Characterization of crystallization of conjugated polymers blends of nano-additives in thin films, fibers and bulk

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Thin film plastic solar cell, where the active layer is composed of a blend of Poly-(3-Hexylthiophene),(P3HT) and [6,6]-phenyl-C61-butyric acid methyl ester ,(PCBM) in bulk heterojunction configuration, (BHJ) currently show efficiencies of about 7%. Yet this value is too low for commercial use.

In order to increase the efficiency one needs to improve the formation of free charge carries and charge mobility. Hole transport via the semi-crystalline polymer- P3HT phase is dominated by the degree of ordering of the polymer phase.

In attempts to increase the electron transport Single Walled Carbon Nanotubes (SWNT) or Multi Walled Carbon Nanotubes (MWNT) were added to the active layer using a block copolymer: $(PEO)_n$-$(Ph)_6$-$(PEO)_n$, (BCP) as a dispersing agent .

In this research we investigated the crystallization process and the degree of crystallinity of P3HT in combination of blends with PCBM and CNT in films, bulk and fibers by using DSC (Differential scanning calorimetry) and absorption spectroscopy.