

ELECTRON DRIVEN PROCESSES FOR PLASMA FEED GASES

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Major feed gases for plasma generation of F atoms are CF₄, SF₆ and NF₃. The etching process is determined by creation of F atoms through Dissociative Electron Attachment (DEA) of CF₄ and by dissociation of CF₄ molecule through electronic excitation and ionization. Hence the estimation of excitation as well as ionization cross sections of e-molecule processes is required. Radicals of feed gases (CF_X etc.) play important role in anisotropic etching. Also, restriction of emission of perfluoro compounds and Global Warming Potential stimulates finding of alternative feed gases. Therefore electron impact studies including computation of various cross sections and investigation of anion formation and resonances are major areas of interest. In this work we report various electron impact total cross sections, resonances and target properties for molecules over an extensive range of impact energies (0.1 eV - 5000 eV). Below 15 eV, we carry an abinitio calculation with fixed nuclei approximation employing the molecular Rmatrix method [1] and beyond the ionization threshold of the target we employ the well established Spherical Complex Optical Potential formalism [2]. The results are compared with available data in literature.

[1] C Limbachiya, A Chaudhari, H Desai, M Vinodkumar, RSC Advances, **5(126)**, 103964 (2015).

[2] C Limbachiya, M Vinodkumar, M Swadia, A Barot, Molecular Phys.**112(1)**,101, (2014).