.00[-15]	6.86[-15]	2.80[-15]
0.1300	1.95[-14]	1.96[-15]	3.20[-14]	6.85[-14]	8.96[-14]	4.75[-14]	1.43[-14]	2.24[-14]	2.62[-14]	8.91[-15]
0.1690	3.31[-14]	4.23[-15]	6.59[-14]	1.42[-13]	1.90[-13]	1.05[-13]	3.58[-14]	5.63[-14]	6.71[-14]	2.05[-14]
0.2197	5.10[-14]	7.02[-15]	1.05[-13]	2.28[-13]	3.09[-13]	1.76[-13]	6.63[-14]	1.05[-13]	1.27[-13]	3.74[-14]
0.2856	7.00[-14]	9.52[-15]	1.38[-13]	3.00[-13]	4.11[-13]	2.40[-13]	9.73[-14]	1.54[-13]	1.88[-13]	5.72[-14]
0.3713	8.51[-14]	1.11[-14]	1.55[-13]	3.38[-13]	4.68[-13]	2.79[-13]	1.20[-13]	1.89[-13]	2.34[-13]	7.59[-14]
0.4827	9.27[-14]	1.16[-14]	1.56[-13]	3.40[-13]	4.74[-13]	2.88[-13]	1.28[-13]	2.03[-13]	2.53[-13]	8.97[-14]
0.6275	9.23[-14]	1.14[-14]	1.44[-13]	3.15[-13]	4.40[-13]	2.71[-13]	1.25[-13]	1.97[-13]	2.47[-13]	9.64[-14]
0.8157	8.63[-14]	1.09[-14]	1.26[-13]	2.74[-13]	3.84[-13]	2.41[-13]	1.14[-13]	1.78[-13]	2.24[-13]	9.63[-14]
1.0604	7.75[-14]	1.04[-14]	1.07[-13]	2.30[-13]	3.23[-13]	2.06[-13]	9.89[-14]	1.53[-13]	1.94[-13]	9.16[-14]
1.3786	6.78[-14]	9.96[-15]	8.92[-14]	1.89[-13]	2.64[-13]	1.73[-13]	8.39[-14]	1.27[-13]	1.63[-13]	8.46[-14]
1.7922	5.83[-14]	9.46[-15]	7.35[-14]	1.53[-13]	2.13[-13]	1.43[-13]	7.00[-14]	1.04[-13]	1.34[-13]	7.67[-14]
2.3298	4.93[-14]	8.76[-15]	5.98[-14]	1.23[-13]	1.70[-13]	1.18[-13]	5.76[-14]	8.34[-14]	1.09[-13]	6.84[-14]
3.0287	4.08[-14]	7.81[-15]	4.79[-14]	9.65[-14]	1.33[-13]	9.47[-14]	4.65[-14]	6.60[-14]	8.75[-14]	5.98[-14]
3.9374	3.30[-14]	6.67[-15]	3.76[-14]	7.47[-14]	1.02[-13]	7.47[-14]	3.67[-14]	5.14[-14]	6.87[-14]	5.09[-14]
5.1186	2.60[-14]	5.46[-15]	2.89[-14]	5.67[-14]	7.75[-14]	5.76[-14]	2.84[-14]	3.92[-14]	5.27[-14]	4.22[-14]
6.6542	2.01[-14]	4.31[-15]	2.18[-14]	4.22[-14]	5.76[-14]	4.34[-14]	2.14[-14]	2.94[-14]	3.97[-14]	3.39[-14]
8.6504	1.51[-14]	3.30[-15]	1.60[-14]	3.09[-14]	4.20[-14]	3.21[-14]	1.58[-14]	2.16[-14]	2.93[-14]	2.65[-14]
11.2455	1.12[-14]	2.45[-15]	1.16[-14]	2.22[-14]	3.02[-14]	2.33[-14]	1.15[-14]	1.56[-14]	2.12[-14]	2.02[-14]
14.6192	8.16[-15]	1.79[-15]	8.31[-15]	1.58[-14]	2.15[-14]	1.66[-14]	8.24[-15]	1.12[-14]	1.52[-14]	1.51[-14]
19.0049	5.86[-15]	1.28[-15]	5.86[-15]	1.11[-14]	1.51[-14]	1.18[-14]	5.82[-15]	7.87[-15]	1.07[-14]	1.10[-14]
24.7064	4.16[-15]	9.06[-16]	4.10[-15]	7.75[-15]	1.05[-14]	8.22[-15]	4.07[-15]	5.50[-15]	7.49[-15]	7.94[-15]
32.1184	2.92[-15]	6.34[-16]	2.84[-15]	5.36[-15]	7.26[-15]	5.70[-15]	2.83[-15]	3.81[-15]	5.20[-15]	5.64[-15]
41.7539	2.04[-15]	4.40[-16]	1.96[-15]	3.69[-15]	4.99[-15]	3.93[-15]	1.95[-15]	2.63[-15]	3.58[-15]	3.96[-15]
54.2800	1.41[-15]	3.03[-16]	1.34[-15]	2.53[-15]	3.42[-15]	2.70[-15]	1.34[-15]	1.80[-15]	2.46[-15]	2.76[-15]

91.7332	6.65[-16]	1.42[-16]	6.26[-16]	1.17[-15]	1.59[-15]	1.26[-15]	6.24[-16]	8.39[-16]	1.15[-15]	1.31[-15]
119.2532	4.54[-16]	9.70[-17]	4.26[-16]	7.98[-16]	1.08[-15]	8.55[-16]	4.24[-16]	5.70[-16]	7.79[-16]	8.97[-16]

T_e			$2s2p^2(^3P)3p$						$2s2p^2(^1D)3p$	
eV	$^3D_2^b$	$^3D_3^b$	$^5S_2$	$^3P_0^b$	$^3P_1^b$	$^3P_2^b$	$^3F_4$	$^3F_3$	$^3F_2$	$^1D_2$
0.1000	4.27[-15]	5.22[-15]	1.51[-15]	3.89[-16]	1.10[-15]	8.17[-16]	1.07[-15]	4.25[-16]	5.29[-16]	9.09[-18]
0.1300	1.38[-14]	1.72[-14]	6.22[-15]	9.76[-16]	2.78[-15]	2.14[-15]	3.97[-15]	1.46[-15]	1.88[-15]	1.19[-16]
0.1690	3.22[-14]	4.09[-14]	1.70[-14]	2.40[-15]	6.87[-15]	5.35[-15]	1.17[-14]	4.00[-15]	5.23[-15]	8.03[-16]
0.2197	5.92[-14]	7.66[-14]	3.36[-14]	5.19[-15]	1.49[-14]	1.17[-14]	2.84[-14]	9.18[-15]	1.21[-14]	3.25[-15]
0.2856	9.14[-14]	1.20[-13]	5.20[-14]	9.39[-15]	2.70[-14]	2.13[-14]	5.61[-14]	1.75[-14]	2.32[-14]	8.91[-15]
0.3713	1.22[-13]	1.63[-13]	6.68[-14]	1.42[-14]	4.10[-14]	3.25[-14]	9.09[-14]	2.78[-14]	3.69[-14]	1.82[-14]
0.4827	1.46[-13]	1.96[-13]	7.48[-14]	1.85[-14]	5.35[-14]	4.26[-14]	1.23[-13]	3.72[-14]	4.95[-14]	2.97[-14]
0.6275	1.57[-13]	2.14[-13]	7.61[-14]	2.13[-14]	6.16[-14]	4.93[-14]	1.44[-13]	4.31[-14]	5.75[-14]	4.05[-14]
0.8157	1.58[-13]	2.16[-13]	7.31[-14]	2.23[-14]	6.47[-14]	5.21[-14]	1.49[-13]	4.46[-14]	5.96[-14]	4.79[-14]
1.0604	1.51[-13]	2.07[-13]	6.87[-14]	2.20[-14]	6.40[-14]	5.20[-14]	1.42[-13]	4.25[-14]	5.69[-14]	5.11[-14]
1.3786	1.40[-13]	1.92[-13]	6.48[-14]	2.10[-14]	6.12[-14]	5.10[-14]	1.28[-13]	3.86[-14]	5.17[-14]	5.07[-14]
1.7922	1.27[-13]	1.75[-13]	6.18[-14]	1.98[-14]	5.78[-14]	5.08[-14]	1.12[-13]	3.45[-14]	4.62[-14]	4.82[-14]
2.3298	1.13[-13]	1.57[-13]	5.88[-14]	1.85[-14]	5.41[-14]	5.25[-14]	9.78[-14]	3.13[-14]	4.21[-14]	4.49[-14]
3.0287	9.92[-14]	1.38[-13]	5.46[-14]	1.71[-14]	5.02[-14]	5.59[-14]	8.78[-14]	2.98[-14]	4.03[-14]	4.14[-14]
3.9374	8.48[-14]	1.18[-13]	4.87[-14]	1.55[-14]	4.60[-14]	5.96[-14]	8.16[-14]	2.99[-14]	4.09[-14]	3.79[-14]
5.1186	7.04[-14]	9.80[-14]	4.16[-14]	1.37[-14]	4.11[-14]	6.17[-14]	7.77[-14]	3.10[-14]	4.31[-14]	3.43[-14]
6.6542	5.68[-14]	7.93[-14]	3.41[-14]	1.18[-14]	3.56[-14]	6.08[-14]	7.37[-14]	3.20[-14]	4.50[-14]	3.05[-14]
8.6504	4.46[-14]	6.23[-14]	2.69[-14]	9.87[-15]	2.99[-14]	5.65[-14]	6.80[-14]	3.17[-14]	4.51[-14]	2.65[-14]
11.2455	3.42[-14]	4.78[-14]	2.05[-14]	7.95[-15]	2.43[-14]	4.96[-14]	6.03[-14]	2.98[-14]	4.27[-14]	2.23[-14]
14.6192	2.56[-14]	3.58[-14]	1.52[-14]	6.21[-15]	1.90[-14]	4.13[-14]	5.11[-14]	2.64[-14]	3.81[-14]	1.81[-14]
19.0049	1.87[-14]	2.63[-14]	1.11[-14]	4.72[-15]	1.45[-14]	3.30[-14]	4.15[-14]	2.22[-14]	3.22[-14]	1.43[-14]
24.7064	1.35[-14]	1.90[-14]	7.93[-15]	3.50[-15]	1.08[-14]	2.54[-14]	3.25[-14]	1.79[-14]	2.60[-14]	1.09[-14]
41.7539	6.77[-15]	9.50[-15]	3.92[-15]	1.83[-15]	5.66[-15]	1.39[-14]	1.82[-14]	1.04[-14]	1.52[-14]	5.95[-15]
54.2800	4.72[-15]	6.62[-15]	2.72[-15]	1.29[-15]	4.00[-15]	9.96[-15]	1.32[-14]	7.63[-15]	1.12[-14]	4.27[-15]
91.7332	2.25[-15]	3.16[-15]	1.28[-15]	6.27[-16]	1.95[-15]	4.94[-15]	6.65[-15]	3.90[-15]	5.71[-15]	2.12[-15]
119.2532	1.54[-15]	2.16[-15]	8.77[-16]	4.32[-16]	1.34[-15]	3.43[-15]	4.64[-15]	2.74[-15]	4.01[-15]	1.47[-15]

T_e				$2s2p^2(^1D)3p$					$2s2p^2(^3P)4p$	
eV	$^3D_1$	$^3D_2$	$^3D_3$	$^1F_3$	$^3P_0$	$^3P_1$	$^3P_2$	$^1P_1$	$^3S_1^b$	$^5D_0$
0.1000	2.50[-15]	3.96[-15]	5.10[-15]	7.18[-18]	3.33[-17]	9.89[-17]	1.70[-16]	8.37[-21]	4.02[-16]	8.03[-17]
0.1300	7.79[-15]	1.25[-14]	1.64[-14]	8.49[-17]	1.96[-16]	5.79[-16]	9.40[-16]	5.74[-19]	1.54[-15]	2.49[-16]
0.1690	1.72[-14]	2.77[-14]	3.70[-14]	6.69[-16]	7.40[-16]	2.18[-15]	3.52[-15]	1.37[-17]	4.46[-15]	5.50[-16]
0.2197	2.92[-14]	4.76[-14]	6.43[-14]	3.23[-15]	1.97[-15]	5.82[-15]	9.40[-15]	1.46[-16]	9.56[-15]	9.32[-16]
0.2856	4.10[-14]	6.73[-14]	9.17[-14]	1.02[-14]	3.97[-15]	1.18[-14]	1.92[-14]	8.27[-16]	1.60[-14]	1.29[-15]
0.3713	4.98[-14]	8.20[-14]	1.13[-13]	2.30[-14]	6.47[-15]	1.93[-14]	3.15[-14]	2.91[-15]	2.19[-14]	1.57[-15]
0.4827	5.40[-14]	8.92[-14]	1.23[-13]	3.95[-14]	8.90[-15]	2.65[-14]	4.37[-14]	7.09[-15]	2.59[-14]	1.77[-15]
0.6275	5.35[-14]	8.87[-14]	1.23[-13]	5.50[-14]	1.07[-14]	3.19[-14]	5.26[-14]	1.30[-14]	2.74[-14]	1.97[-15]
0.8157	4.95[-14]	8.22[-14]	1.14[-13]	6.51[-14]	1.15[-14]	3.43[-14]	5.67[-14]	1.91[-14]	2.69[-14]	2.20[-15]
1.0604	4.38[-14]	7.28[-14]	1.01[-13]	6.84[-14]	1.13[-14]	3.39[-14]	5.62[-14]	2.39[-14]	2.49[-14]	2.43[-15]
1.3786	3.80[-14]	6.33[-14]	8.83[-14]	6.61[-14]	1.06[-14]	3.17[-14]	5.27[-14]	2.65[-14]	2.21[-14]	2.62[-15]
1.7922	3.34[-14]	5.56[-14]	7.77[-14]	6.08[-14]	9.63[-15]	2.89[-14]	4.79[-14]	2.70[-14]	1.90[-14]	2.69[-15]
2.3298	3.01[-14]	5.03[-14]	7.04[-14]	5.49[-14]	8.70[-15]	2.61[-14]	4.34[-14]	2.61[-14]	1.58[-14]	2.62[-15]
3.0287	2.80[-14]	4.69[-14]	6.60[-14]	5.01[-14]	7.93[-15]	2.38[-14]	3.96[-14]	2.43[-14]	1.28[-14]	2.41[-15]
3.9374	2.65[-14]	4.46[-14]	6.30[-14]	4.68[-14]	7.28[-15]	2.18[-14]	3.66[-14]	2.20[-14]	1.02[-14]	2.10[-15]
5.1186	2.49[-14]	4.21[-14]	5.99[-14]	4.46[-14]	6.69[-15]	2.00[-14]	3.37[-14]	1.94[-14]	7.93[-15]	1.74[-15]
6.6542	2.28[-14]	3.87[-14]	5.54[-14]	4.24[-14]	6.06[-15]	1.81[-14]	3.07[-14]	1.68[-14]	6.08[-15]	1.39[-15]
8.6504	2.01[-14]	3.43[-14]	4.93[-14]	3.94[-14]	5.34[-15]	1.59[-14]	2.71[-14]	1.41[-14]	4.60[-15]	1.07[-15]
11.2455	1.70[-14]	2.91[-14]	4.20[-14]	3.52[-14]	4.54[-15]	1.35[-14]	2.31[-14]	1.15[-14]	3.44[-15]	7.99[-16]
14.6192	1.38[-14]	2.37[-14]	3.43[-14]	3.00[-14]	3.72[-15]	1.11[-14]	1.90[-14]	9.07[-15]	2.54[-15]	5.85[-16]
19.0049	1.08[-14]	1.86[-14]	2.70[-14]	2.46[-14]	2.94[-15]	8.74[-15]	1.50[-14]	6.99[-15]	1.86[-15]	4.20[-16]
24.7064	8.20[-15]	1.42[-14]	2.06[-14]	1.94[-14]	2.26[-15]	6.69[-15]	1.15[-14]	5.25[-15]	1.34[-15]	2.98[-16]
32.1184	6.08[-15]	1.05[-14]	1.53[-14]	1.48[-14]	1.69[-15]	5.00[-15]	8.62[-15]	3.86[-15]	9.53[-16]	2.09[-16]
41.7539	4.41[-15]	7.66[-15]	1.12[-14]	1.10[-14]	1.23[-15]	3.65[-15]	6.30[-15]	2.79[-15]	6.73[-16]	1.45[-16]

54.2800	3.15[-15]	5.48[-15]	7.99[-15]	8.00[-15]	8.88[-16]	2.62[-15]	4.53[-15]	1.99[-15]	4.71[-16]	1.00[-16]
91.7332	1.55[-15]	2.71[-15]	3.94[-15]	4.04[-15]	4.41[-16]	1.30[-15]	2.25[-15]	9.74[-16]	2.25[-16]	4.69[-17]
119.2532	1.08[-15]	1.88[-15]	2.74[-15]	2.83[-15]	3.07[-16]	9.04[-16]	1.57[-15]	6.75[-16]	1.55[-16]	3.20[-17]
T_e					$2s2p^2(^3P)4p$					
eV	$^5D_1$	$^5D_2$	$^5D_3$	$^5D_4$	$^5P_1$	$^5P_2$	$^5P_3$	$^5S_2$	$^3D_1^b$	$^3D_2^b$
0.1000	1.23[-15]	2.57[-15]	3.27[-15]	1.69[-15]	4.96[-16]	7.59[-16]	8.38[-16]	3.36[-17]	5.56[-17]	8.23[-17]
0.1300	3.55[-15]	7.50[-15]	9.79[-15]	5.38[-15]	1.85[-15]	2.84[-15]	3.22[-15]	1.41[-16]	1.92[-16]	2.90[-16]
0.1690	7.36[-15]	1.56[-14]	2.09[-14]	1.20[-14]	4.64[-15]	7.17[-15]	8.29[-15]	3.88[-16]	5.26[-16]	8.10[-16]
0.2197	1.18[-14]	2.52[-14]	3.42[-14]	2.05[-14]	8.61[-15]	1.33[-14]	1.57[-14]	7.81[-16]	1.23[-15]	1.93[-15]
0.2856	1.56[-14]	3.34[-14]	4.58[-14]	2.83[-14]	1.27[-14]	1.97[-14]	2.34[-14]	1.27[-15]	2.43[-15]	3.88[-15]
0.3713	1.78[-14]	3.81[-14]	5.26[-14]	3.34[-14]	1.57[-14]	2.44[-14]	2.92[-14]	1.87[-15]	4.06[-15]	6.56[-15]
0.4827	1.83[-14]	3.90[-14]	5.42[-14]	3.50[-14]	1.72[-14]	2.66[-14]	3.20[-14]	2.76[-15]	5.86[-15]	9.55[-15]
0.6275	1.78[-14]	3.74[-14]	5.20[-14]	3.40[-14]	1.73[-14]	2.65[-14]	3.20[-14]	4.13[-15]	7.57[-15]	1.24[-14]
0.8157	1.67[-14]	3.45[-14]	4.77[-14]	3.16[-14]	1.66[-14]	2.49[-14]	3.01[-14]	5.99[-15]	9.05[-15]	1.49[-14]
1.0604	1.55[-14]	3.13[-14]	4.29[-14]	2.89[-14]	1.55[-14]	2.27[-14]	2.74[-14]	8.13[-15]	1.03[-14]	1.70[-14]
1.3786	1.43[-14]	2.81[-14]	3.82[-14]	2.61[-14]	1.42[-14]	2.03[-14]	2.46[-14]	1.03[-14]	1.14[-14]	1.89[-14]
1.7922	1.30[-14]	2.49[-14]	3.36[-14]	2.34[-14]	1.28[-14]	1.79[-14]	2.17[-14]	1.20[-14]	1.23[-14]	2.04[-14]
2.3298	1.16[-14]	2.16[-14]	2.90[-14]	2.06[-14]	1.13[-14]	1.55[-14]	1.89[-14]	1.30[-14]	1.28[-14]	2.12[-14]
3.0287	9.97[-15]	1.83[-14]	2.44[-14]	1.76[-14]	9.74[-15]	1.31[-14]	1.60[-14]	1.31[-14]	1.27[-14]	2.12[-14]
3.9374	8.29[-15]	1.50[-14]	2.00[-14]	1.46[-14]	8.08[-15]	1.08[-14]	1.32[-14]	1.22[-14]	1.21[-14]	2.02[-14]
5.1186	6.66[-15]	1.19[-14]	1.58[-14]	1.17[-14]	6.48[-15]	8.60[-15]	1.06[-14]	1.07[-14]	1.10[-14]	1.84[-14]
6.6542	5.18[-15]	9.22[-15]	1.22[-14]	9.04[-15]	5.04[-15]	6.67[-15]	8.19[-15]	8.89[-15]	9.52[-15]	1.60[-14]
8.6504	3.91[-15]	6.93[-15]	9.15[-15]	6.83[-15]	3.82[-15]	5.04[-15]	6.19[-15]	7.07[-15]	7.94[-15]	1.34[-14]
11.2455	2.89[-15]	5.10[-15]	6.73[-15]	5.04[-15]	2.82[-15]	3.72[-15]	4.57[-15]	5.42[-15]	6.38[-15]	1.08[-14]
14.6192	2.10[-15]	3.68[-15]	4.86[-15]	3.65[-15]	2.05[-15]	2.70[-15]	3.31[-15]	4.04[-15]	4.97[-15]	8.46[-15]
19.0049	1.50[-15]	2.62[-15]	3.46[-15]	2.60[-15]	1.46[-15]	1.93[-15]	2.36[-15]	2.95[-15]	3.77[-15]	6.43[-15]
24.7064	1.05[-15]	1.84[-15]	2.43[-15]	1.83[-15]	1.03[-15]	1.36[-15]	1.67[-15]	2.11[-15]	2.79[-15]	4.77[-15]
41.7539	5.10[-16]	8.90[-16]	1.17[-15]	8.86[-16]	5.00[-16]	6.57[-16]	8.07[-16]	1.05[-15]	1.45[-15]	2.48[-15]
54.2800	3.51[-16]	6.12[-16]	8.07[-16]	6.10[-16]	3.44[-16]	4.53[-16]	5.56[-16]	7.25[-16]	1.02[-15]	1.76[-15]
91.7332	1.64[-16]	2.86[-16]	3.77[-16]	2.85[-16]	1.61[-16]	2.12[-16]	2.60[-16]	3.43[-16]	4.96[-16]	8.53[-16]
119.2532	1.12[-16]	1.95[-16]	2.57[-16]	1.94[-16]	1.10[-16]	1.44[-16]	1.77[-16]	2.34[-16]	3.42[-16]	5.88[-16]
T_e					$2s^22p4d$					
eV	$^3F_2$	$^3F_3$	$^1D_2$	$^3F_4$	$^3D_1$	$^3D_2$	$^3D_3$	$^3P_2$	$^3P_1$	$^3P_0$
0.1000	6.72[-16]	9.94[-18]	1.04[-16]	8.24[-18]	2.25[-16]	3.62[-16]	4.28[-16]	4.48[-16]	2.61[-16]	8.42[-17]
0.1300	1.77[-15]	3.22[-17]	2.81[-16]	2.66[-17]	5.31[-16]	8.67[-16]	1.03[-15]	1.35[-15]	7.71[-16]	2.50[-16]
0.1690	4.46[-15]	7.46[-17]	7.22[-16]	6.04[-17]	1.10[-15]	1.83[-15]	2.17[-15]	3.80[-15]	2.16[-15]	7.01[-16]
0.2197	9.75[-15]	1.36[-16]	1.60[-15]	1.05[-16]	2.05[-15]	3.46[-15]	4.11[-15]	8.96[-15]	5.06[-15]	1.64[-15]
0.2856	1.78[-14]	2.07[-16]	2.94[-15]	1.48[-16]	3.40[-15]	5.84[-15]	6.98[-15]	1.72[-14]	9.65[-15]	3.13[-15]
0.3713	2.72[-14]	2.73[-16]	4.52[-15]	1.79[-16]	4.99[-15]	8.65[-15]	1.05[-14]	2.73[-14]	1.52[-14]	4.92[-15]
0.4827	3.56[-14]	3.22[-16]	5.96[-15]	1.93[-16]	6.46[-15]	1.13[-14]	1.38[-14]	3.68[-14]	2.04[-14]	6.58[-15]
0.6275	4.12[-14]	3.59[-16]	6.92[-15]	2.07[-16]	7.47[-15]	1.31[-14]	1.62[-14]	4.36[-14]	2.40[-14]	7.74[-15]
0.8157	4.35[-14]	5.15[-16]	7.40[-15]	3.93[-16]	7.95[-15]	1.40[-14]	1.74[-14]	4.68[-14]	2.58[-14]	8.28[-15]
1.0604	4.35[-14]	1.39[-15]	7.88[-15]	1.52[-15]	8.20[-15]	1.44[-14]	1.82[-14]	4.73[-14]	2.60[-14]	8.35[-15]
1.3786	4.30[-14]	4.41[-15]	9.47[-15]	5.38[-15]	8.97[-15]	1.57[-14]	2.01[-14]	4.68[-14]	2.58[-14]	8.28[-15]
1.7922	4.36[-14]	1.15[-14]	1.35[-14]	1.44[-14]	1.11[-14]	1.93[-14]	2.53[-14]	4.72[-14]	2.62[-14]	8.44[-15]
2.3298	4.63[-14]	2.42[-14]	2.06[-14]	3.06[-14]	1.52[-14]	2.62[-14]	3.49[-14]	4.96[-14]	2.79[-14]	9.05[-15]
3.0287	5.06[-14]	4.22[-14]	3.01[-14]	5.36[-14]	2.10[-14]	3.61[-14]	4.85[-14]	5.40[-14]	3.08[-14]	1.01[-14]
3.9374	5.52[-14]	6.26[-14]	4.02[-14]	7.97[-14]	2.74[-14]	4.73[-14]	6.34[-14]	5.91[-14]	3.41[-14]	1.13[-14]
5.1186	5.81[-14]	8.02[-14]	4.81[-14]	1.02[-13]	3.26[-14]	5.65[-14]	7.56[-14]	6.26[-14]	3.65[-14]	1.21[-14]
6.6542	5.78[-14]	9.05[-14]	5.19[-14]	1.16[-13]	3.51[-14]	6.12[-14]	8.17[-14]	6.27[-14]	3.68[-14]	1.23[-14]
8.6504	5.40[-14]	9.18[-14]	5.10[-14]	1.17[-13]	3.46[-14]	6.06[-14]	8.06[-14]	5.90[-14]	3.48[-14]	1.16[-14]
11.2455	4.75[-14]	8.54[-14]	4.64[-14]	1.09[-13]	3.15[-14]	5.55[-14]	7.36[-14]	5.22[-14]	3.09[-14]	1.03[-14]
14.6192	3.97[-14]	7.40[-14]	3.96[-14]	9.48[-14]	2.70[-14]	4.76[-14]	6.31[-14]	4.37[-14]	2.59[-14]	8.68[-15]
19.0049	3.17[-14]	6.06[-14]	3.21[-14]	7.77[-14]	2.19[-14]	3.87[-14]	5.13[-14]	3.50[-14]	2.08[-14]	6.97[-15]
24.7064	2.44[-14]	4.76[-14]	2.50[-14]	6.10[-14]	1.71[-14]	3.03[-14]	4.00[-14]	2.71[-14]	1.61[-14]	5.39[-15]
32.1184	1.82[-14]	3.61[-14]	1.89[-14]	4.63[-14]	1.29[-14]	2.29[-14]	3.02[-14]	2.03[-14]	1.20[-14]	4.04[-15]

41.7539	1.33[-14]	2.66[-14]	1.39[-14]	3.42[-14]	9.49[-15]	1.68[-14]	2.22[-14]	1.48[-14]	8.82[-15]	2.96[-15]
54.2800	9.58[-15]	1.93[-14]	1.00[-14]	2.47[-14]	6.85[-15]	1.22[-14]	1.61[-14]	1.07[-14]	6.34[-15]	2.13[-15]
91.7332	4.75[-15]	9.65[-15]	4.99[-15]	1.24[-14]	3.42[-15]	6.07[-15]	8.01[-15]	5.30[-15]	3.15[-15]	1.06[-15]
119.2532	3.30[-15]	6.72[-15]	3.47[-15]	8.63[-15]	2.38[-15]	4.23[-15]	5.58[-15]	3.68[-15]	2.19[-15]	7.36[-16]
T_e					$2s^22p5d$					
eV	$^3F_2$	$^3F_3$	$^1D_2$	$^3F_4$	$^3D_1$	$^3D_2$	$^3D_3$	$^3P_2$	$^3P_1$	$^3P_0$
0.1000	3.28[-18]	4.87[-18]	3.82[-18]	5.71[-18]	6.19[-18]	8.19[-18]	1.22[-17]	2.20[-18]	3.00[-19]	1.24[-19]
0.1300	1.46[-17]	1.89[-17]	2.08[-17]	2.29[-17]	1.95[-17]	2.72[-17]	3.99[-17]	8.40[-18]	1.97[-18]	7.93[-19]
0.1690	5.08[-17]	5.97[-17]	7.73[-17]	7.45[-17]	4.46[-17]	6.64[-17]	9.36[-17]	2.50[-17]	8.74[-18]	3.40[-18]
0.2197	1.37[-16]	1.54[-16]	2.09[-16]	1.96[-16]	8.07[-17]	1.30[-16]	1.74[-16]	6.17[-17]	2.78[-17]	1.05[-17]
0.2856	2.86[-16]	3.18[-16]	4.31[-16]	4.09[-16]	1.24[-16]	2.16[-16]	2.73[-16]	1.27[-16]	6.61[-17]	2.44[-17]
0.3713	4.78[-16]	5.29[-16]	7.14[-16]	6.83[-16]	1.68[-16]	3.12[-16]	3.77[-16]	2.20[-16]	1.23[-16]	4.48[-17]
0.4827	6.61[-16]	7.27[-16]	9.86[-16]	9.41[-16]	2.06[-16]	4.02[-16]	4.68[-16]	3.24[-16]	1.89[-16]	6.80[-17]
0.6275	7.83[-16]	8.57[-16]	1.18[-15]	1.11[-15]	2.33[-16]	4.68[-16]	5.36[-16]	4.16[-16]	2.49[-16]	8.86[-17]
0.8157	8.24[-16]	8.97[-16]	1.25[-15]	1.16[-15]	2.50[-16]	5.07[-16]	5.77[-16]	4.83[-16]	2.92[-16]	1.03[-16]
1.0604	8.13[-16]	8.96[-16]	1.22[-15]	1.15[-15]	2.67[-16]	5.36[-16]	6.19[-16]	5.37[-16]	3.27[-16]	1.15[-16]
1.3786	9.06[-16]	1.10[-15]	1.18[-15]	1.41[-15]	3.41[-16]	6.51[-16]	7.96[-16]	6.81[-16]	4.15[-16]	1.44[-16]
1.7922	1.55[-15]	2.22[-15]	1.39[-15]	2.86[-15]	6.49[-16]	1.16[-15]	1.54[-15]	1.26[-15]	7.60[-16]	2.59[-16]
2.3298	3.64[-15]	5.73[-15]	2.47[-15]	7.38[-15]	1.58[-15]	2.75[-15]	3.82[-15]	3.06[-15]	1.81[-15]	6.06[-16]
3.0287	8.28[-15]	1.34[-14]	5.37[-15]	1.72[-14]	3.66[-15]	6.32[-15]	8.97[-15]	7.19[-15]	4.15[-15]	1.38[-15]
3.9374	1.58[-14]	2.58[-14]	1.06[-14]	3.31[-14]	7.08[-15]	1.22[-14]	1.75[-14]	1.41[-14]	7.99[-15]	2.63[-15]
5.1186	2.48[-14]	4.06[-14]	1.75[-14]	5.21[-14]	1.13[-14]	1.95[-14]	2.80[-14]	2.26[-14]	1.27[-14]	4.16[-15]
6.6542	3.28[-14]	5.37[-14]	2.40[-14]	6.90[-14]	1.50[-14]	2.60[-14]	3.75[-14]	3.04[-14]	1.69[-14]	5.52[-15]
8.6504	3.76[-14]	6.15[-14]	2.82[-14]	7.90[-14]	1.73[-14]	3.00[-14]	4.34[-14]	3.53[-14]	1.95[-14]	6.35[-15]
11.2455	3.83[-14]	6.28[-14]	2.93[-14]	8.06[-14]	1.77[-14]	3.08[-14]	4.45[-14]	3.62[-14]	1.99[-14]	6.49[-15]
14.6192	3.56[-14]	5.84[-14]	2.76[-14]	7.50[-14]	1.65[-14]	2.87[-14]	4.16[-14]	3.39[-14]	1.86[-14]	6.04[-15]
19.0049	3.08[-14]	5.05[-14]	2.41[-14]	6.49[-14]	1.43[-14]	2.49[-14]	3.61[-14]	2.95[-14]	1.61[-14]	5.24[-15]
24.7064	2.52[-14]	4.13[-14]	1.99[-14]	5.30[-14]	1.17[-14]	2.04[-14]	2.96[-14]	2.42[-14]	1.32[-14]	4.29[-15]
41.7539	1.49[-14]	2.45[-14]	1.19[-14]	3.14[-14]	6.95[-15]	1.21[-14]	1.76[-14]	1.44[-14]	7.83[-15]	2.54[-15]
54.2800	1.10[-14]	1.80[-14]	8.77[-15]	2.31[-14]	5.13[-15]	8.95[-15]	1.30[-14]	1.06[-14]	5.77[-15]	1.87[-15]
91.7332	5.65[-15]	9.25[-15]	4.52[-15]	1.19[-14]	2.63[-15]	4.60[-15]	6.67[-15]	5.45[-15]	2.97[-15]	9.62[-16]
119.2532	3.97[-15]	6.50[-15]	3.18[-15]	8.35[-15]	1.85[-15]	3.23[-15]	4.69[-15]	3.83[-15]	2.08[-15]	6.76[-16]
T_e					$2s^22p6d$					
eV	$^3F_2$	$^3F_3$	$^1D_2$	$^3F_4$	$^3D_1$	$^3D_2$	$^3D_3$	$^3P_2$	$^3P_1$	$^3P_0$
0.1000	5.79[-18]	8.59[-18]	6.99[-18]	9.11[-18]	1.14[-17]	1.24[-17]	4.20[-17]	2.29[-17]	2.04[-18]	8.70[-21]
0.1300	2.75[-17]	3.69[-17]	3.19[-17]	4.28[-17]	3.54[-17]	4.25[-17]	1.10[-16]	4.96[-17]	6.54[-18]	1.15[-19]
0.1690	1.03[-16]	1.31[-16]	1.08[-16]	1.64[-16]	7.76[-17]	1.08[-16]	2.28[-16]	8.96[-17]	1.56[-17]	7.85[-19]
0.2197	2.93[-16]	3.68[-16]	2.80[-16]	4.84[-16]	1.30[-16]	2.21[-16]	3.83[-16]	1.40[-16]	3.10[-17]	3.22[-18]
0.2856	6.36[-16]	8.02[-16]	5.72[-16]	1.08[-15]	1.80[-16]	3.79[-16]	5.49[-16]	1.96[-16]	5.42[-17]	8.99[-18]
0.3713	1.09[-15]	1.38[-15]	9.44[-16]	1.86[-15]	2.14[-16]	5.57[-16]	6.91[-16]	2.52[-16]	8.45[-17]	1.86[-17]
0.4827	1.52[-15]	1.93[-15]	1.30[-15]	2.62[-15]	2.31[-16]	7.16[-16]	7.86[-16]	3.01[-16]	1.18[-16]	3.08[-17]
0.6275	1.81[-15]	2.30[-15]	1.56[-15]	3.12[-15]	2.33[-16]	8.21[-16]	8.26[-16]	3.39[-16]	1.49[-16]	4.32[-17]
0.8157	1.90[-15]	2.42[-15]	1.66[-15]	3.27[-15]	2.29[-16]	8.62[-16]	8.20[-16]	3.67[-16]	1.77[-16]	5.47[-17]
1.0604	1.83[-15]	2.33[-15]	1.62[-15]	3.13[-15]	2.31[-16]	8.55[-16]	7.99[-16]	4.00[-16]	2.09[-16]	6.74[-17]
1.3786	1.69[-15]	2.17[-15]	1.52[-15]	2.90[-15]	2.69[-16]	8.65[-16]	8.44[-16]	4.86[-16]	2.72[-16]	9.04[-17]
1.7922	1.77[-15]	2.38[-15]	1.57[-15]	3.16[-15]	4.34[-16]	1.06[-15]	1.20[-15]	7.90[-16]	4.65[-16]	1.57[-16]
2.3298	2.67[-15]	3.92[-15]	2.19[-15]	5.20[-15]	9.68[-16]	1.86[-15]	2.46[-15]	1.76[-15]	1.05[-15]	3.55[-16]
3.0287	5.31[-15]	8.27[-15]	4.17[-15]	1.11[-14]	2.27[-15]	3.94[-15]	5.65[-15]	4.14[-15]	2.48[-15]	8.31[-16]
3.9374	1.03[-14]	1.65[-14]	8.16[-15]	2.22[-14]	4.63[-15]	7.81[-15]	1.15[-14]	8.51[-15]	5.05[-15]	1.69[-15]
5.1186	1.70[-14]	2.76[-14]	1.38[-14]	3.74[-14]	7.80[-15]	1.31[-14]	1.93[-14]	1.44[-14]	8.51[-15]	2.83[-15]
6.6542	2.38[-14]	3.87[-14]	1.97[-14]	5.27[-14]	1.10[-14]	1.83[-14]	2.72[-14]	2.03[-14]	1.20[-14]	3.96[-15]
8.6504	2.85[-14]	4.65[-14]	2.40[-14]	6.36[-14]	1.32[-14]	2.21[-14]	3.28[-14]	2.46[-14]	1.44[-14]	4.75[-15]
11.2455	3.01[-14]	4.93[-14]	2.57[-14]	6.75[-14]	1.40[-14]	2.34[-14]	3.48[-14]	2.61[-14]	1.52[-14]	5.03[-15]
14.6192	2.88[-14]	4.72[-14]	2.48[-14]	6.48[-14]	1.34[-14]	2.25[-14]	3.33[-14]	2.51[-14]	1.46[-14]	4.82[-15]
19.0049	2.55[-14]	4.18[-14]	2.21[-14]	5.75[-14]	1.19[-14]	1.99[-14]	2.96[-14]	2.22[-14]	1.29[-14]	4.26[-15]
24.7064	2.12[-14]	3.48[-14]	1.84[-14]	4.79[-14]	9.87[-15]	1.66[-14]	2.46[-14]	1.85[-14]	1.08[-14]	3.55[-15]

32.1184	1.68[-14]	2.76[-14]	1.47[-14]	3.80[-14]	7.84[-15]	1.32[-14]	1.95[-14]	1.47[-14]	8.56[-15]	2.82[-15]
41.7539	1.29[-14]	2.11[-14]	1.13[-14]	2.91[-14]	5.99[-15]	1.01[-14]	1.50[-14]	1.13[-14]	6.54[-15]	2.15[-15]
54.2800	9.57[-15]	1.57[-14]	8.38[-15]	2.16[-14]	4.45[-15]	7.49[-15]	1.11[-14]	8.37[-15]	4.86[-15]	1.60[-15]
91.7332	4.97[-15]	8.16[-15]	4.36[-15]	1.12[-14]	2.31[-15]	3.89[-15]	5.77[-15]	4.35[-15]	2.53[-15]	8.31[-16]
119.2532	3.50[-15]	5.75[-15]	3.08[-15]	7.93[-15]	1.63[-15]	2.74[-15]	4.07[-15]	3.07[-15]	1.78[-15]	5.86[-16]
T_e					$2s^22p7d$					
eV	$^3F_2$	$^3F_3$	$^1D_2$	$^3D_1$	$^3D_2$	$^3F_4$	$^3D_3$	$^3P_2$	$^3P_1$	$^3P_0$
0.1000	1.98[-16]	4.67[-16]	1.58[-16]	5.57[-17]	5.21[-17]	1.61[-16]	1.11[-16]	6.26[-17]	3.69[-17]	8.05[-21]
0.1300	7.37[-16]	1.73[-15]	5.35[-16]	1.16[-16]	1.34[-16]	5.64[-16]	2.63[-16]	1.30[-16]	6.68[-17]	1.07[-19]
0.1690	2.22[-15]	5.14[-15]	1.51[-15]	2.03[-16]	3.11[-16]	1.51[-15]	5.15[-16]	2.27[-16]	1.03[-16]	7.41[-19]
0.2197	5.52[-15]	1.26[-14]	3.61[-15]	3.03[-16]	6.44[-16]	3.31[-15]	8.60[-16]	3.41[-16]	1.40[-16]	3.10[-18]
0.2856	1.12[-14]	2.53[-14]	7.11[-15]	3.93[-16]	1.17[-15]	6.08[-15]	1.27[-15]	4.55[-16]	1.78[-16]	8.90[-18]
0.3713	1.83[-14]	4.13[-14]	1.15[-14]	4.56[-16]	1.82[-15]	9.37[-15]	1.67[-15]	5.53[-16]	2.13[-16]	1.91[-17]
0.4827	2.50[-14]	5.61[-14]	1.57[-14]	4.85[-16]	2.46[-15]	1.23[-14]	2.00[-15]	6.24[-16]	2.46[-16]	3.28[-17]
0.6275	2.94[-14]	6.57[-14]	1.84[-14]	4.84[-16]	2.91[-15]	1.41[-14]	2.20[-15]	6.65[-16]	2.73[-16]	4.81[-17]
0.8157	3.06[-14]	6.84[-14]	1.93[-14]	4.68[-16]	3.10[-15]	1.45[-14]	2.23[-15]	6.87[-16]	3.00[-16]	6.49[-17]
1.0604	2.92[-14]	6.51[-14]	1.85[-14]	4.58[-16]	3.07[-15]	1.39[-14]	2.17[-15]	7.18[-16]	3.39[-16]	8.68[-17]
1.3786	2.61[-14]	5.84[-14]	1.68[-14]	4.87[-16]	2.94[-15]	1.29[-14]	2.14[-15]	8.07[-16]	4.17[-16]	1.21[-16]
1.7922	2.28[-14]	5.09[-14]	1.49[-14]	6.17[-16]	2.93[-15]	1.24[-14]	2.35[-15]	1.06[-15]	5.89[-16]	1.86[-16]
2.3298	2.01[-14]	4.46[-14]	1.37[-14]	1.02[-15]	3.42[-15]	1.34[-14]	3.34[-15]	1.80[-15]	1.03[-15]	3.38[-16]
3.0287	1.93[-14]	4.12[-14]	1.38[-14]	2.07[-15]	5.13[-15]	1.71[-14]	6.13[-15]	3.69[-15]	2.08[-15]	6.92[-16]
3.9374	2.10[-14]	4.13[-14]	1.59[-14]	4.13[-15]	8.75[-15]	2.48[-14]	1.18[-14]	7.44[-15]	4.11[-15]	1.36[-15]
5.1186	2.47[-14]	4.42[-14]	1.98[-14]	7.13[-15]	1.41[-14]	3.58[-14]	2.01[-14]	1.29[-14]	7.01[-15]	2.31[-15]
6.6542	2.88[-14]	4.75[-14]	2.41[-14]	1.04[-14]	2.00[-14]	4.72[-14]	2.90[-14]	1.89[-14]	1.01[-14]	3.32[-15]
8.6504	3.16[-14]	4.90[-14]	2.72[-14]	1.29[-14]	2.44[-14]	5.55[-14]	3.60[-14]	2.36[-14]	1.25[-14]	4.09[-15]
11.2455	3.19[-14]	4.76[-14]	2.80[-14]	1.40[-14]	2.64[-14]	5.85[-14]	3.92[-14]	2.57[-14]	1.35[-14]	4.42[-15]
14.6192	2.98[-14]	4.32[-14]	2.65[-14]	1.37[-14]	2.57[-14]	5.61[-14]	3.84[-14]	2.52[-14]	1.32[-14]	4.31[-15]
19.0049	2.60[-14]	3.70[-14]	2.34[-14]	1.23[-14]	2.31[-14]	4.98[-14]	3.45[-14]	2.27[-14]	1.19[-14]	3.87[-15]
24.7064	2.15[-14]	3.02[-14]	1.95[-14]	1.04[-14]	1.94[-14]	4.17[-14]	2.91[-14]	1.92[-14]	9.98[-15]	3.26[-15]
41.7539	1.29[-14]	1.79[-14]	1.18[-14]	6.42[-15]	1.20[-14]	2.55[-14]	1.80[-14]	1.19[-14]	6.15[-15]	2.01[-15]
54.2800	9.60[-15]	1.32[-14]	8.79[-15]	4.80[-15]	8.95[-15]	1.90[-14]	1.35[-14]	8.88[-15]	4.60[-15]	1.50[-15]
91.7332	4.97[-15]	6.78[-15]	4.57[-15]	2.51[-15]	4.68[-15]	9.88[-15]	7.05[-15]	4.65[-15]	2.40[-15]	7.84[-16]
119.2532	3.50[-15]	4.77[-15]	3.22[-15]	1.78[-15]	3.31[-15]	6.98[-15]	4.98[-15]	3.29[-15]	1.70[-15]	5.54[-16]
T_e					$2s^22p8d$					
eV	$^3F_2$	$^3D_2$	$^3F_3$	$^3D_1$	$^3F_4$	$^1D_2$	$^3D_3$	$^3P_2$	$^3P_1$	$^3P_0$
0.1000	1.28[-17]	3.15[-16]	1.12[-16]	2.89[-16]	1.11[-17]	1.16[-16]	5.06[-16]	3.17[-16]	1.90[-16]	5.80[-17]
0.1300	6.66[-17]	5.70[-16]	2.45[-16]	5.03[-16]	7.18[-17]	2.94[-16]	9.69[-16]	5.78[-16]	3.23[-16]	9.31[-17]
0.1690	2.60[-16]	9.15[-16]	5.39[-16]	7.55[-16]	3.43[-16]	6.91[-16]	1.57[-15]	8.95[-16]	4.66[-16]	1.27[-16]
0.2197	7.49[-16]	1.35[-15]	1.18[-15]	1.01[-15]	1.13[-15]	1.38[-15]	2.27[-15]	1.23[-15]	6.02[-16]	1.57[-16]
0.2856	1.62[-15]	1.82[-15]	2.32[-15]	1.23[-15]	2.64[-15]	2.31[-15]	2.97[-15]	1.56[-15]	7.29[-16]	1.87[-16]
0.3713	2.75[-15]	2.25[-15]	3.84[-15]	1.39[-15]	4.68[-15]	3.26[-15]	3.60[-15]	1.86[-15]	8.50[-16]	2.23[-16]
0.4827	3.81[-15]	2.59[-15]	5.35[-15]	1.48[-15]	6.67[-15]	4.00[-15]	4.05[-15]	2.08[-15]	9.62[-16]	2.63[-16]
0.6275	4.52[-15]	2.79[-15]	6.42[-15]	1.51[-15]	8.01[-15]	4.39[-15]	4.28[-15]	2.23[-15]	1.06[-15]	3.02[-16]
0.8157	4.74[-15]	2.86[-15]	6.84[-15]	1.50[-15]	8.45[-15]	4.44[-15]	4.28[-15]	2.32[-15]	1.15[-15]	3.42[-16]
1.0604	4.56[-15]	2.90[-15]	6.70[-15]	1.50[-15]	8.12[-15]	4.25[-15]	4.18[-15]	2.42[-15]	1.26[-15]	3.92[-16]
1.3786	4.18[-15]	3.02[-15]	6.27[-15]	1.58[-15]	7.38[-15]	4.03[-15]	4.16[-15]	2.62[-15]	1.44[-15]	4.67[-16]
1.7922	3.87[-15]	3.36[-15]	5.99[-15]	1.78[-15]	6.81[-15]	3.99[-15]	4.49[-15]	3.05[-15]	1.75[-15]	5.83[-16]
2.3298	4.12[-15]	4.18[-15]	6.55[-15]	2.21[-15]	7.42[-15]	4.44[-15]	5.67[-15]	3.94[-15]	2.28[-15]	7.75[-16]
3.0287	5.69[-15]	6.02[-15]	9.13[-15]	3.09[-15]	1.09[-14]	5.93[-15]	8.67[-15]	5.78[-15]	3.26[-15]	1.12[-15]
3.9374	9.40[-15]	9.54[-15]	1.49[-14]	4.75[-15]	1.90[-14]	9.05[-15]	1.45[-14]	9.14[-15]	4.96[-15]	1.71[-15]
5.1186	1.52[-14]	1.47[-14]	2.36[-14]	7.19[-15]	3.13[-14]	1.37[-14]	2.28[-14]	1.39[-14]	7.33[-15]	2.52[-15]
6.6542	2.17[-14]	2.03[-14]	3.32[-14]	9.87[-15]	4.50[-14]	1.89[-14]	3.18[-14]	1.91[-14]	9.84[-15]	3.36[-15]
8.6504	2.68[-14]	2.48[-14]	4.07[-14]	1.20[-14]	5.59[-14]	2.29[-14]	3.87[-14]	2.31[-14]	1.17[-14]	3.99[-15]
11.2455	2.93[-14]	2.68[-14]	4.42[-14]	1.29[-14]	6.10[-14]	2.48[-14]	4.18[-14]	2.48[-14]	1.25[-14]	4.24[-15]
14.6192	2.88[-14]	2.62[-14]	4.33[-14]	1.27[-14]	6.00[-14]	2.42[-14]	4.08[-14]	2.42[-14]	1.21[-14]	4.10[-15]
19.0049	2.60[-14]	2.36[-14]	3.90[-14]	1.14[-14]	5.42[-14]	2.18[-14]	3.67[-14]	2.17[-14]	1.09[-14]	3.66[-15]

24.7064	2.20[-14]	2.00[-14]	3.30[-14]	9.64[-15]	4.59[-14]	1.84[-14]	3.09[-14]	1.83[-14]	9.14[-15]	3.07[-15]
32.1184	1.77[-14]	1.60[-14]	2.65[-14]	7.74[-15]	3.69[-14]	1.48[-14]	2.48[-14]	1.47[-14]	7.31[-15]	2.46[-15]
41.7539	1.37[-14]	1.24[-14]	2.04[-14]	5.98[-15]	2.85[-14]	1.14[-14]	1.91[-14]	1.13[-14]	5.63[-15]	1.89[-15]
54.2800	1.03[-14]	9.26[-15]	1.53[-14]	4.47[-15]	2.13[-14]	8.53[-15]	1.43[-14]	8.48[-15]	4.21[-15]	1.41[-15]
91.7332	5.39[-15]	4.86[-15]	8.02[-15]	2.35[-15]	1.12[-14]	4.48[-15]	7.49[-15]	4.44[-15]	2.20[-15]	7.38[-16]
119.2532	3.81[-15]	3.44[-15]	5.67[-15]	1.66[-15]	7.93[-15]	3.17[-15]	5.30[-15]	3.14[-15]	1.56[-15]	5.22[-16]
T_e	$2s^22p4d$		$2s^22p5d$		$2s^22p6d$		$2s^22p7d$		$2s^22p8d$	
eV	$^1F_3$	$^1P_1$	$^1F_3$	$^1P_1$	$^1F_3$	$^1P_1$	$^1F_3$	$^1P_1$	$^1F_3$	$^1P_1$
0.1000	5.24[-20]	1.84[-19]	1.05[-19]	1.95[-19]	1.14[-18]	5.62[-19]	7.86[-18]	2.96[-18]	2.01[-18]	3.05[-17]
0.1300	7.35[-19]	1.12[-18]	1.73[-18]	1.08[-18]	6.79[-18]	3.11[-18]	3.44[-17]	1.27[-17]	1.12[-17]	8.97[-17]
0.1690	5.23[-18]	4.58[-18]	1.45[-17]	3.67[-18]	3.96[-17]	1.06[-17]	1.51[-16]	3.76[-17]	5.77[-17]	2.34[-16]
0.2197	2.21[-17]	1.35[-17]	7.02[-17]	8.59[-18]	1.74[-16]	2.47[-17]	5.84[-16]	8.13[-17]	2.29[-16]	4.90[-16]
0.2856	6.23[-17]	3.02[-17]	2.21[-16]	1.51[-17]	5.36[-16]	4.35[-17]	1.72[-15]	1.37[-16]	6.63[-16]	8.20[-16]
0.3713	1.29[-16]	5.45[-17]	4.95[-16]	2.13[-17]	1.19[-15]	6.15[-17]	3.75[-15]	1.88[-16]	1.44[-15]	1.14[-15]
0.4827	2.12[-16]	8.26[-17]	8.46[-16]	2.54[-17]	2.04[-15]	7.39[-17]	6.36[-15]	2.23[-16]	2.48[-15]	1.36[-15]
0.6275	2.97[-16]	1.12[-16]	1.17[-15]	2.73[-17]	2.82[-15]	7.99[-17]	8.80[-15]	2.38[-16]	3.54[-15]	1.46[-15]
0.8157	4.65[-16]	1.74[-16]	1.38[-15]	2.98[-17]	3.32[-15]	8.48[-17]	1.03[-14]	2.45[-16]	4.42[-15]	1.47[-15]
1.0604	1.19[-15]	4.50[-16]	1.47[-15]	4.02[-17]	3.46[-15]	9.99[-17]	1.08[-14]	2.64[-16]	5.18[-15]	1.48[-15]
1.3786	3.63[-15]	1.42[-15]	1.63[-15]	7.80[-17]	3.34[-15]	1.42[-16]	1.02[-14]	3.21[-16]	6.06[-15]	1.56[-15]
1.7922	9.28[-15]	3.72[-15]	2.44[-15]	2.13[-16]	3.38[-15]	2.59[-16]	9.36[-15]	4.61[-16]	7.33[-15]	1.77[-15]
2.3298	1.91[-14]	7.71[-15]	4.91[-15]	6.45[-16]	4.44[-15]	5.91[-16]	9.14[-15]	8.20[-16]	9.29[-15]	2.20[-15]
3.0287	3.26[-14]	1.31[-14]	1.00[-14]	1.71[-15]	7.61[-15]	1.41[-15]	1.09[-14]	1.70[-15]	1.23[-14]	2.99[-15]
3.9374	4.73[-14]	1.87[-14]	1.78[-14]	3.63[-15]	1.35[-14]	2.94[-15]	1.56[-14]	3.41[-15]	1.69[-14]	4.34[-15]
5.1186	5.98[-14]	2.33[-14]	2.67[-14]	6.14[-15]	2.13[-14]	5.07[-15]	2.27[-14]	5.89[-15]	2.27[-14]	6.24[-15]
6.6542	6.69[-14]	2.56[-14]	3.44[-14]	8.54[-15]	2.89[-14]	7.25[-15]	3.03[-14]	8.55[-15]	2.84[-14]	8.27[-15]
8.6504	6.76[-14]	2.55[-14]	3.87[-14]	1.01[-14]	3.41[-14]	8.85[-15]	3.58[-14]	1.06[-14]	3.23[-14]	9.81[-15]
11.2455	6.26[-14]	2.34[-14]	3.90[-14]	1.06[-14]	3.57[-14]	9.47[-15]	3.78[-14]	1.15[-14]	3.34[-14]	1.04[-14]
14.6192	5.42[-14]	2.01[-14]	3.60[-14]	1.00[-14]	3.39[-14]	9.15[-15]	3.63[-14]	1.12[-14]	3.17[-14]	1.01[-14]
19.0049	4.44[-14]	1.64[-14]	3.10[-14]	8.77[-15]	2.98[-14]	8.15[-15]	3.22[-14]	1.01[-14]	2.80[-14]	9.07[-15]
24.7064	3.48[-14]	1.28[-14]	2.52[-14]	7.24[-15]	2.47[-14]	6.81[-15]	2.69[-14]	8.52[-15]	2.33[-14]	7.64[-15]
41.7539	1.95[-14]	7.10[-15]	1.49[-14]	4.34[-15]	1.49[-14]	4.16[-15]	1.64[-14]	5.25[-15]	1.42[-14]	4.72[-15]
54.2800	1.41[-14]	5.13[-15]	1.09[-14]	3.21[-15]	1.11[-14]	3.09[-15]	1.22[-14]	3.93[-15]	1.06[-14]	3.53[-15]
91.7332	7.07[-15]	2.56[-15]	5.61[-15]	1.66[-15]	5.74[-15]	1.61[-15]	6.37[-15]	2.05[-15]	5.52[-15]	1.85[-15]
119.2532	4.92[-15]	1.78[-15]	3.94[-15]	1.17[-15]	4.05[-15]	1.14[-15]	4.49[-15]	1.45[-15]	3.90[-15]	1.31[-15]
T_e	$2s^22p5s$				$2s^22p6s$				$2s^22p5g$	
eV	$^3P_0$	$^3P_1$	$^3P_2$	$^1P_2$	$^3P_0$	$^3P_1$	$^3P_2$	$^1P_2$	$^3G_4$	$^3G_3$
0.1000	7.32[-19]	2.34[-18]	4.76[-17]	6.03[-18]	2.52[-17]	7.27[-17]	1.17[-16]	6.22[-18]	1.60[-18]	2.15[-18]
0.1300	4.21[-18]	1.33[-17]	9.07[-17]	3.34[-17]	3.99[-17]	1.19[-16]	1.93[-16]	3.44[-17]	5.17[-18]	6.76[-18]
0.1690	1.60[-17]	4.97[-17]	1.66[-16]	1.14[-16]	5.25[-17]	1.64[-16]	2.61[-16]	1.17[-16]	1.22[-17]	1.53[-17]
0.2197	4.41[-17]	1.35[-16]	3.04[-16]	2.68[-16]	6.08[-17]	2.04[-16]	3.09[-16]	2.75[-16]	2.30[-17]	2.71[-17]
0.2856	9.32[-17]	2.82[-16]	5.28[-16]	4.76[-16]	6.59[-17]	2.39[-16]	3.40[-16]	4.86[-16]	3.69[-17]	4.03[-17]
0.3713	1.59[-16]	4.76[-16]	8.24[-16]	6.84[-16]	7.05[-17]	2.71[-16]	3.66[-16]	6.93[-16]	5.16[-17]	5.23[-17]
0.4827	2.27[-16]	6.76[-16]	1.13[-15]	8.38[-16]	7.67[-17]	3.00[-16]	3.96[-16]	8.41[-16]	6.36[-17]	6.04[-17]
0.6275	2.83[-16]	8.36[-16]	1.39[-15]	9.10[-16]	8.51[-17]	3.27[-16]	4.36[-16]	9.03[-16]	7.03[-17]	6.32[-17]
0.8157	3.19[-16]	9.38[-16]	1.55[-15]	9.07[-16]	9.52[-17]	3.50[-16]	4.84[-16]	8.85[-16]	7.42[-17]	6.36[-17]
1.0604	3.51[-16]	1.03[-15]	1.70[-15]	8.76[-16]	1.08[-16]	3.76[-16]	5.46[-16]	8.19[-16]	1.20[-16]	9.62[-17]
1.3786	4.48[-16]	1.31[-15]	2.18[-15]	9.44[-16]	1.37[-16]	4.46[-16]	6.86[-16]	7.65[-16]	4.76[-16]	3.68[-16]
1.7922	7.46[-16]	2.18[-15]	3.64[-15]	1.43[-15]	2.33[-16]	7.14[-16]	1.16[-15]	8.62[-16]	2.06[-15]	1.58[-15]
2.3298	1.38[-15]	4.05[-15]	6.73[-15]	2.93[-15]	5.00[-16]	1.48[-15]	2.45[-15]	1.36[-15]	6.78[-15]	5.21[-15]
3.0287	2.34[-15]	6.96[-15]	1.14[-14]	6.19[-15]	1.04[-15]	3.02[-15]	5.01[-15]	2.54[-15]	1.70[-14]	1.31[-14]
3.9374	3.45[-15]	1.04[-14]	1.69[-14]	1.14[-14]	1.85[-15]	5.31[-15]	8.74[-15]	4.46[-15]	3.34[-14]	2.56[-14]
5.1186	4.41[-15]	1.35[-14]	2.16[-14]	1.74[-14]	2.75[-15]	7.86[-15]	1.28[-14]	6.77[-15]	5.30[-14]	4.07[-14]
6.6542	4.97[-15]	1.53[-14]	2.44[-14]	2.26[-14]	3.49[-15]	9.95[-15]	1.61[-14]	8.81[-15]	7.05[-14]	5.41[-14]
8.6504	5.04[-15]	1.57[-14]	2.47[-14]	2.54[-14]	3.88[-15]	1.10[-14]	1.77[-14]	1.00[-14]	8.10[-14]	6.21[-14]
11.2455	4.69[-15]	1.47[-14]	2.30[-14]	2.55[-14]	3.87[-15]	1.10[-14]	1.76[-14]	1.02[-14]	8.27[-14]	6.34[-14]
14.6192	4.07[-15]	1.29[-14]	2.00[-14]	2.35[-14]	3.55[-15]	1.01[-14]	1.60[-14]	9.52[-15]	7.70[-14]	5.91[-14]

19.0049	3.34[-15]	1.06[-14]	1.64[-14]	2.01[-14]	3.03[-15]	8.59[-15]	1.36[-14]	8.25[-15]	6.67[-14]	5.12[-14]
24.7064	2.63[-15]	8.36[-15]	1.29[-14]	1.64[-14]	2.46[-15]	6.96[-15]	1.10[-14]	6.76[-15]	5.46[-14]	4.19[-14]
32.1184	1.99[-15]	6.37[-15]	9.79[-15]	1.27[-14]	1.91[-15]	5.41[-15]	8.54[-15]	5.30[-15]	4.28[-14]	3.28[-14]
41.7539	1.47[-15]	4.72[-15]	7.24[-15]	9.58[-15]	1.44[-15]	4.07[-15]	6.42[-15]	4.02[-15]	3.24[-14]	2.48[-14]
54.2800	1.07[-15]	3.42[-15]	5.24[-15]	7.04[-15]	1.06[-15]	2.99[-15]	4.70[-15]	2.96[-15]	2.39[-14]	1.83[-14]
91.7332	5.35[-16]	1.72[-15]	2.63[-15]	3.60[-15]	5.41[-16]	1.53[-15]	2.40[-15]	1.53[-15]	1.23[-14]	9.40[-15]
119.2532	3.73[-16]	1.20[-15]	1.83[-15]	2.52[-15]	3.80[-16]	1.07[-15]	1.68[-15]	1.07[-15]	8.61[-15]	6.60[-15]

T_e		$2s^22p7s$				$2s^22p8s$			$2s^22p6g$	
eV	$^3P_0$	$^3P_1$	$^3P_2$	$^1P_2$	$^3P_0$	$^3P_1$	$^3P_2$	$^1P_2$	$^3G_4$	$^3G_3$
0.1000	2.91[-17]	8.06[-17]	1.35[-16]	5.97[-18]	2.82[-17]	7.75[-17]	1.30[-16]	9.46[-18]	2.19[-18]	2.92[-18]
0.1300	4.61[-17]	1.32[-16]	2.21[-16]	3.30[-17]	4.60[-17]	1.32[-16]	2.25[-16]	4.49[-17]	7.07[-18]	9.16[-18]
0.1690	6.03[-17]	1.84[-16]	2.97[-16]	1.12[-16]	6.52[-17]	1.98[-16]	3.44[-16]	1.42[-16]	1.66[-17]	2.07[-17]
0.2197	6.91[-17]	2.31[-16]	3.47[-16]	2.63[-16]	8.59[-17]	2.80[-16]	5.06[-16]	3.21[-16]	3.13[-17]	3.67[-17]
0.2856	7.28[-17]	2.71[-16]	3.72[-16]	4.65[-16]	1.10[-16]	3.79[-16]	7.34[-16]	5.58[-16]	5.02[-17]	5.47[-17]
0.3713	7.44[-17]	3.02[-16]	3.85[-16]	6.60[-16]	1.38[-16]	4.85[-16]	1.03[-15]	7.89[-16]	7.01[-17]	7.09[-17]
0.4827	7.67[-17]	3.26[-16]	4.00[-16]	7.98[-16]	1.65[-16]	5.80[-16]	1.35[-15]	9.52[-16]	8.64[-17]	8.20[-17]
0.6275	8.15[-17]	3.43[-16]	4.25[-16]	8.52[-16]	1.89[-16]	6.48[-16]	1.62[-15]	1.02[-15]	9.54[-17]	8.59[-17]
0.8157	8.91[-17]	3.57[-16]	4.64[-16]	8.31[-16]	2.06[-16]	6.85[-16]	1.81[-15]	9.95[-16]	9.71[-17]	8.36[-17]
1.0604	9.99[-17]	3.72[-16]	5.17[-16]	7.61[-16]	2.18[-16]	7.01[-16]	1.90[-15]	9.12[-16]	1.05[-16]	8.67[-17]
1.3786	1.22[-16]	4.14[-16]	6.25[-16]	6.83[-16]	2.34[-16]	7.24[-16]	1.97[-15]	8.13[-16]	2.25[-16]	1.76[-16]
1.7922	1.94[-16]	5.92[-16]	9.74[-16]	6.80[-16]	2.86[-16]	8.43[-16]	2.18[-15]	7.71[-16]	9.27[-16]	7.14[-16]
2.3298	4.31[-16]	1.19[-15]	2.07[-15]	9.77[-16]	4.69[-16]	1.31[-15]	2.98[-15]	9.85[-16]	3.48[-15]	2.68[-15]
3.0287	1.01[-15]	2.64[-15]	4.63[-15]	2.01[-15]	9.65[-16]	2.61[-15]	5.16[-15]	1.91[-15]	9.89[-15]	7.60[-15]
3.9374	2.05[-15]	5.17[-15]	9.04[-15]	4.22[-15]	1.95[-15]	5.19[-15]	9.41[-15]	4.10[-15]	2.15[-14]	1.65[-14]
5.1186	3.43[-15]	8.45[-15]	1.47[-14]	7.52[-15]	3.37[-15]	8.91[-15]	1.55[-14]	7.62[-15]	3.69[-14]	2.83[-14]
6.6542	4.79[-15]	1.16[-14]	2.01[-14]	1.11[-14]	4.90[-15]	1.29[-14]	2.18[-14]	1.17[-14]	5.21[-14]	3.99[-14]
8.6504	5.75[-15]	1.38[-14]	2.37[-14]	1.39[-14]	6.08[-15]	1.60[-14]	2.66[-14]	1.51[-14]	6.27[-14]	4.81[-14]
11.2455	6.09[-15]	1.44[-14]	2.48[-14]	1.51[-14]	6.62[-15]	1.73[-14]	2.87[-14]	1.69[-14]	6.64[-14]	5.09[-14]
14.6192	5.84[-15]	1.37[-14]	2.35[-14]	1.48[-14]	6.48[-15]	1.69[-14]	2.79[-14]	1.68[-14]	6.36[-14]	4.88[-14]
19.0049	5.17[-15]	1.21[-14]	2.07[-14]	1.34[-14]	5.84[-15]	1.53[-14]	2.50[-14]	1.54[-14]	5.63[-14]	4.32[-14]
24.7064	4.31[-15]	1.01[-14]	1.72[-14]	1.13[-14]	4.93[-15]	1.29[-14]	2.10[-14]	1.31[-14]	4.69[-14]	3.59[-14]
41.7539	2.62[-15]	6.08[-15]	1.04[-14]	6.96[-15]	3.05[-15]	7.95[-15]	1.29[-14]	8.22[-15]	2.84[-14]	2.18[-14]
54.2800	1.95[-15]	4.51[-15]	7.69[-15]	5.20[-15]	2.28[-15]	5.94[-15]	9.65[-15]	6.17[-15]	2.11[-14]	1.62[-14]
91.7332	1.01[-15]	2.34[-15]	3.98[-15]	2.72[-15]	1.19[-15]	3.11[-15]	5.05[-15]	3.25[-15]	1.10[-14]	8.40[-15]
119.2532	7.14[-16]	1.65[-15]	2.81[-15]	1.92[-15]	8.44[-16]	2.20[-15]	3.57[-15]	2.30[-15]	7.73[-15]	5.92[-15]

T_e					$2s^22p5g$					
eV	$^3H_4$	$^3H_5$	$^1G_4$	$^3G_5$	$^3F_4$	$^1F_3$	$^3H_6$	$^1H_5$	$^3F_2$	$^3F_3$
0.1000	8.66[-19]	2.17[-18]	1.10[-18]	2.89[-18]	6.06[-21]	1.03[-18]	2.24[-19]	8.83[-20]	1.01[-36]	8.09[-37]
0.1300	3.53[-18]	7.55[-18]	4.08[-18]	9.77[-18]	8.36[-20]	3.22[-18]	2.49[-18]	1.01[-18]	8.15[-32]	6.70[-32]
0.1690	1.19[-17]	2.00[-17]	1.23[-17]	2.45[-17]	5.75[-19]	7.16[-18]	1.45[-17]	6.11[-18]	4.48[-28]	3.82[-28]
0.2197	3.25[-17]	4.39[-17]	3.08[-17]	4.99[-17]	2.32[-18]	1.24[-17]	5.14[-17]	2.28[-17]	3.11[-25]	2.80[-25]
0.2856	6.96[-17]	8.13[-17]	6.27[-17]	8.65[-17]	6.18[-18]	1.78[-17]	1.24[-16]	5.82[-17]	4.39[-23]	4.22[-23]
0.3713	1.18[-16]	1.28[-16]	1.04[-16]	1.29[-16]	1.20[-17]	2.23[-17]	2.24[-16]	1.11[-16]	1.82[-21]	1.87[-21]
0.4827	1.65[-16]	1.72[-16]	1.42[-16]	1.67[-16]	1.83[-17]	2.49[-17]	3.21[-16]	1.68[-16]	2.99[-20]	3.27[-20]
0.6275	1.96[-16]	2.02[-16]	1.68[-16]	1.91[-16]	2.34[-17]	2.55[-17]	3.87[-16]	2.12[-16]	2.78[-19]	3.26[-19]
0.8157	2.08[-16]	2.15[-16]	1.79[-16]	2.00[-16]	2.97[-17]	2.69[-17]	4.13[-16]	2.38[-16]	2.75[-18]	3.49[-18]
1.0604	2.53[-16]	2.73[-16]	2.22[-16]	2.53[-16]	7.81[-17]	6.09[-17]	4.74[-16]	3.02[-16]	2.93[-17]	3.83[-17]
1.3786	6.34[-16]	7.45[-16]	5.91[-16]	7.06[-16]	4.21[-16]	3.20[-16]	1.02[-15]	7.80[-16]	2.13[-16]	2.81[-16]
1.7922	2.37[-15]	2.88[-15]	2.27[-15]	2.77[-15]	1.92[-15]	1.46[-15]	3.54[-15]	2.93[-15]	1.01[-15]	1.35[-15]
2.3298	7.60[-15]	9.28[-15]	7.36[-15]	8.99[-15]	6.44[-15]	4.90[-15]	1.12[-14]	9.40[-15]	3.39[-15]	4.59[-15]
3.0287	1.89[-14]	2.31[-14]	1.85[-14]	2.26[-14]	1.63[-14]	1.24[-14]	2.77[-14]	2.34[-14]	8.55[-15]	1.17[-14]
3.9374	3.71[-14]	4.53[-14]	3.64[-14]	4.45[-14]	3.21[-14]	2.45[-14]	5.42[-14]	4.58[-14]	1.69[-14]	2.33[-14]
5.1186	5.89[-14]	7.19[-14]	5.81[-14]	7.11[-14]	5.12[-14]	3.91[-14]	8.62[-14]	7.29[-14]	2.68[-14]	3.74[-14]
6.6542	7.82[-14]	9.56[-14]	7.76[-14]	9.49[-14]	6.83[-14]	5.21[-14]	1.15[-13]	9.69[-14]	3.58[-14]	5.01[-14]
8.6504	8.99[-14]	1.10[-13]	8.94[-14]	1.09[-13]	7.87[-14]	6.01[-14]	1.32[-13]	1.11[-13]	4.11[-14]	5.78[-14]
11.2455	9.18[-14]	1.12[-13]	9.16[-14]	1.12[-13]	8.06[-14]	6.15[-14]	1.35[-13]	1.14[-13]	4.21[-14]	5.92[-14]

14.6192	8.56[-14]	1.05[-13]	8.54[-14]	1.04[-13]	7.51[-14]	5.73[-14]	1.26[-13]	1.06[-13]	3.92[-14]	5.53[-14]
19.0049	7.41[-14]	9.06[-14]	7.41[-14]	9.06[-14]	6.51[-14]	4.97[-14]	1.09[-13]	9.21[-14]	3.40[-14]	4.80[-14]
24.7064	6.07[-14]	7.42[-14]	6.07[-14]	7.42[-14]	5.34[-14]	4.07[-14]	8.92[-14]	7.54[-14]	2.78[-14]	3.93[-14]
32.1184	4.75[-14]	5.81[-14]	4.76[-14]	5.82[-14]	4.18[-14]	3.19[-14]	6.99[-14]	5.91[-14]	2.18[-14]	3.08[-14]
41.7539	3.60[-14]	4.40[-14]	3.60[-14]	4.41[-14]	3.17[-14]	2.42[-14]	5.29[-14]	4.47[-14]	1.65[-14]	2.34[-14]
54.2800	2.65[-14]	3.24[-14]	2.66[-14]	3.25[-14]	2.33[-14]	1.78[-14]	3.90[-14]	3.30[-14]	1.22[-14]	1.72[-14]
91.7332	1.36[-14]	1.67[-14]	1.37[-14]	1.67[-14]	1.20[-14]	9.16[-15]	2.00[-14]	1.70[-14]	6.26[-15]	8.86[-15]
119.2532	9.57[-15]	1.17[-14]	9.60[-15]	1.17[-14]	8.43[-15]	6.43[-15]	1.41[-14]	1.19[-14]	4.39[-15]	6.23[-15]

T_e						$2s^22p6g$				
eV	$^3H_4$	$^3H_5$	$^1G_4$	$^3G_5$	$^3F_4$	$^1F_3$	$^3H_6$	$^1H_5$	$^3F_2$	$^3F_3$
0.1000	1.15[-18]	2.79[-18]	1.86[-18]	4.96[-18]	2.00[-18]	1.97[-18]	3.58[-19]	1.40[-19]	1.52[-36]	1.22[-36]
0.1300	5.01[-18]	9.95[-18]	6.76[-18]	1.66[-17]	6.48[-18]	6.20[-18]	3.98[-18]	1.60[-18]	1.23[-31]	1.01[-31]
0.1690	1.82[-17]	2.76[-17]	1.96[-17]	4.10[-17]	1.52[-17]	1.41[-17]	2.32[-17]	9.67[-18]	6.75[-28]	5.82[-28]
0.2197	5.20[-17]	6.37[-17]	4.73[-17]	8.17[-17]	2.86[-17]	2.53[-17]	8.20[-17]	3.59[-17]	4.69[-25]	4.28[-25]
0.2856	1.14[-16]	1.23[-16]	9.42[-17]	1.38[-16]	4.55[-17]	3.83[-17]	1.98[-16]	9.16[-17]	6.63[-23]	6.47[-23]
0.3713	1.97[-16]	2.00[-16]	1.54[-16]	2.01[-16]	6.30[-17]	5.06[-17]	3.56[-16]	1.74[-16]	2.75[-21]	2.88[-21]
0.4827	2.76[-16]	2.74[-16]	2.11[-16]	2.56[-16]	7.71[-17]	5.94[-17]	5.11[-16]	2.63[-16]	4.48[-20]	4.97[-20]
0.6275	3.29[-16]	3.25[-16]	2.48[-16]	2.89[-16]	8.47[-17]	6.31[-17]	6.17[-16]	3.31[-16]	3.60[-19]	4.22[-19]
0.8157	3.45[-16]	3.42[-16]	2.59[-16]	2.94[-16]	8.60[-17]	6.25[-17]	6.51[-16]	3.64[-16]	1.90[-18]	2.35[-18]
1.0604	3.42[-16]	3.45[-16]	2.59[-16]	2.92[-16]	9.45[-17]	6.79[-17]	6.40[-16]	3.75[-16]	1.10[-17]	1.45[-17]
1.3786	4.48[-16]	4.87[-16]	3.68[-16]	4.27[-16]	2.08[-16]	1.55[-16]	7.75[-16]	5.18[-16]	7.63[-17]	1.04[-16]
1.7922	1.22[-15]	1.45[-15]	1.12[-15]	1.35[-15]	8.68[-16]	6.60[-16]	1.87[-15]	1.48[-15]	4.21[-16]	5.79[-16]
2.3298	4.15[-15]	5.03[-15]	3.94[-15]	4.81[-15]	3.25[-15]	2.48[-15]	6.10[-15]	5.07[-15]	1.65[-15]	2.29[-15]
3.0287	1.15[-14]	1.41[-14]	1.12[-14]	1.36[-14]	9.20[-15]	7.02[-15]	1.69[-14]	1.42[-14]	4.70[-15]	6.58[-15]
3.9374	2.49[-14]	3.04[-14]	2.44[-14]	2.98[-14]	1.99[-14]	1.52[-14]	3.64[-14]	3.07[-14]	1.02[-14]	1.44[-14]
5.1186	4.28[-14]	5.22[-14]	4.23[-14]	5.17[-14]	3.41[-14]	2.59[-14]	6.26[-14]	5.29[-14]	1.75[-14]	2.48[-14]
6.6542	6.04[-14]	7.37[-14]	6.01[-14]	7.34[-14]	4.81[-14]	3.65[-14]	8.86[-14]	7.49[-14]	2.47[-14]	3.50[-14]
8.6504	7.27[-14]	8.88[-14]	7.27[-14]	8.89[-14]	5.78[-14]	4.39[-14]	1.07[-13]	9.03[-14]	2.97[-14]	4.23[-14]
11.2455	7.71[-14]	9.41[-14]	7.73[-14]	9.45[-14]	6.12[-14]	4.64[-14]	1.13[-13]	9.59[-14]	3.14[-14]	4.48[-14]
14.6192	7.38[-14]	9.02[-14]	7.43[-14]	9.08[-14]	5.86[-14]	4.44[-14]	1.09[-13]	9.20[-14]	3.01[-14]	4.30[-14]
19.0049	6.54[-14]	7.98[-14]	6.59[-14]	8.06[-14]	5.19[-14]	3.93[-14]	9.64[-14]	8.15[-14]	2.66[-14]	3.81[-14]
24.7064	5.44[-14]	6.65[-14]	5.50[-14]	6.72[-14]	4.31[-14]	3.27[-14]	8.03[-14]	6.79[-14]	2.21[-14]	3.17[-14]
41.7539	3.30[-14]	4.03[-14]	3.34[-14]	4.08[-14]	2.62[-14]	1.98[-14]	4.87[-14]	4.12[-14]	1.34[-14]	1.92[-14]
54.2800	2.45[-14]	3.00[-14]	2.48[-14]	3.03[-14]	1.94[-14]	1.47[-14]	3.62[-14]	3.06[-14]	9.97[-15]	1.43[-14]
91.7332	1.27[-14]	1.56[-14]	1.29[-14]	1.58[-14]	1.01[-14]	7.63[-15]	1.88[-14]	1.59[-14]	5.17[-15]	7.42[-15]
119.2532	8.98[-15]	1.10[-14]	9.10[-15]	1.11[-14]	7.11[-15]	5.38[-15]	1.33[-14]	1.12[-14]	3.65[-15]	5.23[-15]

T_e						$2s^22p7g$				
eV	$^3H_4$	$^3H_5$	$^1G_4$	$^3G_5$	$^3F_4$	$^1F_3$	$^3H_6$	$^1H_5$	$^3F_2$	$^3F_3$
0.1000	1.57[-18]	3.70[-18]	2.85[-18]	7.62[-18]	2.86[-18]	3.33[-18]	5.45[-19]	2.13[-19]	1.21[-20]	6.26[-21]
0.1300	7.16[-18]	1.35[-17]	1.02[-17]	2.55[-17]	9.38[-18]	1.05[-17]	6.06[-18]	2.43[-18]	1.25[-19]	5.88[-20]
0.1690	2.72[-17]	3.85[-17]	2.92[-17]	6.24[-17]	2.26[-17]	2.40[-17]	3.53[-17]	1.47[-17]	7.00[-19]	3.02[-19]
0.2197	7.99[-17]	9.18[-17]	6.96[-17]	1.23[-16]	4.42[-17]	4.35[-17]	1.25[-16]	5.45[-17]	2.41[-18]	9.76[-19]
0.2856	1.78[-16]	1.82[-16]	1.37[-16]	2.07[-16]	7.36[-17]	6.65[-17]	3.02[-16]	1.39[-16]	5.74[-18]	2.23[-18]
0.3713	3.08[-16]	3.00[-16]	2.24[-16]	2.99[-16]	1.06[-16]	8.86[-17]	5.43[-16]	2.64[-16]	1.02[-17]	3.93[-18]
0.4827	4.34[-16]	4.15[-16]	3.05[-16]	3.79[-16]	1.34[-16]	1.05[-16]	7.79[-16]	3.98[-16]	1.47[-17]	5.77[-18]
0.6275	5.18[-16]	4.96[-16]	3.59[-16]	4.26[-16]	1.51[-16]	1.12[-16]	9.39[-16]	5.01[-16]	1.82[-17]	7.81[-18]
0.8157	5.44[-16]	5.24[-16]	3.74[-16]	4.32[-16]	1.55[-16]	1.11[-16]	9.91[-16]	5.49[-16]	2.17[-17]	1.15[-17]
1.0604	5.23[-16]	5.11[-16]	3.61[-16]	4.11[-16]	1.56[-16]	1.09[-16]	9.52[-16]	5.47[-16]	2.98[-17]	2.30[-17]
1.3786	5.40[-16]	5.53[-16]	3.96[-16]	4.56[-16]	2.15[-16]	1.53[-16]	9.51[-16]	5.90[-16]	7.23[-17]	8.31[-17]
1.7922	9.86[-16]	1.12[-15]	8.42[-16]	1.01[-15]	6.35[-16]	4.76[-16]	1.56[-15]	1.15[-15]	3.04[-16]	4.09[-16]
2.3298	3.04[-15]	3.65[-15]	2.83[-15]	3.45[-15]	2.35[-15]	1.79[-15]	4.49[-15]	3.67[-15]	1.21[-15]	1.68[-15]
3.0287	8.85[-15]	1.08[-14]	8.48[-15]	1.04[-14]	7.02[-15]	5.37[-15]	1.29[-14]	1.08[-14]	3.65[-15]	5.15[-15]
3.9374	2.03[-14]	2.47[-14]	1.97[-14]	2.41[-14]	1.61[-14]	1.23[-14]	2.95[-14]	2.48[-14]	8.38[-15]	1.19[-14]
5.1186	3.66[-14]	4.46[-14]	3.58[-14]	4.38[-14]	2.89[-14]	2.20[-14]	5.32[-14]	4.50[-14]	1.51[-14]	2.14[-14]
6.6542	5.37[-14]	6.56[-14]	5.30[-14]	6.48[-14]	4.22[-14]	3.21[-14]	7.83[-14]	6.62[-14]	2.20[-14]	3.14[-14]
8.6504	6.67[-14]	8.15[-14]	6.61[-14]	8.09[-14]	5.23[-14]	3.97[-14]	9.74[-14]	8.24[-14]	2.72[-14]	3.89[-14]

11.2455	7.24[-14]	8.85[-14]	7.20[-14]	8.81[-14]	5.66[-14]	4.29[-14]	1.06[-13]	8.95[-14]	2.95[-14]	4.22[-14]
14.6192	7.07[-14]	8.63[-14]	7.05[-14]	8.62[-14]	5.51[-14]	4.18[-14]	1.03[-13]	8.75[-14]	2.87[-14]	4.11[-14]
19.0049	6.35[-14]	7.75[-14]	6.34[-14]	7.75[-14]	4.94[-14]	3.74[-14]	9.30[-14]	7.86[-14]	2.58[-14]	3.69[-14]
24.7064	5.34[-14]	6.52[-14]	5.34[-14]	6.53[-14]	4.15[-14]	3.15[-14]	7.83[-14]	6.62[-14]	2.16[-14]	3.10[-14]
32.1184	4.28[-14]	5.22[-14]	4.28[-14]	5.23[-14]	3.32[-14]	2.51[-14]	6.27[-14]	5.30[-14]	1.73[-14]	2.48[-14]
41.7539	3.29[-14]	4.02[-14]	3.30[-14]	4.03[-14]	2.55[-14]	1.93[-14]	4.82[-14]	4.08[-14]	1.33[-14]	1.91[-14]
54.2800	2.46[-14]	3.00[-14]	2.46[-14]	3.01[-14]	1.91[-14]	1.44[-14]	3.60[-14]	3.05[-14]	9.93[-15]	1.42[-14]
91.7332	1.28[-14]	1.57[-14]	1.29[-14]	1.57[-14]	9.96[-15]	7.53[-15]	1.88[-14]	1.59[-14]	5.19[-15]	7.44[-15]
119.2532	9.07[-15]	1.11[-14]	9.11[-15]	1.11[-14]	7.03[-15]	5.32[-15]	1.33[-14]	1.13[-14]	3.66[-15]	5.26[-15]
T_e						$2s^22p7i$				
eV	$^3K_6$	$^3K_7$	$^1I_6$	$^3I_7$	$^3I_5$	$^3I_6$	$^3K_8$	$^1K_7$	$^3H_4$	$^3H_5$
0.1000	9.31[-64]	1.06[-63]	5.78[-69]	6.60[-69]	3.95[-69]	4.68[-69]	1.71[-63]	1.45[-63]	2.36[-69]	2.89[-69]
0.1300	6.66[-53]	7.56[-53]	1.04[-55]	1.19[-55]	7.14[-56]	8.45[-56]	1.22[-52]	1.04[-52]	4.26[-56]	5.23[-56]
0.1690	1.51[-44]	1.72[-44]	1.50[-45]	1.71[-45]	1.03[-45]	1.22[-45]	2.70[-44]	2.30[-44]	6.14[-46]	7.53[-46]
0.2197	1.25[-37]	1.43[-37]	8.94[-38]	1.02[-37]	6.11[-38]	7.23[-38]	1.81[-37]	1.58[-37]	3.66[-38]	4.49[-38]
0.2856	8.51[-32]	9.70[-32]	7.80[-32]	8.90[-32]	5.33[-32]	6.31[-32]	1.13[-31]	9.96[-32]	3.20[-32]	3.92[-32]
0.3713	2.82[-27]	3.22[-27]	2.65[-27]	3.02[-27]	1.81[-27]	2.14[-27]	3.71[-27]	3.29[-27]	1.09[-27]	1.33[-27]
0.4827	7.86[-24]	8.97[-24]	7.38[-24]	8.43[-24]	5.04[-24]	5.97[-24]	1.03[-23]	9.14[-24]	3.03[-24]	3.72[-24]
0.6275	3.21[-21]	3.67[-21]	3.02[-21]	3.45[-21]	2.06[-21]	2.44[-21]	4.22[-21]	3.73[-21]	1.24[-21]	1.52[-21]
0.8157	3.01[-19]	3.43[-19]	2.83[-19]	3.23[-19]	1.93[-19]	2.29[-19]	3.95[-19]	3.50[-19]	1.17[-19]	1.43[-19]
1.0604	9.14[-18]	1.04[-17]	8.59[-18]	9.81[-18]	5.89[-18]	6.98[-18]	1.20[-17]	1.06[-17]	3.57[-18]	4.38[-18]
1.3786	1.18[-16]	1.35[-16]	1.11[-16]	1.27[-16]	7.68[-17]	9.09[-17]	1.56[-16]	1.38[-16]	4.68[-17]	5.74[-17]
1.7922	8.08[-16]	9.24[-16]	7.61[-16]	8.70[-16]	5.28[-16]	6.25[-16]	1.07[-15]	9.45[-16]	3.25[-16]	3.98[-16]
2.3298	3.40[-15]	3.89[-15]	3.21[-15]	3.68[-15]	2.25[-15]	2.66[-15]	4.53[-15]	4.01[-15]	1.39[-15]	1.70[-15]
3.0287	9.86[-15]	1.13[-14]	9.34[-15]	1.07[-14]	6.57[-15]	7.77[-15]	1.33[-14]	1.17[-14]	4.05[-15]	4.97[-15]
3.9374	2.12[-14]	2.43[-14]	2.02[-14]	2.32[-14]	1.43[-14]	1.69[-14]	2.90[-14]	2.56[-14]	8.77[-15]	1.07[-14]
5.1186	3.60[-14]	4.13[-14]	3.44[-14]	3.95[-14]	2.43[-14]	2.87[-14]	4.97[-14]	4.39[-14]	1.49[-14]	1.82[-14]
6.6542	5.02[-14]	5.77[-14]	4.81[-14]	5.53[-14]	3.40[-14]	4.03[-14]	7.00[-14]	6.19[-14]	2.07[-14]	2.53[-14]
8.6504	5.99[-14]	6.88[-14]	5.76[-14]	6.62[-14]	4.07[-14]	4.82[-14]	8.42[-14]	7.44[-14]	2.46[-14]	3.01[-14]
11.2455	6.31[-14]	7.25[-14]	6.08[-14]	6.98[-14]	4.30[-14]	5.08[-14]	8.92[-14]	7.88[-14]	2.58[-14]	3.16[-14]
14.6192	6.02[-14]	6.92[-14]	5.80[-14]	6.67[-14]	4.10[-14]	4.85[-14]	8.55[-14]	7.55[-14]	2.45[-14]	3.00[-14]
19.0049	5.31[-14]	6.10[-14]	5.13[-14]	5.90[-14]	3.62[-14]	4.29[-14]	7.57[-14]	6.69[-14]	2.16[-14]	2.64[-14]
24.7064	4.41[-14]	5.07[-14]	4.26[-14]	4.90[-14]	3.01[-14]	3.56[-14]	6.31[-14]	5.57[-14]	1.79[-14]	2.19[-14]
41.7539	2.67[-14]	3.07[-14]	2.58[-14]	2.97[-14]	1.82[-14]	2.16[-14]	3.83[-14]	3.38[-14]	1.08[-14]	1.32[-14]
54.2800	1.98[-14]	2.28[-14]	1.92[-14]	2.21[-14]	1.35[-14]	1.60[-14]	2.85[-14]	2.52[-14]	8.00[-15]	9.79[-15]
91.7332	1.03[-14]	1.18[-14]	9.96[-15]	1.15[-14]	7.03[-15]	8.31[-15]	1.48[-14]	1.31[-14]	4.14[-15]	5.07[-15]
119.2532	7.24[-15]	8.33[-15]	7.02[-15]	8.08[-15]	4.95[-15]	5.86[-15]	1.04[-14]	9.22[-15]	2.92[-15]	3.57[-15]
T_e						$2s^22p8g$				
eV	$^3H_4$	$^3H_5$	$^1G_4$	$^3G_5$	$^3F_4$	$^1F_3$	$^3H_6$	$^1H_5$	$^3F_2$	$^3F_3$
0.1000	3.35[-18]	7.71[-18]	6.40[-18]	1.71[-17]	6.93[-18]	9.12[-18]	1.29[-18]	5.05[-19]	9.44[-19]	1.81[-20]
0.1300	1.60[-17]	2.86[-17]	2.30[-17]	5.71[-17]	2.27[-17]	2.88[-17]	1.44[-17]	5.76[-18]	3.06[-18]	1.97[-19]
0.1690	6.27[-17]	8.42[-17]	6.60[-17]	1.40[-16]	5.42[-17]	6.54[-17]	8.36[-17]	3.48[-17]	7.35[-18]	1.16[-18]
0.2197	1.89[-16]	2.07[-16]	1.58[-16]	2.78[-16]	1.05[-16]	1.17[-16]	2.96[-16]	1.29[-16]	1.43[-17]	4.19[-18]
0.2856	4.25[-16]	4.20[-16]	3.14[-16]	4.68[-16]	1.72[-16]	1.77[-16]	7.15[-16]	3.30[-16]	2.35[-17]	1.05[-17]
0.3713	7.40[-16]	7.01[-16]	5.13[-16]	6.79[-16]	2.46[-16]	2.34[-16]	1.29[-15]	6.27[-16]	3.33[-17]	1.96[-17]
0.4827	1.05[-15]	9.80[-16]	7.02[-16]	8.61[-16]	3.08[-16]	2.74[-16]	1.85[-15]	9.47[-16]	4.15[-17]	2.97[-17]
0.6275	1.25[-15]	1.18[-15]	8.27[-16]	9.69[-16]	3.45[-16]	2.91[-16]	2.22[-15]	1.19[-15]	4.73[-17]	3.94[-17]
0.8157	1.31[-15]	1.25[-15]	8.63[-16]	9.85[-16]	3.55[-16]	2.87[-16]	2.35[-15]	1.31[-15]	5.42[-17]	5.20[-17]
1.0604	1.25[-15]	1.21[-15]	8.27[-16]	9.31[-16]	3.54[-16]	2.77[-16]	2.24[-15]	1.29[-15]	7.13[-17]	7.82[-17]
1.3786	1.16[-15]	1.15[-15]	7.95[-16]	8.99[-16]	4.00[-16]	3.06[-16]	2.05[-15]	1.23[-15]	1.24[-16]	1.53[-16]
1.7922	1.37[-15]	1.46[-15]	1.07[-15]	1.25[-15]	7.28[-16]	5.55[-16]	2.26[-15]	1.52[-15]	3.28[-16]	4.42[-16]
2.3298	2.84[-15]	3.33[-15]	2.58[-15]	3.13[-15]	2.09[-15]	1.60[-15]	4.33[-15]	3.36[-15]	1.06[-15]	1.50[-15]
3.0287	7.41[-15]	9.09[-15]	7.18[-15]	8.81[-15]	5.94[-15]	4.52[-15]	1.10[-14]	9.09[-15]	3.08[-15]	4.40[-15]
3.9374	1.69[-14]	2.10[-14]	1.68[-14]	2.06[-14]	1.37[-14]	1.03[-14]	2.51[-14]	2.11[-14]	7.09[-15]	1.02[-14]
5.1186	3.10[-14]	3.88[-14]	3.11[-14]	3.84[-14]	2.50[-14]	1.88[-14]	4.63[-14]	3.90[-14]	1.29[-14]	1.87[-14]
6.6542	4.64[-14]	5.83[-14]	4.70[-14]	5.79[-14]	3.72[-14]	2.79[-14]	6.97[-14]	5.88[-14]	1.92[-14]	2.79[-14]

8.6504	5.86[-14]	7.38[-14]	5.97[-14]	7.35[-14]	4.68[-14]	3.50[-14]	8.83[-14]	7.45[-14]	2.41[-14]	3.51[-14]
11.2455	6.44[-14]	8.14[-14]	6.60[-14]	8.13[-14]	5.13[-14]	3.83[-14]	9.74[-14]	8.23[-14]	2.65[-14]	3.86[-14]
14.6192	6.36[-14]	8.04[-14]	6.53[-14]	8.04[-14]	5.05[-14]	3.77[-14]	9.63[-14]	8.14[-14]	2.60[-14]	3.80[-14]
19.0049	5.76[-14]	7.29[-14]	5.93[-14]	7.30[-14]	4.57[-14]	3.41[-14]	8.74[-14]	7.38[-14]	2.35[-14]	3.44[-14]
24.7064	4.88[-14]	6.18[-14]	5.03[-14]	6.20[-14]	3.87[-14]	2.88[-14]	7.41[-14]	6.26[-14]	1.99[-14]	2.91[-14]
32.1184	3.92[-14]	4.97[-14]	4.05[-14]	4.99[-14]	3.11[-14]	2.31[-14]	5.97[-14]	5.04[-14]	1.60[-14]	2.34[-14]
41.7539	3.03[-14]	3.84[-14]	3.13[-14]	3.86[-14]	2.40[-14]	1.79[-14]	4.61[-14]	3.90[-14]	1.23[-14]	1.81[-14]
54.2800	2.27[-14]	2.88[-14]	2.35[-14]	2.89[-14]	1.80[-14]	1.34[-14]	3.46[-14]	2.92[-14]	9.24[-15]	1.35[-14]
91.7332	1.19[-14]	1.51[-14]	1.23[-14]	1.52[-14]	9.42[-15]	7.00[-15]	1.82[-14]	1.53[-14]	4.85[-15]	7.09[-15]
119.2532	8.44[-15]	1.07[-14]	8.73[-15]	1.08[-14]	6.67[-15]	4.96[-15]	1.29[-14]	1.09[-14]	3.43[-15]	5.02[-15]

T_e					$2s^22p8i$					
eV	$^3K_7$	$^3K_6$	$^3I_7$	$^1I_6$	$^3I_5$	$^3I_6$	$^3K_8$	$^1K_7$	$^3H_5$	$^3H_4$
0.1000	7.98[-63]	6.95[-63]	5.70[-63]	4.88[-63]	1.68[-63]	1.92[-63]	1.07[-62]	9.07[-63]	9.92[-72]	8.12[-72]
0.1300	5.65[-52]	4.92[-52]	3.96[-52]	3.39[-52]	1.14[-52]	1.30[-52]	7.64[-52]	6.48[-52]	6.62[-58]	5.42[-58]
0.1690	1.15[-43]	9.99[-44]	7.92[-44]	6.79[-44]	2.25[-44]	2.57[-44]	1.56[-43]	1.32[-43]	2.67[-47]	2.19[-47]
0.2197	2.64[-37]	2.31[-37]	1.83[-37]	1.57[-37]	5.36[-38]	6.14[-38]	3.60[-37]	3.05[-37]	3.52[-39]	2.89[-39]
0.2856	3.02[-32]	2.63[-32]	2.41[-32]	2.07[-32]	1.06[-32]	1.24[-32]	3.87[-32]	3.33[-32]	5.69[-33]	4.66[-33]
0.3713	7.50[-28]	6.51[-28]	7.03[-28]	6.09[-28]	4.09[-28]	4.83[-28]	8.80[-28]	7.72[-28]	3.10[-28]	2.54[-28]
0.4827	2.71[-24]	2.35[-24]	2.62[-24]	2.27[-24]	1.59[-24]	1.88[-24]	3.12[-24]	2.75[-24]	1.24[-24]	1.02[-24]
0.6275	1.44[-21]	1.25[-21]	1.40[-21]	1.21[-21]	8.53[-22]	1.01[-21]	1.65[-21]	1.46[-21]	6.72[-22]	5.51[-22]
0.8157	1.66[-19]	1.44[-19]	1.61[-19]	1.40[-19]	9.86[-20]	1.17[-19]	1.90[-19]	1.68[-19]	7.78[-20]	6.38[-20]
1.0604	5.90[-18]	5.11[-18]	5.73[-18]	4.97[-18]	3.50[-18]	4.14[-18]	6.76[-18]	5.97[-18]	2.76[-18]	2.27[-18]
1.3786	8.54[-17]	7.40[-17]	8.30[-17]	7.19[-17]	5.06[-17]	5.99[-17]	9.82[-17]	8.66[-17]	3.99[-17]	3.27[-17]
1.7922	6.31[-16]	5.47[-16]	6.13[-16]	5.31[-16]	3.73[-16]	4.41[-16]	7.30[-16]	6.44[-16]	2.92[-16]	2.40[-16]
2.3298	2.82[-15]	2.44[-15]	2.74[-15]	2.38[-15]	1.66[-15]	1.96[-15]	3.30[-15]	2.91[-15]	1.29[-15]	1.05[-15]
3.0287	8.59[-15]	7.44[-15]	8.37[-15]	7.25[-15]	5.01[-15]	5.92[-15]	1.02[-14]	8.99[-15]	3.83[-15]	3.14[-15]
3.9374	1.93[-14]	1.68[-14]	1.89[-14]	1.64[-14]	1.12[-14]	1.32[-14]	2.33[-14]	2.06[-14]	8.43[-15]	6.91[-15]
5.1186	3.41[-14]	2.96[-14]	3.34[-14]	2.89[-14]	1.96[-14]	2.32[-14]	4.16[-14]	3.67[-14]	1.46[-14]	1.19[-14]
6.6542	4.93[-14]	4.27[-14]	4.83[-14]	4.18[-14]	2.81[-14]	3.33[-14]	6.07[-14]	5.36[-14]	2.06[-14]	1.69[-14]
8.6504	6.05[-14]	5.24[-14]	5.93[-14]	5.14[-14]	3.44[-14]	4.06[-14]	7.52[-14]	6.63[-14]	2.50[-14]	2.04[-14]
11.2455	6.52[-14]	5.65[-14]	6.40[-14]	5.55[-14]	3.69[-14]	4.36[-14]	8.15[-14]	7.19[-14]	2.66[-14]	2.18[-14]
14.6192	6.33[-14]	5.49[-14]	6.22[-14]	5.39[-14]	3.58[-14]	4.23[-14]	7.96[-14]	7.02[-14]	2.56[-14]	2.10[-14]
19.0049	5.67[-14]	4.92[-14]	5.57[-14]	4.83[-14]	3.20[-14]	3.78[-14]	7.15[-14]	6.31[-14]	2.28[-14]	1.87[-14]
24.7064	4.77[-14]	4.13[-14]	4.69[-14]	4.06[-14]	2.68[-14]	3.17[-14]	6.02[-14]	5.31[-14]	1.90[-14]	1.56[-14]
41.7539	2.93[-14]	2.54[-14]	2.88[-14]	2.50[-14]	1.65[-14]	1.94[-14]	3.72[-14]	3.28[-14]	1.16[-14]	9.52[-15]
54.2800	2.19[-14]	1.89[-14]	2.15[-14]	1.86[-14]	1.23[-14]	1.45[-14]	2.78[-14]	2.45[-14]	8.65[-15]	7.09[-15]
91.7332	1.14[-14]	9.90[-15]	1.12[-14]	9.74[-15]	6.41[-15]	7.57[-15]	1.45[-14]	1.28[-14]	4.51[-15]	3.69[-15]
119.2532	8.07[-15]	6.99[-15]	7.95[-15]	6.89[-15]	4.52[-15]	5.35[-15]	1.03[-14]	9.06[-15]	3.18[-15]	2.61[-15]

T_e	$2s^22p7g$		$2s^22p8g$		$2s^22p7i$		$2s^22p8i$	
eV	$^3G_3$	$^3G_4$	$^3G_3$	$^3G_4$	$^1H_5$	$^3H_6$	$^1H_5$	$^3H_6$
0.1000	3.60[-18]	2.54[-18]	8.08[-18]	6.35[-18]	3.80[-69]	4.46[-69]	1.54[-63]	1.81[-63]
0.1300	1.14[-17]	8.44[-18]	2.55[-17]	2.08[-17]	6.87[-56]	8.05[-56]	1.05[-52]	1.23[-52]
0.1690	2.60[-17]	2.10[-17]	5.82[-17]	5.05[-17]	9.88[-46]	1.16[-45]	2.07[-44]	2.42[-44]
0.2197	4.71[-17]	4.28[-17]	1.05[-16]	9.97[-17]	5.88[-38]	6.89[-38]	4.94[-38]	5.79[-38]
0.2856	7.21[-17]	7.42[-17]	1.60[-16]	1.68[-16]	5.13[-32]	6.02[-32]	1.01[-32]	1.18[-32]
0.3713	9.63[-17]	1.11[-16]	2.13[-16]	2.44[-16]	1.74[-27]	2.04[-27]	3.93[-28]	4.64[-28]
0.4827	1.14[-16]	1.43[-16]	2.51[-16]	3.10[-16]	4.86[-24]	5.70[-24]	1.53[-24]	1.80[-24]
0.6275	1.22[-16]	1.63[-16]	2.69[-16]	3.51[-16]	1.99[-21]	2.33[-21]	8.21[-22]	9.71[-22]
0.8157	1.21[-16]	1.70[-16]	2.68[-16]	3.65[-16]	1.86[-19]	2.19[-19]	9.50[-20]	1.12[-19]
1.0604	1.19[-16]	1.73[-16]	2.62[-16]	3.68[-16]	5.70[-18]	6.68[-18]	3.38[-18]	3.99[-18]
1.3786	1.66[-16]	2.36[-16]	2.98[-16]	4.21[-16]	7.46[-17]	8.75[-17]	4.91[-17]	5.80[-17]
1.7922	5.11[-16]	6.84[-16]	5.68[-16]	7.71[-16]	5.18[-16]	6.08[-16]	3.64[-16]	4.31[-16]
2.3298	1.93[-15]	2.53[-15]	1.70[-15]	2.23[-15]	2.23[-15]	2.62[-15]	1.64[-15]	1.94[-15]
3.0287	5.86[-15]	7.62[-15]	4.93[-15]	6.43[-15]	6.62[-15]	7.78[-15]	5.05[-15]	5.97[-15]
3.9374	1.35[-14]	1.76[-14]	1.15[-14]	1.50[-14]	1.46[-14]	1.71[-14]	1.15[-14]	1.36[-14]
5.1186	2.45[-14]	3.18[-14]	2.11[-14]	2.77[-14]	2.51[-14]	2.95[-14]	2.05[-14]	2.42[-14]

6.6542	3.60[-14]	4.67[-14]	3.17[-14]	4.16[-14]	3.54[-14]	4.17[-14]	2.97[-14]	3.51[-14]
8.6504	4.46[-14]	5.80[-14]	4.00[-14]	5.26[-14]	4.27[-14]	5.03[-14]	3.67[-14]	4.33[-14]
11.2455	4.84[-14]	6.30[-14]	4.40[-14]	5.79[-14]	4.52[-14]	5.33[-14]	3.97[-14]	4.69[-14]
14.6192	4.73[-14]	6.14[-14]	4.34[-14]	5.72[-14]	4.33[-14]	5.11[-14]	3.86[-14]	4.57[-14]
19.0049	4.24[-14]	5.52[-14]	3.93[-14]	5.18[-14]	3.84[-14]	4.53[-14]	3.47[-14]	4.10[-14]
24.7064	3.57[-14]	4.64[-14]	3.33[-14]	4.39[-14]	3.20[-14]	3.77[-14]	2.92[-14]	3.45[-14]
41.7539	2.20[-14]	2.86[-14]	2.07[-14]	2.73[-14]	1.94[-14]	2.29[-14]	1.80[-14]	2.12[-14]
54.2800	1.64[-14]	2.13[-14]	1.55[-14]	2.05[-14]	1.44[-14]	1.70[-14]	1.34[-14]	1.58[-14]
91.7332	8.57[-15]	1.11[-14]	8.13[-15]	1.07[-14]	7.49[-15]	8.84[-15]	7.01[-15]	8.29[-15]
119.2532	6.06[-15]	7.88[-15]	5.75[-15]	7.60[-15]	5.28[-15]	6.23[-15]	4.96[-15]	5.86[-15]

Table X: High-n contribution to the DR rate coefficients ($g_0\alpha_d$ in cm^3/s) for excited levels of C-like oxygen.

T_e	$2s^22p^2$					$2s2p^3$		
eV	$^3P_0$	$^3P_1$	$^3P_2$	$^1D_2$	$^1S_0$	$(^4S)\ ^5S_2$	$(^2D)\ ^3D_1$	$(^2D)\ ^3D_2$
0.2197	2.60[-26]	7.00[-26]	1.10[-25]	1.10[-30]	2.00[-43]	1.40[-25]	4.50[-26]	7.00[-26]
0.2856	3.30[-23]	9.50[-23]	1.45[-22]	1.45[-27]	3.90[-37]	1.99[-22]	6.60[-23]	1.06[-22]
0.3713	7.60[-21]	2.20[-20]	3.45[-20]	3.46[-25]	2.60[-32]	5.30[-20]	1.77[-20]	2.85[-20]
0.4827	4.77[-19]	1.40[-18]	2.21[-18]	2.28[-23]	1.31[-28]	3.78[-18]	1.26[-18]	2.04[-18]
0.6275	1.09[-17]	3.19[-17]	5.11[-17]	8.23[-22]	1.03[-25]	9.50[-17]	3.16[-17]	5.17[-17]
0.8157	1.13[-16]	3.33[-16]	5.38[-16]	4.79[-20]	2.33[-23]	1.06[-15]	3.55[-16]	5.83[-16]
1.0604	6.33[-16]	1.87[-15]	3.05[-15]	1.79[-18]	2.01[-21]	6.32[-15]	2.12[-15]	3.49[-15]
1.3786	2.20[-15]	6.55[-15]	1.07[-14]	2.85[-17]	6.75[-20]	2.30[-14]	7.77[-15]	1.28[-14]
1.7922	5.29[-15]	1.58[-14]	2.59[-14]	2.23[-16]	9.80[-19]	5.73[-14]	1.95[-14]	3.23[-14]
2.3298	9.54[-15]	2.85[-14]	4.69[-14]	9.95[-16]	7.19[-18]	1.06[-13]	3.65[-14]	6.06[-14]
3.0287	1.38[-14]	4.11[-14]	6.80[-14]	2.89[-15]	3.07[-17]	1.55[-13]	5.47[-14]	9.09[-14]
3.9374	1.68[-14]	5.01[-14]	8.30[-14]	6.00[-15]	8.62[-17]	1.91[-13]	6.92[-14]	1.15[-13]
5.1186	1.79[-14]	5.35[-14]	8.88[-14]	9.66[-15]	1.75[-16]	2.05[-13]	7.68[-14]	1.28[-13]
6.6542	1.72[-14]	5.16[-14]	8.58[-14]	1.27[-14]	2.75[-16]	1.97[-13]	7.68[-14]	1.28[-13]
8.6504	1.53[-14]	4.60[-14]	7.66[-14]	1.44[-14]	3.56[-16]	1.75[-13]	7.08[-14]	1.18[-13]
11.2455	1.29[-14]	3.86[-14]	6.43[-14]	1.45[-14]	3.97[-16]	1.46[-13]	6.12[-14]	1.02[-13]
14.6192	1.03[-14]	3.08[-14]	5.15[-14]	1.33[-14]	3.94[-16]	1.16[-13]	5.02[-14]	8.36[-14]
19.0049	7.90[-15]	2.37[-14]	3.97[-14]	1.13[-14]	3.58[-16]	8.85[-14]	3.95[-14]	6.57[-14]
24.7064	5.90[-15]	1.78[-14]	2.98[-14]	9.19[-15]	3.04[-16]	6.57[-14]	3.00[-14]	5.00[-14]
32.1184	4.31[-15]	1.30[-14]	2.18[-14]	7.14[-15]	2.45[-16]	4.77[-14]	2.22[-14]	3.71[-14]
41.7539	3.10[-15]	9.31[-15]	1.56[-14]	5.37[-15]	1.89[-16]	3.41[-14]	1.61[-14]	2.69[-14]
54.2800	2.19[-15]	6.59[-15]	1.11[-14]	3.94[-15]	1.42[-16]	2.40[-14]	1.15[-14]	1.92[-14]
70.5640	1.53[-15]	4.62[-15]	7.76[-15]	2.83[-15]	1.03[-16]	1.68[-14]	8.12[-15]	1.35[-14]
91.7332	1.06[-15]	3.21[-15]	5.39[-15]	2.01[-15]	7.43[-17]	1.16[-14]	5.67[-15]	9.45[-15]
119.2532	7.34[-16]	2.21[-15]	3.72[-15]	1.41[-15]	5.25[-17]	8.00[-15]	3.93[-15]	6.54[-15]

T_e	$2s2p^3$						
eV	$(^2D)\ ^3D_3$	$(^2P)\ ^3P_0$	$(^2P)\ ^3P_1$	$(^2P)\ ^3P_2$	$(^2D)\ ^1D_2$	$(^4S)\ ^3S_1$	$(^2P)\ ^1P_1$
0.2197	9.00[-26]	2.30[-26]	6.70[-26]	1.10[-25]	1.80[-40]	1.20[-27]	9.00[-41]
0.2856	1.37[-22]	3.30[-23]	9.90[-23]	1.57[-22]	4.50[-34]	1.63[-24]	2.14[-34]
0.3713	3.78[-20]	9.20[-21]	2.69[-20]	4.31[-20]	3.65[-29]	3.96[-22]	1.70[-29]
0.4827	2.73[-18]	6.52[-19]	1.93[-18]	3.12[-18]	2.09[-25]	2.62[-20]	9.72[-26]
0.6275	6.99[-17]	1.66[-17]	4.92[-17]	8.01[-17]	1.54[-22]	6.30[-19]	7.20[-23]
0.8157	7.94[-16]	1.88[-16]	5.59[-16]	9.15[-16]	2.33[-20]	6.83[-18]	1.09[-20]
1.0604	4.79[-15]	1.13[-15]	3.37[-15]	5.53[-15]	1.04[-18]	3.98[-17]	4.87[-19]
1.3786	1.77[-14]	4.15[-15]	1.24[-14]	2.04[-14]	1.82[-17]	1.43[-16]	8.54[-18]
1.7922	4.45[-14]	1.04[-14]	3.11[-14]	5.14[-14]	1.59[-16]	3.64[-16]	7.42[-17]
2.3298	8.38[-14]	1.95[-14]	5.82[-14]	9.64[-14]	8.24[-16]	7.76[-16]	3.81[-16]
3.0287	1.26[-13]	2.90[-14]	8.69[-14]	1.44[-13]	2.87[-15]	1.66[-15]	1.31[-15]
3.9374	1.60[-13]	3.64[-14]	1.09[-13]	1.81[-13]	7.24[-15]	3.60[-15]	3.28[-15]
5.1186	1.78[-13]	4.00[-14]	1.20[-13]	1.99[-13]	1.40[-14]	6.96[-15]	6.30[-15]
6.6542	1.78[-13]	3.97[-14]	1.19[-13]	1.98[-13]	2.18[-14]	1.12[-14]	9.71[-15]
8.6504	1.65[-13]	3.63[-14]	1.09[-13]	1.81[-13]	2.83[-14]	1.52[-14]	1.25[-14]
11.2455	1.42[-13]	3.12[-14]	9.34[-14]	1.56[-13]	3.18[-14]	1.78[-14]	1.41[-14]
14.6192	1.17[-13]	2.54[-14]	7.63[-14]	1.27[-13]	3.19[-14]	1.83[-14]	1.41[-14]
19.0049	9.19[-14]	1.99[-14]	5.98[-14]	9.98[-14]	2.93[-14]	1.72[-14]	1.29[-14]
24.7064	6.99[-14]	1.51[-14]	4.54[-14]	7.57[-14]	2.51[-14]	1.49[-14]	1.10[-14]
32.1184	5.19[-14]	1.12[-14]	3.36[-14]	5.61[-14]	2.03[-14]	1.23[-14]	8.94[-15]
41.7539	3.77[-14]	8.11[-15]	2.43[-14]	4.07[-14]	1.58[-14]	9.61[-15]	6.95[-15]
54.2800	2.69[-14]	5.78[-15]	1.73[-14]	2.90[-14]	1.19[-14]	7.29[-15]	5.23[-15]
70.5640	1.90[-14]	4.07[-15]	1.22[-14]	2.04[-14]	8.74[-15]	5.37[-15]	3.84[-15]
91.7332	1.32[-14]	2.84[-15]	8.52[-15]	1.43[-14]	6.29[-15]	3.88[-15]	2.76[-15]
119.2532	9.17[-15]	1.97[-15]	5.90[-15]	9.87[-15]	4.46[-15]	2.76[-15]	1.96[-15]

Table XI: Total DR rate coefficients ($g_0\alpha_d^{\rm tot}$ in cm^3/s): $\alpha_d^{\rm tot}$=α_d^a+α_d^b+α_d^c as function of electron temperature (T$_e$ in eV) for C-like oxygen. Contributions of α_d^a and α_d^c are the sums from excited states with n=2-8 and n=9-30000, respectively. Contribution of α_d^b is from scaling of the $2s^22pnl-2s2p^2nl$ transitions from n=9 up to $n=30000$.

T$_e$	$g_0\alpha_d^a$	$g_0\alpha_d^b$	$g_0\alpha_d^c$	$g_0\alpha_d^{\rm total}$
0.1000	1.11[-10]	4.49[-44]	3.35[-41]	1.11[-10]
0.1300	9.73[-11]	4.30[-37]	2.72[-34]	9.73[-11]
0.1690	9.03[-11]	1.01[-31]	5.84[-29]	9.03[-11]
0.2197	8.85[-11]	1.50[-27]	7.49[-25]	8.85[-11]
0.2856	9.15[-11]	3.03[-24]	1.07[-21]	9.15[-11]
0.3713	9.76[-11]	1.30[-21]	2.81[-19]	9.76[-11]
0.4827	1.03[-10]	1.47[-19]	1.96[-17]	1.03[-10]
0.6275	1.05[-10]	5.76[-18]	4.89[-16]	1.05[-10]
0.8157	1.02[-10]	1.47[-16]	5.45[-15]	1.02[-10]
1.0604	9.39[-11]	4.25[-15]	3.24[-14]	9.40[-11]
1.3786	8.36[-11]	7.82[-14]	1.18[-13]	8.38[-11]
1.7922	7.27[-11]	7.45[-13]	2.94[-13]	7.38[-11]
2.3298	6.27[-11]	4.09[-12]	5.49[-13]	6.74[-11]
3.0287	5.44[-11]	1.46[-11]	8.19[-13]	6.98[-11]
3.9374	4.77[-11]	3.71[-11]	1.03[-12]	8.59[-11]
5.1186	4.26[-11]	7.16[-11]	1.14[-12]	1.15[-10]
6.6542	3.81[-11]	1.11[-10]	1.15[-12]	1.50[-10]
8.6504	3.37[-11]	1.43[-10]	1.06[-12]	1.78[-10]
11.2455	2.91[-11]	1.61[-10]	9.26[-13]	1.91[-10]
14.6192	2.43[-11]	1.61[-10]	7.66[-13]	1.86[-10]
19.0049	1.95[-11]	1.47[-10]	6.08[-13]	1.68[-10]
24.7064	1.52[-11]	1.26[-10]	4.66[-13]	1.42[-10]
32.1184	1.15[-11]	1.02[-10]	3.48[-13]	1.14[-10]
41.7539	8.51[-12]	7.95[-11]	2.54[-13]	8.82[-11]
54.2800	6.17[-12]	5.98[-11]	1.82[-13]	6.61[-11]
70.5640	4.40[-12]	4.39[-11]	1.29[-13]	4.84[-11]
91.7332	3.10[-12]	3.16[-11]	9.03[-14]	3.48[-11]
119.2532	2.16[-12]	2.24[-11]	6.27[-14]	2.46[-11]
155.0291	1.50[-12]	1.58[-11]	4.32[-14]	1.74[-11]
201.5378	1.03[-12]	1.10[-11]	2.97[-14]	1.21[-11]
261.9991	7.07[-13]	7.60[-12]	2.03[-14]	8.32[-12]
340.5989	4.83[-13]	5.22[-12]	1.38[-14]	5.71[-12]
442.7785	3.29[-13]	3.57[-12]	9.40[-15]	3.90[-12]
575.6121	2.24[-13]	2.43[-12]	6.38[-15]	2.66[-12]
748.2956	1.52[-13]	1.65[-12]	4.33[-15]	1.81[-12]
972.7843	1.03[-13]	1.12[-12]	2.93[-15]	1.23[-12]
1264.6195	6.95[-14]	7.61[-13]	1.98[-15]	8.32[-13]