

Abstract Submitted  
for the GEC14 Meeting of  
The American Physical Society

**Ion beam and performance characteristics in the presence of multiply charged ions in annular and cylindrical type Hall thruster plasmas<sup>1</sup>**

HOLAK KIM, YOUBONG LIM, JONGHO SEON, WONHO CHOE, Korea Advanced Institute of Science and Technology (KAIST), KOREA ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY (KAIST) COLLABORATION, KYUNG HEE UNIVERSITY COLLABORATION — Operation performance and ion beam characteristics in the presence of multiply charged ions in cylindrical Hall thruster (CHT) and annular Hall thruster (AHT) plasmas are compared under identical conditions such as channel diameter, channel depth, and propellant flow rate. According to our previous results, the propellant utilization of the 200 W class CHT well exceeds unity [J. Lee et al., Appl. Phys. Lett. 99, 131505 (2011); M. Seo et al., Phys. Plasmas 20, 023507 (2013)] and the papers suggest that this may be related to the presence of multiply charged ions. In this work, we report the large fractions of Xe<sup>2+</sup> and Xe<sup>3+</sup> ions measured in the CHT plasma, which are about 16-26% and 6-7%, respectively. The measured values of specific impulse and thrust are higher by 1.4 times in CHT than in AHT at 300 V of the anode voltage, and it is found that the high fraction of multiply charged ions is responsible for the higher values of specific impulse and thrust. The details of the comparison of the overall performance and beam characteristics associated with multiply charged ions in AHT and CHT will be presented.

<sup>1</sup>This work was partly supported by the Space Core Technology Program (Grant No. 2014M1A3A3A02034510) and the Korea Institute of Materials Science (KIMS) (Grant No. 10043470).

Holak Kim  
Korea Advanced Institute of Science and Technology (KAIST)

Date submitted: 29 Aug 2014

Electronic form version 1.4