Erratum

Dielectronic recombination data for dynamic finite-density plasmas

IV. The carbon isoelectronic sequence

O. Zatsarinny[1], T. W. Gorczyca[1], K. T. Korista[1], J. Fu[1], N. R. Badnell[2], W. Mitthumsiri[3], and D. W. Savin[3]

[1] Department of Physics, Western Michigan University, Kalamazoo, MI 49008, USA
  e-mail: oleg.zatsarinny@wmich.edu;[gorczyca;korista]@physics.wmich.edu
[2] Department of Physics, University of Strathclyde, Glasgow, G4 0NG, UK
[3] Columbia Astrophysics Laboratory, Columbia University, New York, NY 10027, USA
  e-mail: savin@astro.columbia.edu

Mistakes in an earlier publication (Zatsarinny et al. 2004) have been discovered and are corrected. First, in Table 1, some of the DR fitting coefficients are incorrect due to initially undetected human errors in the postprocessing of the atomic data. As a result, we have refitted our archived totals for the entire sequence using up to seven terms in the summation of Eq. (3). We have retabulated in Table 1 only results for those ions that showed significant differences, which occur at lower temperatures, from those of our initial fitting procedure. We emphasize that these few errors were not in the atomic physics calculations, which are accurate for the entire sequence i.e. the *adf09* files are unchanged, but rather only in the fitting algorithm.

Second, we have discovered that the electron energy range over which our photoionization cross-sections were calculated was accidentally restricted. Thus, the extrapolation of the cross-sections to higher energies before convolution with a Maxwellian distribution to form RR rate coefficients was applied at much lower energies than usual and before it was accurate to do so. Consequently, the $T^{-3/2}$ asymptotic behavior of the RR rate coefficient comes in at too low a temperature. Thus, our fitting coefficients for RR should not be used for $T \gtrsim 3 Z^2$ eV, where Z is the residual charge of the electron target.

References

Zatsarinny, O., Gorczyca, T. W., Korista, K., Badnell, N. R., & Savin, D. W. 2004, A&A, 417, 1173

Table 1. Fitting coefficients of Eq. (3) for dielectronic recombination of selected C-like ions forming N-like systems. The c_i are in units of 10^{-11} cm^3 s^{-1} eV$^{1.5}$ and the E_i are in eV.

Ion	c_1	c_2	c_3	c_4	c_5	c_6	c_7
N$^+$	1.326E–03	2.208E–03	2.798E–03	4.710E+01	3.400E+01	0.000E–00	0.000E–00
Na^{5+}	8.944E–00	1.579E–00	5.288E–00	2.826E+01	8.656E+02	1.649E+03	1.692E+02
Cl^{11+}	2.137E+01	1.151E+02	2.546E+02	4.916E+02	2.155E+03	9.192E+03	2.058E+04
Mo^{36+}	4.395E+03	3.210E+03	1.327E+04	2.290E+04	1.043E+05	2.331E+05	0.000E-00
Xe^{48+}	6.550E+02	4.419E+03	2.799E+04	5.873E+04	1.820E+05	2.701E+05	0.000E-00
	E_1	E_2	E_3	E_4	E_5	E_6	E_7
N$^+$	1.090E–03	7.260E–03	8.290E–01	1.259E+01	2.279E+01	0.000E–00	0.000E–00
Na^{5+}	2.977E–02	1.976E–01	1.439E+00	6.207E+00	2.881E+01	9.393E+01	1.712E+02
Cl^{11+}	1.583E–01	1.297E+00	5.735E+00	2.848E+01	5.510E+01	2.209E+02	3.508E+02
Mo^{36+}	3.216E+00	1.173E+01	6.497E+01	2.246E+02	1.067E+03	2.462E+03	0.000E–00
Xe^{48+}	1.130E+01	3.336E+01	1.254E+02	4.392E+02	1.852E+03	4.231E+03	0.000E–00