Abstract Submitted
for the GEC20 Meeting of
The American Physical Society

Ion Energy and Angular Distributions onto Surfaces of Catalysts in Atmospheric Pressure Plasmas[1] NATALIA YU. BABAEVA, GEORGE V. NAIDIS, Joint Institute for High Temperatures, MARK J. KUSHNER, Univ. of Michigan — Plasma catalysis is gaining increasing interest as a means of efficient and selective chemical conversion. The manner in which plasmas activate catalytic processes is poorly known. In a packed bed reactor (PBR) the discharge propagating along the surface of a catalyst pellet can produce electric field enhancement in addition to that naturally generated by the polarization and shape of the pellet. This electric field enhancement can then accelerate ions into the surface of pellet which, even at atmospheric pressure, can produce bursts of ion energies in excess of tens of eV. These high energy ions in turn can affect the surface chemistry. In this paper, we report on results from a computational investigation of the ion energy and angular distributions (IEADs) to surfaces for atmospheric pressure plasmas propagating in a PBR in the presence of catalyst particles. The two-dimensional *nonPDPSIM* modeling platform was used in which IEADs are computed using Monte Carlo techniques. We show that ions with high energies can be delivered to surfaces while changing the surface conditions and thus influence the behavior of surface streamers. We discuss the details of the IEADs which depend on the size of the catalyst, its shape, dielectric constant and conductivity.

[1]Work of NB and GN was supported by RFBR Grant 20-02-00320. Work of MJK was supported by DOE Fusion Energy Sciences (DE-SC0020232).

Mark Kushner
Univ of Michigan - Ann Arbor

Date submitted: 12 Jun 2020 Electronic form version 1.4