Effect of secondaryelectron emission on plasma characteristics in RF atmosphere argon glowdischarges

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Based on plasma fluidtheory and the drift-diffusive approximation, a one-dimensional fluid modelingis carried out for RF atmosphere glow discharges in argon between twoparallel-plate electrodes. The model includes the continuity equations of theions, the electrons and the metastable atoms, and the electron energy equation,as well as Poisson equation. In this work, the frequency and peak voltage ofthe RF power is 13.56 MHz and 1000V, the distance between the electrodes is 0.2cm, and the secondary electron emissioncoefficient is constant and it is changed as 0.01, 0.1, 0.2 and 0.3. The resultshow that, as the secondary electron emission coefficient increases, thecycle-averaged densities of the ions and the electrons in the bulk plasmaincrease and the cycle-averaged densities of the metastable atoms in the poweredsheath and in the grounded sheath increase and have two peaks in each sheath.However, the cycle-averaged electron temperature and the cycle-averagedelectric field are almost no change as the secondary electron emissioncoefficient changes. In the bulk plasma, the cycle-averaged electron heating isno change as the secondary electron emission coefficient changes. But, in thepowered sheathe and in the grounded sheath, the electron heating increases as thesecondary electron emission coefficient increases.