

L-SHELL IONIZATION CROSS SECTIONS BY POSITRONS

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Inner-shell ionization process by positron impact is of fundamental importance to understand the collision dynamics between anti-particle and atom. Extensive experimental and theoretical investigations have been reported. At high energies the inner-shell ionization cross sections by positrons are almost same as those by electrons. On the other hand, in the case of low-energy region large difference in cross sections between electrons and positrons is expected because of the Coulomb deflection of the projectile due to the target nucleus and the exchange effect.

In this work the L-shell ionization cross sections for Ag, In and Sn by positron impact were calculated with the binary-encounter approximation (BEA) and the classical trajectory Monte Carlo (CTMC) method. The BEA cross sections are obtained for four different atomic models, i.e. the free-fall model, the nonrelativistic and relativistic hydrogenic models, and the HFR model.

The BEA cross sections and the CTMC results are compared with the measured values. The CTMC calculations are in good agreement with the experimental data. On the other hand, the BEA values with different velocity distributions are generally larger than the experimental results in the energy region higher than 15 keV, except for the case of the free-fall model at 30 keV.

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