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Influence of power on the surface loss reaction of F radicals in a low pressure CF_4:O_2 ICP discharge MAHSA SETAREH, MORTEZA FARNIA, ALI MAGHARI, University of Tehran, UNIVERSITY OF TEHRAN TEAM — A zero dimensional modeling code Global_kin, developed by Kushner is applied to model the CF_4/O_2 radio frequency inductively coupled plasma at applied powers of 80-300W, pressure of 25mTorr and temperature of 400K. The calculated results indicated that the Fluorine (F) is the dominant radical produced in CF_4:O_2 discharge which is lost mostly at the walls rather than in formation of F_2 molecules. We calculated the time integrated rate of F loss at the wall together with the relative contribution of wall reactions on the total loss of F corresponding to the sticking probabilities. The model predicts that although the absolute time integrated loss rates at the walls increase with power, but the relative contribution of the wall loss process decreases slightly upon higher powers. Furthermore, at lower O_2 contents (or high CF_4 contents), the relative contribution of the wall loss process is much lower because F radicals can also get lost in reactions with other plasma species such as CF_3 to form again CF_4. At equal contents of O_2 and CF_4, 35-45% of the F radicals are lost at the walls, depending on the power. The numerical modeling results for CF_4 decomposition into new products are validated based on experimental data from literature.

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