

Abstract Submitted
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Characterization of Atmospheric Pressure DC Negative Corona Discharges for Thin Film Deposition¹ DION ANTAO, ALEXANDER FRIDMAN, BAKHTIER FAROUK, Drexel University — The applicability of DC corona discharges with their lower temperatures and uniformity is investigated for the deposition of thin films. The deposition is done at atmospheric pressure and room temperature, which lowers the facility cost as no vacuum or low pressure facilities are required and also enables continuous processing rather than batch processing. We report on our studies the operating regimes and the structures of DC negative corona discharges for a point to plate electrode configuration for thin film deposition. Traditionally DC coronas have been operated at extremely low currents. By modifying the circuit, we have been able to operate the DC corona at higher currents without breakdown. We operated the DC negative corona discharge in new regimes where a stable and diffuse glow has been observed near the anode surface. This diffuse glow is observed in air and methane containing discharges. The discharge is characterized by voltage-current diagnostics. Optical emission spectroscopy (OES) is used to obtain spatially resolved temperature measurements. The DC negative corona discharge has been observed to deposit films on the anode surface. The deposition of films and particles on the anode surface has introduced the possibility of using corona discharges as a novel method of materials deposition or surface modification at atmospheric pressure.

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