

Abstract Submitted
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COMSOL Modeling of Transport of Neutral Radicals to Substrate Surfaces Located Downstream from an Atmospheric Pressure Weakly Ionized Plasma Reactor ROKIBUL ISLAM, WILLIAM LEKOBOW, ERIK WEMLINGER, PATRICK PEDROW, Washington State University — An Atmospheric Pressure Weakly Ionized Plasma (APWIP) Reactor generates a significant number of charged particles and neutral radicals. In our work the carrier gas is argon and the precursor molecule is acetylene. The APWIP is generated by corona discharges associated with an array of high voltage metal needles facing a grounded metal screen. Neutral radical transport downstream from the grounded screen to the substrate via diffusion and convection will be modeled with COMSOL, a finite element software package. Substrates will include objects with various shapes and characteristic dimensions that range from nanometers to centimeters. After the model is validated against canonical problems with known solutions, thin film deposition rates will be compared with experimentally measured results. Substrate geometries will include discs, spheres, fibers and highly porous surfaces such as those found on asphalt road surfaces. A single generic neutral radical will be used to represent the entire family of neutral radicals resulting from acetylene bond scission by free electron impact.

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