

Morphology improvement of ZnO/P3HT-b-PEO bulk heterojunction films by using a low temperature route

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Hybrid solar cells, a combination of conventional inorganic and organic photovoltaic systems, offer outstanding potential due to their minor investment compared to inorganic solar cells and higher stability compared to organic solar cells. However, so far device efficiencies are significantly lower as compared to the other photovoltaic systems. A possible way to improve the film structure and thereby the device efficiency is to introduce amphiphilic block copolymers into the sol-gel synthesis of the inorganic part such as ZnO. Unlike the traditional diblock copolymer, in the present approach we make use of a new functional block copolymer PEO-b-P3HT. In the PEO block the ZnO phase is synthesized and the P3HT block can be used directly as the hole transporting layer. The nanostructure inside thin films is probed with GISAXS. Moreover, SEM and AFM detect the surface morphology of the composite films. The crystallization of ZnO nanostructures are examined with XRD and the thickness is investigated by profilometry measurements.

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