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Characteristics of wall sheath and secondary electron emission under different electron temperature in Hall thruster PING DUAN, HAI-JUAN QIN, ANNING CAO, XINWEI ZHOU, Department of Physics, Dalian Maritime University, LONG CHEN, School of Physics and Optoelectronic Technology, Dalian University of Technology, HONG GAO, Department of Physics, Dalian Maritime University — Characteristics of discharge channel wall plasma sheath in Hall thruster have great effects on its performance. In this paper, we establish a two-dimensional physical model in Hall thruster sheath area to investigate the influences of the different electron temperature, propellant and particle weight on sheath potential and secondary electron emission in Hall thruster, by the method of Particle In Cell (PIC) simulation. And the electric field at the particle position is obtained by solving the Poisson's equation. The numerical results show that when the electron temperature is low, the change of sheath potential drop is bigger than that with electrons at high temperature, the surface potential maintains a stable value and the stability of the sheath is good. When the electron temperature is high, the surface potential maintains persistent oscillation, and the stability of the sheath is reduced. Along with the increase of electron temperature, the coefficient of secondary electron emission in wall reduce after the first increasing. For three kinds of propellant (Ar, Kr, Xe), with the increase of ion mass, sheath potential and the secondary electron emission coefficient in turn reduce.

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