Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Submonolayer Crystalline Tetracene Film Formation by Vapor-Liquid-Solid Deposition.[1] CYRUS SCHAAF, MICHAEL JENKINS, LINNEA BAVIK, BRAD JOHNSON, DAVID PATRICK, Western Washington University —
Over the last several decades, studies of submonolayer nucleation and growth kinetics by vacuum deposition have produced a sophisticated understanding of the connections between structural film properties such as island size distributions, island density, inter-island spacing statistics, nucleation and growth rates, with underlying atomistic process of monomer deposition, diffusion, and aggregation. By comparison, the comparable theoretical understanding of polycrystalline films formed in liquid solvent environments is much less well developed. Here we present studies into the early stage nucleation and growth kinetics of organic molecular films of tetracene prepared by a vapor-liquid-solid deposition technique in which tetracene monomers are delivered at a constant rate via a vapor-phase flux to a substrate coated with a sub-micron thick layer of an organic liquid solvent, causing crystals to nucleate and grow. We use in-situ, real-time fluorescence videomicroscopy to follow the formation and growth of individual crystals, including simultaneous spatial mapping of the monomer concentration and depletion zones.

[1]This work was supported by the National Science Foundation (DMR-0705908 and DMR-1207338).

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Date submitted: 11 Nov 2016 Electronic form version 1.4