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Isomer and Fluorination Effects among Fluorine Substituted Hydrocarbon C_3/C_4 Molecules in Electron Impact Ionization U.R. PATEL, Gandhinagar Institute of Technology, K.N. JOSHIPURA, S P University, Gujarat, India — Electron collision processes are very important in both man-made and natural plasmas, for determining the energy balances and transport properties of electrons. Electron -molecule scattering leading to ionization represents one of the most fundamental processes in collision physics. In the gas phase, the total efficiency of the process is described by the absolute total electron impact ionization cross section. Carbon based materials are some of the widely used materials for a divertor plate and magnetically confined fusion devices. In the "ITER," it is very important for steady state operation to have an estimate of the lifetime of carbon plasma facing components. Apart from fusion plasma relevance, the present theoretical study is very important in modeling and controlling other electron assisted processes in many areas. Hydrocarbons play an important role for plasma diagnostics as impurities in the Tokamak fusion divertor, as seed gases for the production of radicals and ions in low temperature plasma processing. Fluorine substituted hydrocarbons (perfluorocarbons) are important as reactants in plasma assisted fabrication processes. In the present work, we have calculated total ionization cross sections Q_{ion} for C_3/C_4 Hydrocarbon isomers by electron impact, and comparisons are made mutually to observe isomer effect. Comparisons are also made by substituting H atom by F atom and revealing fluorination effect. The present calculations are quite significant owing to the lack of experimental data, with just an isolated previous theoretical work in some cases.

Umang Patel
Gandhinagar Institute of Technology, Gandhinagar, Gujarat

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