Abstract Submitted
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Non Empirical Calculation of Emission Properties of Xe:Cl_2:Ar Glow Discharge MAXIM DEMINSKY, Kintech Lab, Moscow, Russia, IRINA CHERNYSHEVA, ALEXANDER ELETSKII, IGOR KOCHETOV, ANDREI ZAITSEVSKII, BORIS POTAPKIN, Kintech Lab, Moscow, Russia, DARRYL MICHAEL, DAVID SMITH, TIMOTHY SOMMERER, GE Global Reseach, Niskayuna, US — Emission properties of the Xe:Cl_2:Ar DC glow discharge have been calculated using the kinetic code VIBROKIN. Potential energy curves for the ground and excited states and the electronic transitions strengths of XeCl excimer molecule are calculated ab initio within the quasirelativistic many-electron intermediate Hamiltonian approach; the relativity is introduced through the relativistic pseudo-potentials of atomic cores. The cross section of the harpooning reaction responsible for formation of XeCl excimer molecule is evaluated on the basis of the asymptotic method. The similar approach was also applied for estimation of the cross section for quenching the XeCl excimer molecule and metastable Xe atoms by Cl_2 molecule. The electron impact excitation cross sections for the mixture components as well as the Cl_2 dissociation cross section were calculated using modified Born approximation, taking into account electron exchange. The calculation results present dependencies of the electron energy balance and the excimer emission efficiency as a function of the reduced electrical field strength, electron number density and gas mixture composition.

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