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$2p_{3/2}^{-1}3x^{-1}$-$3x^{-1}4d^{-1}$ X-Ray Satellites spectra in the L$\beta_2$region
SURENDRA POONIA, Research Scientist — The X-ray satellite spectra arising due to $2p_{3/2}^{-1}3x^{-1}$-$3x^{-1}4d^{-1}$ (x ≡ s, p, d) transition array, in elements with Z = 42 to 90, have been calculated. While the energies of various transitions of the array have been determined by using available Hartree-Fock-Slater data on $1s^{-1}$-$2p^{-1}3x^{-1}$ and $2p_{3/2}^{-1}$-$3x^{-1}$,$3x'^{-1}$ Auger transition energies, their relative intensities have been estimated by considering cross sections of singly ionized $2x^{-1}$ (x ≡ s, p) states and then of subsequent Coster-Kronig and shake off processes. The calculated spectra have been compared with the measured satellite energies in Lβ_2 spectra. Their intense peaks have been identified as the observed satellite lines. It has been established that four satellites observed in the L$\beta_2$region of the X-ray spectra of various elements and named β_2^I, $\beta_2^{(b)}$, β_2^{II} and $\beta_2^{(c)}$ in order of increasing energy are mainly emitted by $2p_{3/2}^{-1}3d^{-1}$-$4d^{-2}$ transitions. In the present study, we report the transition assignments to the satellites β_2^I, $\beta_2^{(b)}$, β_2^{II} and $\beta_2^{(c)}$ reported in the spectra of elements with Z = 42 to 52 and the satellites named β_2^I and β_2^{II} in the L - emission spectra of the elements of $_{74}$W to $_{90}$Th. It is observed that out of these four satellites, $\beta_2^{(b)}$ can be assigned to superposition of $^3F_4-^3G_5$ and $^3F_4-^3D_3$ transitions and that this must be the most intense of all these satellites in the elements Z = 42-50. In the range of elements Z = 52 to 77, the satellite β_2^I is emitted by these transitions.

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