ADJACENT NEEDLE STREAMER SYNCHRONICITY IN ARGON-ACETYLENE ATMOSPHERIC PRESSURE WEAKLY IONIZED PLASMA

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Atmospheric pressure weakly ionized plasma (APWIP) is utilized at Washington State University to explore plasma-polymerized film deposition. Gas composition greatly affects the streamer properties. Here we present research into the correlation between needle streamers for an argon acetylene environment.

Two circular needle arrays are used, an inner array (4 needles) and an outer array (8 needles). Needle to needle gaps range from 1.9cm to 6.5cm. A 60Hz 10kVRMS voltage source produces the streamers and concomitantly the APWIP. Broad band current sensors are used to measure the needle current allowing for an experimental study of correlations between streamer current pulses associated with adjacent needles.

Optimization of the film deposition requires insight into the plasma reactor environment. Quantifying needle streamer correlations will inform modeling and optimization of the plasma reactor and film deposition.