

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Secondary Electron Emission Properties of Plasma Facing Ceramic Materials at High Temperatures¹ YEVGENY RAITSES, PAUL DOUBAL, Princeton Plasma Phys Lab, ROSTISLAV SPEKTOR, The Aerospace Corporation — The plasma-wall interaction in the presence of strong secondary electron emission (SEE) has been studied theoretically and experimentally both as a basic phenomenon and in relation to numerous plasma applications such as, for example, fusion devices and Hall thrusters. Herein, we report on SEE measurements for boron nitride (BN) ceramics, which are commonly used as channel wall materials for Hall thrusters. Measurements were conducted for BN ceramics of three different grades with different fractions (0, 1% and 40%) and phases of different binder additions (calcium borate, silicon oxide) and as a function of the sample temperature relevant to the thruster operation (about 600K). For all three grades, the energy at which the yield equals to 1 at room temperature was measured to be near 40 V. This result is in agreement with previous measurements [1,2]. At the elevated temperature, the yield was slightly different for these ceramics, but lower than at the room temperature. This temperature effect was not as strong as measured in [2]. Analysis of these results and their implication on plasma-surface interactions in Hall thrusters and other related devices are presented.

[1] Dunaevsky et al, Phys. Plasmas **10**, 2574 (2003);

[2] Belhaj et al, J. Phys. D: Appl. Phys. **42**, 105309 (2009).

¹This work was partially supported by the Aerospace Corporation and by DOE contract DE-AC02-09CH11466

Yevgeny Raitses
Princeton Plasma Phys Lab

Date submitted: 24 Jul 2015

Electronic form version 1.4