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**Nanoscale Correlation of Heterogeneous Morphology and Electrical Transport in Nanostructured Organic and Hybrid Solar Cells** JIEBING SUN, SEAN WAGNER, XIAOYU LIU, PHILLIP DUXBURY, PENGPENG ZHANG, Michigan State University — The knowledge of correlation between morphology and electrical properties is essential both to understand fundamental physics and to facilitate device optimization. We report a systematic study of the organic blend of PCBM particles and P3HT fibers formed via the thermal annealing method. We use conductive atomic force microscopy (c-AFM) to simultaneously map the surface morphology and collect the electrical current. Cross-section AFM is attempted to get the internal 3D morphology so as to establish its correlation with the electrical properties. The obtained heterogeneity in the current map with a resolution up to 20 nm is attributed to the formation of cross-linked three dimensional fiber network, which is further supported by a three dimensional device model incorporating the geometry of nanowire and the c-AFM tip. Results on the hybrid cell of ZnO nanowires infiltrated with P3HT will also be discussed.

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