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Dissociation, recombination and detachment in oxygen discharges diluted with argon JON T. GUDMUNDSSON, EYTHOR G. THORSTEINSSON, University of Iceland — We use a global (volume averaged) model to study the presence of negative ions and metastable species in low pressure high density O_2/Ar discharge. In particular the role of argon dilution in the dissociation of oxygen is investigated and the increase in the metastable $O(^2D)$ density with argon dilution. Furthermore, the electronegativity of the discharge is explored as a function of argon dilution. We find the negative oxygen ion O^- to be the dominant negative ion in the discharge in the pressure range of interest, 1 – 100 mTorr. Dissociative attachment of the oxygen molecule in the ground state $O_2(^3\Sigma_g^-)$ and the metastable oxygen molecule $O_2(a^1\Delta_g)$ are the dominating channels for creation of the negative oxygen ion O^-. At low pressure (< 5 mTorr) electron impact detachement dominates the loss of negative ions but recombination involving O^- and O^+ ions is an important loss channel. At higher pressure detachment on $O(^3P)$ becomes the main loss channel for the O^- ion.

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