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Alternative Method of Electrospraying for Scalable Deposition of Nanomaterials KALYAN KANAKAMEDALA, THEDA DANIELS-RACE, Lousiana State University — There is a great deal of interest in various room temperature methods for the deposition of nanomaterials. Among these, Electrospraying has, in the last decade, garnered attention due to its simplicity and versatility. In this method, a liquid droplet is subjected to a high voltage (kV range) such that charge density on the droplet dominates the surface tension, causing the droplet to breakdown. This interaction is repeated to produce micron size droplets until a Taylor cone or "spray" of droplets is formed that, in turn, can be deposited uniformly across a substrate. Electrospraying has been used for the deposition of polymers, metals and insulators alike, given the versatility of the method. However, this method is also limited due to scaling issues caused by complexities of the electric fields across multiple nozzles, as needed to create the spray itself. In this work, we investigate an alternative method by which to scale the electropsraying process using a free solution surface. Effects of parameters such as solution viscosity, distance between the solution and target, and voltage variations are investigated with respect to their effect on the final deposited film. Our results demonstrate that generation of the spray from the free surface removes several barriers to uniform deposition in comparison to other methods of coverage.

Theda Daniels-Race
Lousiana State University

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