Abstract Submitted
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Fluid simulations of discharge mode transition in inductively coupled Ar/O2 plasmas with an RF bias[1] JIA-WEI HUANG, HONG LI, YU-RU ZHANG, FEI GAO, YOU-NIAN WANG, School of Physics, Dalian University of Technology, Dalian 116024, China — A two-dimensional fluid model is developed to investigate the influence of an RF bias power on planar coil inductively coupled Ar/O2 plasmas, in which the inductive discharge is mainly sustained by a power with a fixed frequency 13.56 MHz, while the capacitively-coupled bias power has a lower frequency. In the simulations, the bulk plasma is described by a fluid model, combined bi-directionally with a sheath model, and the stochastic heating caused by the RF sheath oscillation is considered by adding a heat flux at the bulk-sheath boundary. In addition, secondary electron emission at the bias electrode is also taken into account. Numerical results show that the discharge transits from the inductive mode (H mode) to the capacitive mode (E mode) by increasing RF bias power, and thus the electron density first decreases and then increases with bias power.

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