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The simulation of a three-dimensional fluid model for H2 inductively coupled plasma at low pressure[1] YING-JIE WANG, FEI GAO, YOU-NIAN WANG, Key Laboratory of Materials Modification by Laser, Ion, and Electron Beams (Ministry of Education),School of Physics, Dalian University of Technology
— A three-dimensional fluid model is developed to study the radio-frequency inductively coupled H2 discharge with an expansion region at low pressure for neutral beam injector. In simulation, the effective collision frequency are considered which include Ohmic heating and stochastic heating. It is found that with stochastic heating taken into account, the deposition power rises, so the electron density is much higher than that in the case without stochastic heating effect. Because stochastic heating effect is a main heating mechanism at pressures of 10 mTorr or less. Furthermore, the effects of absorption power and pressure on the electron density and temperature is demonstrated. The electron density and temperature rise with the absorption power increases. When the pressure increases, the electron density is also increase and the maximum of electron is from diffusion chamber to driver chamber. In addition, the plasma characteristics are also investigated with and without magnetic field.

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