Abstract Submitted
for the GEC20 Meeting of
The American Physical Society

Fluid Modeling of Capacitively Coupled Radio-frequency Discharge Over a Wide Range of Frequencies HAN LUO, ANDREI KHOMENKO, SERGEY MACHERET, Purdue University — A parallel-plate capacitively coupled radio-frequency (CCRF) discharge in air and argon in a wide range of frequencies (25-165 MHz) was simulated with fluid model using drift diffusion approximation and local mean energy assumption. Different combinations of the boundary conditions and reaction mechanisms were used and the results compared with in-house experimental results. The calculated electron number densities, reactances and sheath thicknesses are in good agreement with the experimental results. A decoupled simulation of chemistry of neutral species in air plasma on a long (millisecond) time scale shows that under the conditions of experiments at a pressure on the order of 1 Torr the losses of atomic oxygen are due to diffusion and surface recombination, and that the mole fraction of atomic oxygen reaches about 1%.

Han Luo
Purdue Univ

Date submitted: 12 Jun 2020 Electronic form version 1.4