

Abstract Submitted  
for the MAR15 Meeting of  
The American Physical Society

**New Insight into Morphology of High Performance BHJ Photo-voltaics Using High Resolution AFM** FENG LIU, Lawrence Berkeley National Lab, DONG WANG, KEN NAKAJIMA, Tohoku University, THOMAS RUSSELL, Lawrence Berkeley National Lab, THOMAS RUSSELL COLLABORATION — Direct imaging of the bulk BHJ thin film morphology in OPV is essential to understand device function and optimize efficiency. While transmission electron tomography provides a 3D, real-space image of the morphology, quantifying the structure is not possible. Here we used high-resolution atomic force microscopy in the tapping and nano-mechanical modes to investigate the BHJ active layer morphology which, when combined with Ar ion etching, provided unique insights with unparalleled spatial resolution. PCBM was seen to form a network that interpenetrated into the fibrillar network of the hole-conducting polymer, both being imbedded in a mixture of the two components. The free surface was found to be enriched with polymer crystals having a face-on orientation, and the morphology at the anode interface was markedly different.

Feng Liu  
Lawrence Berkeley National Lab

Date submitted: 14 Nov 2014

Electronic form version 1.4