Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Thermally-Induced Dewetting in Ultra-Thin C_{60} films on Copper Phthalocyanine TERRY MCAFEE, HARALD ADE, DANIEL DOUGHERTY, North Carolina State University — Organic photovoltaics have made significant advances in the past decade. These advances have occurred primarily by the synthesis of new materials that manipulate the bandgap to improve the short circuit currents and open circuit voltages. Domain size and orientation of the donor and acceptor materials has shown to also have a significant impact on device performance, and must be better understood and controlled to achieve organic solar cells that are a feasible alternative energy source. The evolution of thermally-annealed ultra-thin fullerene-C60 layers on copper phthalocyanine is examined by Atomic Force Microscopy and Near Edge X-Ray Absorption Fine Structure spectroscopy. Annealing at 105C causes 2 nm thick C60 films to de-wet the copper pthalocyanine substrate surface. Coarsening of C60 clusters is observed that creates mounds that exceed the nominal C60 thickness by more than an order of magnitude. Sequential deposition and annealing of C60 layers alternated with a donor material such as CuPc could be utilized to engineer a Bulk Heterojunction structure with C60 domain sizes catered to the exciton diffusion length.

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Date submitted: 19 Nov 2012 Electronic form version 1.4