

A global (volume averaged) model of a nitrogen discharge

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Abstract

We use a global (volume averaged) model to study the dissociation of the nitrogen molecule and the role of metastable species in a low pressure (1 - 100 mTorr) high density nitrogen discharge. The collisional energy loss per electron ion pair created is evaluated for the nitrogen atom and the nitrogen molecule. The dissociation mechanism in the nitrogen discharge is investigated as a function of power and pressure. The dissociation fraction is of the order of a few percent and increases with increased applied power. Furthermore, we explore and compare the reaction rates for the creation and destruction of the positive ions N^+ and N_2^+ .