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Nanoscale Efficiency Maps for Organic Solar Cell Devices - Initial Results. BENJAMIN WATTS, North Carolina State University, ANDREW MINOR, Lawrence Berkeley National Laboratory, FRANCIS HELLMAN, University of California, Berkeley, HARALD ADE, North Carolina State University — Solar cells based on thin blend films of conjugated polymers and/or fullerene derivatives are a promising alternative to the currently available silicon-based solar cells. However, these systems tend to display complex segregation of the organic components during film formation, with the degree of segregation observed shown to depend on parameters such as spincasting spin-speed and solvent type. Many studies in recent years have focused on the influence of film morphology on device performance, often comparing the micron- or nano-scale segregation features observed by scanning probe (AFM, Kelvin probe, NSOM) or electrom microscopies (SEM, TEM) in blend films to the efficiency of fully fabricated macroscopic devices that utilize similarly fabricated active layer blend films. Here, we present details and initial results of two experiments that promise to allow nanoscale observation of the local device efficiency: electron- and soft X-ray beam induced current (EBIC and SoXBIC respectively). EBIC and SoXBIC involve scanning a focused beam of the respective probe across a fully formed photovoltaic device, injecting charges into the active polymer layer and measuring the resulting current between the device electrodes in order to generate 2D efficiency maps.

Benjamin Watts
North Carolina State University

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