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Ionization cross sections and rate coefficients for $CFCl_3$ molecule by electron impact SATYENDRA PAL, NEERAJ KUMAR, Department of Physics, MMH College, Ghaziabad, Uttar Pradesh, India — Chlorofluorocarbons (CFCs) or freons are important industrial material with wide-ranging applications as refrigerant, aerosol propellant and semiconductor etchant, etc. The large-scale industrial consumption is of particular environmental concern because of its potential for ozone destruction in the stratosphere. The present work reports the calculations for differential cross sections as a function of secondary/ ejected electron energy and the scattering angle in the ionization of $CFCl_3$ by electron collision leading to the production of various cations viz. CCl_3^+, $CFCl_2^+$, CCl_2^+, $CFCl^+$, CCl^+, Cl^+, CF^+, F^+, and C^+ through direct and dissociative ionization processes at a fixed incident electron energy of 200eV. A modified Jain-Khare semi-empirical formalism based on oscillator strength has been employed. To the best of our knowledge, no experimental and/or theoretical data is available for comparison of the present results for differential cross sections. The corresponding derived integral cross sections in terms of the partial ionization cross sections corresponding to these cations, in the energy range varying from ionization threshold to 1000 eV, revealed a reasonably good agreement with the experimental and theoretical data, wherever available. In addition to the differential and integral ionization cross sections, we have also calculated the ionization rate coefficients using the evaluated partial ionization cross sections and the Maxwell-Boltzmann distribution as a function of electron energy.

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