Abstract Submitted
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Spatiotemporal analysis of the electric field reversals in capacitively coupled SiH_4/Ar RF discharge[1] WANG XI-FENG, JIA WEN-ZHU, SONG YUAN-HONG, DAI ZHONG-LING, WANG YOU-NIAN, School of Physics, Dalian University of Technology, Dalian , PSEG TEAM — A capacitively coupled RF SiH_4/Ar discharge is investigated by a fluid/MC hybrid model, in which we focus our main attention on the influences of gas ratio, pressure and voltage amplitude on the electric field reversals. It is found that as a small proportion of SiH_4 is added in Ar discharge, a weak reverse electric field is obtained near the collapse sheath edge, mainly due to the accumulation of electrons on account of drift and ambipolar diffusion. Results show that electrons might be heated by the reverse fields during the sheath contraction. However, these heated electrons are not sufficient for background gas ionization. As the SiH_4 ratio increases, the electron field reversal is enhanced apparently and becomes the dominate electron heating method, contributing to high energy tails of electron energy probability functions (EEPFs) which would be responsible for significant ionization at sheath collapse phase. Further, the electric field reversal could be enhanced by increasing the pressure and voltage, leading to an enhanced heating compared with that in a pure Ar discharge.

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