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Nanoscale Composition and Efficiency of Conjugated Polymer Based Photovoltaic Devices BENJAMIN WATTS, North Carolina State University, CHRIS MCNEILL, Cavendish Laboratory, LARS THOMSEN, WARWICK BELCHER, The University of Newcastle, HARALD ADE, North Carolina State University, NEIL GREENHAM, Cavendish Laboratory, PAUL DASTOOR, The University of Newcastle — Organic solar cells based on thin blend films of conjugated polymers and/or fullerene derivatives promise significant advantages in flexibility and low-cost fabrication over conventional, silicon based devices. However, these polymer systems tend to display complex segregation of the component materials 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 demonstrated a link between film morphology and device performance and subsequent changes in fabrication methods have resulted in improved device efficiencies that now approach 5% total power conversion. Here, we present studies providing further details on the morphology-efficiency relationship through the application of scanning transmission X-ray Microscopy (STXM) to generate quantitative composition maps of conjugated polymer blend films and comparison to the measured efficiency of photovoltaic devices incorporating corresponding blend film active layers.

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