ELECTRON IMPACT IONIZATION CROSS SECTION OF FLUOROCARBON RADICALS

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Electron interaction with atoms and molecules play a fundamental role in understanding and modeling of atmospheric and industrial plasma. The interaction of electron with matter leading to ionization is one of the fundamental processes in collision physics and has variety of applications in modeling plasma processes, atmospheric chemistry, etc. Hence the measurement and/or calculation of ionization cross section (Q_{ion}) have been of at most important [1]. The electron-impact dissociation of the stable parent molecules such as CF_4, C_2F_6, C_3F_8 and C_4F_8 in the plasma leads to the formation of reactive radicals C_xF_y (x=1-3, y=1-7) which are important for the chemical reactions in fluorocarbon-containing plasmas [2]. The ionization of parent molecules along with its daughter fragments and radicals is one of the important chemical reactions occuring in these plasma. There are many studies on the ionization dynamics of stable and parent fluorocarbon molecules, however there are very few studies of ionization for the C_xF_y radicals. The experimental study of electron ionization with C_xF_y radicals is rather difficult [3] and moreover there are also no rigorous method of calculation for Q_{ion}. In the present study we have used the binary encounter Bethe (BEB) [4] method to calculate and study the Q_{ion} for various fluorocarbon molecules/radicals for which there are very less data in the literature. A sample result of initial calculations of Q_{ion} for C_2F_x (x=1-6) species is shown in Fig.1.

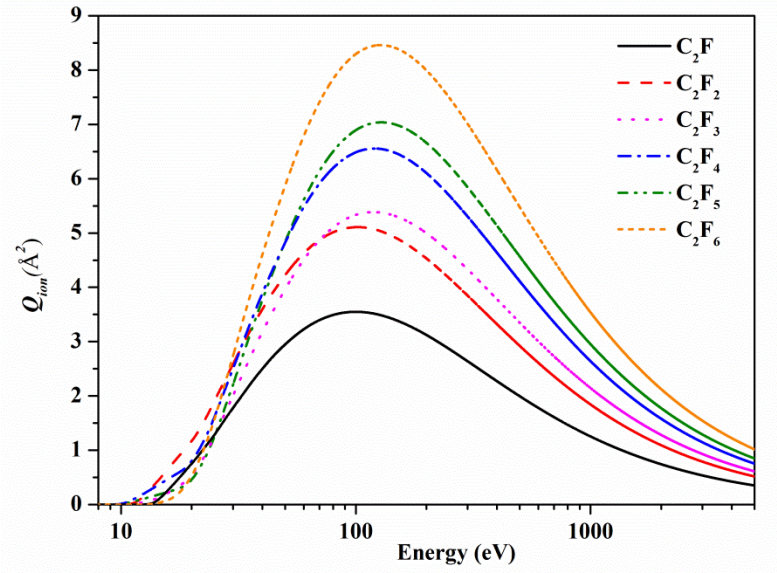

Figure 1: Q_{ion} for C_2F_x (x=1-6) species in Å^2

References

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