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In Situ Printing: Insights into the Morphology Formation and Optical Property Evolution of Slot-Die-Coated Active Layers Containing Low Bandgap Polymer Donor and Nonfullerene Small Molecule Acceptor

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Printing of active layers for application in organic solar cells with a meniscus-guided slot-die coating technique is a promising approach to overcome the up-scaling challenge, which is one of the main drawbacks in the field of organic photovoltaics on their way to marketability. Thin films of the conjugated high-efficiency polymer PBDB-T-SF and the non-fullerene small molecule acceptor IT-4F, which can achieve a power conversion efficiency of 13 % are printed with a meniscus-guided slot-die coater. As the solar cell performance is influenced significantly by the morphology of the active layer, it is important to understand the mechanism of structure formation during printing and drying of the active layers to enable a further optimization of the solar cell performance. Meniscus guided slot die coating of PBDB-T-SF:IT-4F is studied in situ with grazing incidence small angle X ray scattering (GISAXS), optical microscopy and UV/Vis spectroscopy to give an insight into the morphology evolution during drying of active layers.

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