

Characterization of the optical and morphological properties of high-efficiency polymers

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Organic photovoltaics are gaining impact as a feasible alternative to conventional solar cells. Using polymers as active material has several potential advantages, for instance reduced production costs and an increased device flexibility. However, efficiencies of polymer solar cells stay far below those of inorganic photovoltaics. In order to enhance the solar cell performance, recent research efforts focus on identifying high-efficiency polymers. This has led to the development of low band gap materials with efficiencies approaching 10 %. Our work focuses on a group of high-efficiency polymers called PBDTTTs. We investigate the optical and morphological properties of model systems using the prominent examples PTB7 and PTB7-Th. Applied characterization techniques include UV/Vis measurements, optical microscopy, AFM, XRR, XRD and GISAXS/GIWAXS. Exploratory solar cells link the power conversion efficiency to parameters such as the active layer composition and morphology.

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