Abstract Submitted
for the GEC15 Meeting of
The American Physical Society

Electron Impact Ionization Cross Sections and Rate Coefficients for Single Carbon Freon Molecules[1] SATYENDRA PAL, NEERAJ KUMAR, Department of Physics, MMH College, Ghaziabad, U.P., India — Single carbon Freon molecules or chlorofluorocarbons (CFCs) 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. In the present work, we have extended and generalized the modified Jain-Khare (JK) semi-empirical formalism for the evaluation of the total ionization cross sections corresponding to the formation of the cations in the electron impact ionization of molecules to the electron impact ionization of single carbon freon molecules, viz. $CFCl_3$, CF_2Cl_2 and CF_3Cl. The integral partial and the total ionization cross sections as function of incident electron energy are evaluated in the energy range varying from ionization threshold to 1000 eV. In absence of available differential cross sections, the corresponding derived partial and total ionization cross sections 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 temperature/energy.

[1]The work is supported by DST, New Delhi, India

Satyendra Pal
Department of Physics, MMH College, Ghaziabad, U.P., India

Date submitted: 26 May 2015 Electronic form version 1.4