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Organic Vapor-Liquid-Solid Deposition for Controlled Growth of Organic Semiconductor Films. DAVID PATRICK, BRAD JOHNSON, Western Washington University — Thin films of low molecular weight organic semiconductors (OS) are drawing much attention for their potential use in a range of different applications. Because the optical and electronic properties of OS films are extremely sensitive to structural imperfections, domain size, and crystallographic orientation, preparation of high quality thin films with controlled microstructural organization under technologically favorable conditions has long been a bottleneck toward practical applications and better controlled fundamental studies. Here we describe an approach for fabricating OS films that comes close to achieving these demanding objectives. The main advance is the combined use of atmospheric pressure vapor-phase deposition into a thermotropic liquid crystal (LC) solvent, which is applied as a thin coating onto a supporting substrate, providing an organized fluid environment in which OS crystals nucleate and grow. The technique produces relatively large crystals, enables control over crystallographic orientation, growth habit, and size, and involves near ambient conditions compatible with a variety of substrates and inexpensive processing conditions. Results will be presented for the model compounds tetracene and pentacene.

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