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Controlled Growth of Organic Semiconductor Films Using Electrospray Vapor-Liquid-Solid Deposition DANIEL SHAW, KEVIN BUFKIN, BRAD JOHNSON, DAVID PATRICK, Western Washington University — Interest in low molecular weight organic semiconductors (OS) for applications such as light-emitting diodes, photovoltaics, and other technologies stems in part from their prospects for enabling significantly reduced manufacturing costs compared to traditional inorganic semiconductors. However many of the best performing prototype devices produced so far have involved expensive or time-consuming fabrication methods, such as the use of single crystals or thin films deposited under high vacuum conditions. New methods are needed capable of rapidly and inexpensively producing high quality polycrystalline films, preferably involving near-ambient conditions. This poster will present studies of one such approach based on an electrospray vapor-liquid-solid growth technique. The method produces polycrystalline OS films deposited via atmospheric-pressure sublimation from a carrier gas (argon) which is partially ionized by a corona discharge. Vapor-phase molecules are then attracted to a charged substrate coated with a thin liquid solvent layer, in which they dissolve and grow as crystals, producing films with large grain sizes. This poster will describe the electrostatic and hydrodynamic features of the deposition mechanism, and the growth kinetics of the resulting polycrystalline films.

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