Abstract Submitted
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Scaling Nanosecond Electric Pulse Parameters for Plasma Species Generation[1] NANCY ISNER, ALLEN GARNER, Purdue University — Multiple applications, including combustion, flow control, and medicine, have leveraged nanosecond pulsed plasma (NPP) discharges to generate plasma generated reactive species (PGRS). While a one moment fluid model has been developed to examine NPP discharges, a detailed assessment of the effect of electric pulse (EP) parameters, such as electric field intensity and pulse shape, on PGRS formation remains incompletely characterized. Here, we assess the influence of EP conditions on the electric potential in the gap and PGRS by coupling a quasi-one-dimensional model for a parallel plate geometry with a Boltzmann solver (BOLSIG+) to improve plasma species calculations [1]. We consider a single discharge for a low-pressure gas (3 Torr) using a five-species model for argon [2]. We examine variations in PGRS for changes and the voltage and pulse width of the applied EP. By fixing the energy delivered by the EP, we further examine the implications of pulse width on species generation and sheath formation. Implications of pulsed power parameters will be discussed. 1. G. J. M. Hagelaar and L. C. Pitchford, Plasma Sources Sci. Technol. 14, 722–733 (2005). 2. T. Piskin, V. Podolsky, S. Macheret, and J. Poggie, J. Phys. D. Appl. Phys. 52, 304002 (2019).

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