Abstract Submitted
for the GEC15 Meeting of
The American Physical Society

Energetic ion production in high current hollow cathodes[1] JOHN FOSTER, YAO KOVACH, NEIL ARTHUR, ERIC VIGES, CHRIS DAVIS, The University of MIchigan-Ann Arbor — High power Hall and gridded ion thrusters are being considered as a propulsion option supporting human operations (cargo or tug) to Mars. These engines utilize hollow cathodes for plasma production and beam neutralization. It has now been well documented that these cathodes produce energetic ions when operated at high current densities. Such ions are observed with peak energies approaching 100 eV. Because these ions can drive erosion of the cathode assembly, they represent a credible failure mode. An understanding of energetic ion production and approaches to mitigation is therefore desired. Presented here are data documenting the presence of energetic ions for both a barium oxide and a lanthanum hexaboride cathode as measured using a retarding potential analyzer. Also presented are energetic ion mitigation approaches, which are designed to eliminate the ion energy transfer mechanism.

[1]NASA SBIR Contract NNX15CP62P

John Foster
The University of MIchigan-Ann Arbor

Date submitted: 19 Jun 2015 Electronic form version 1.4