Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

Effects of pulse-to-pulse residual species on discharges in repetitively pulsed discharges through packed bed reactors[1] JULIUSZ KRUSZELNICKI, KENNETH W. ENGELING, JOHN E. FOSTER, MARK J. KUSHNER, University of Michigan — Atmospheric pressure dielectric barrier discharges (DBDs) sustained in packed bed reactors (PBRs) are being investigated for conversion of toxic and waste gases, and CO_2 removal. These discharges are repetitively pulsed having varying flow rates and internal geometries, which results in species from the prior pulse still being in the discharge zone at the time the following discharge pulse occurs. A non-negligible residual plasma density remains, which effectively acts as preionization. This residual charge changes the discharge properties of subsequent pulses, and may impact important PBR properties such as chemical selectivity. Similarly, the residual neutral reactive species produced during earlier pulses will impact the reaction rates on subsequent pulses. We report on results of a computational investigation of a 2D PBR using the plasma hydrodynamics simulator *nonPDPSIM*. Results will be discussed for air flowing though an array of dielectric rods at atmospheric pressure. The effects of inter-pulse residual species on PBR discharges will be quantified. Means of controlling the presence of residual species in the reactor through gas flow rate, pulse repetition, pulse width and geometry will be described. Comparisons will be made to experiments.

[1]Work supported by US DOE Office of Fusion Energy Science and the National Science Foundation.

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Date submitted: 09 Jun 2016 Electronic form version 1.4