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Investigation of novel absorber polymers for highly efficient doctor bladed polymer solar cells

Organic photovoltaic (OPV) have shown great development over the past years and increasing interest due to the advantages of low temperature processing, easy fabrication and the potential for cheap solar cells (SCs). Absorber polymers like PTB7 and PBDTT-FTTE have recently been reported with power conversion efficiencies (PCEs) in the range of 10% in spin coated bulk heterojunction (BHJ) PSCs and are tested in this case with the blade coating technique, which is compatible with mass production methods like roll to roll (R2R).

In this work, solution processed hole transport layers (HTLs), as well as absorber blends with different additives are investigated in both standard and inverted polymer solar cell devices. Additionally, analyses such as secondary ion mass spectrometry (SIMS) and dark lock-in thermography (DLIT) imaging are performed to show the inside of working and non working PSCs. Depending on the device structure, up to 7% PCEs are obtained for first doctor bladed PSCs. However the obtained PCEs, as well as the reproducibility of the process depends on the used materials.

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