

Performance improvement of polymer solar cells by ternary blending of amorphous and semi-crystalline polymer analogues with PCBM

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Abstract: Ternary blending of amorphous and semi-crystalline anthracene-containing poly(*p*-phenylene-ethynylene)-*alt*-poly(*p*-phenylene-vinylene) (PPE-PPV) copolymers (AnE-PVs) with PCBM was investigated in bulk heterojunction solar cells. In general, a strong impact on all photovoltaic parameters was observed by increasing the amount of amorphous AnE-PV*ba*-derivative in relation to its semi-crystalline counterpart AnE-PV*ab*. Interestingly, small additions of the amorphous copolymer were beneficial for overall solar cell performance. The results indicate that a certain amorphous fraction of the donor polymer may be required for obtaining optimal bulk heterojunction morphologies, yielding maximum photovoltaic performance.