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Multiply Charged Ions Produced after Deexcitation Processes for Important Elements in Astrophysics

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Abstract: Selection random number method (Monte Carlo technique) is used to calculate the ion charge state distributions (CSD) and mean ion charge \bar{q} after K-, L_I, L_{III}- and M_I- shell ionization in neutral atoms and their q-fold ground state ions (q = 0 to 10) from C to Fe elements. Atomic data for radiative and non-radiative transitions and electron shake off process, which is used in the modeling vacancy cascade program, are computed with relativistic wave functions. Use of atomic data is important to accurately model vacancy cascades. To enhance the agreement between calculated and experimental values, the electron shake-off processes and shifts of the electron energy level during vacancy cascade propagation have been considered. The results obtained from present calculations reasonably agree with other calculation and experimental spectra.

Key Words: Auger Cascade, Ion charge state distributions, Monte Carlo technique

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