

Abstract Submitted
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Performance prediction of a novel microplasma thruster with microhollow cathode discharge¹ GUANGQING XIA, Dalian University of Technology, GENWANG MAO, Northwestern Polytechnical University — The gas heating of microhollow cathode discharge(MHCD) is found to have a strong relation with overall discharge behavior in the theoretical and experimental investigation. It provides crucial understanding to support the application and preliminary design of MHCD plasma thruster. The hot gas heated is expanded through a Laval-type converging-diverging micro-nozzle to produce thrust. With the MHCD hole diameter 100 μm and at the pressure 50~750 Torr, input power 0.15~2 W and mass flow rate 0.15~1.5 mg/s, the thrust produced by this kind of propulsion system is preliminary expected to be in the range of several tens to several thousands μN and the specific impulse is evaluated on the order of 600~1000 N·s/kg when using argon while on the order of 3000 N·s/kg using helium as the propellant gas. From the main performance of the MHCD plasma thruster, it can be applied as a new microplasma propulsion system for attitude control and station keeping of nano-satellites.

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