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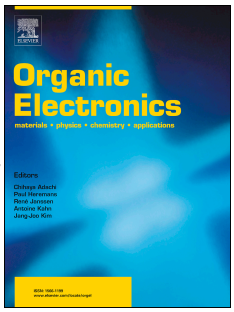

Regulation of the performance parameters of poly(3-alkylthiophene)/[6,6]-phenyl C_{61}-butyric acid methyl ester solar cells by 1,2,3,4-bis(*p*-methylbenzylidene) sorbitol

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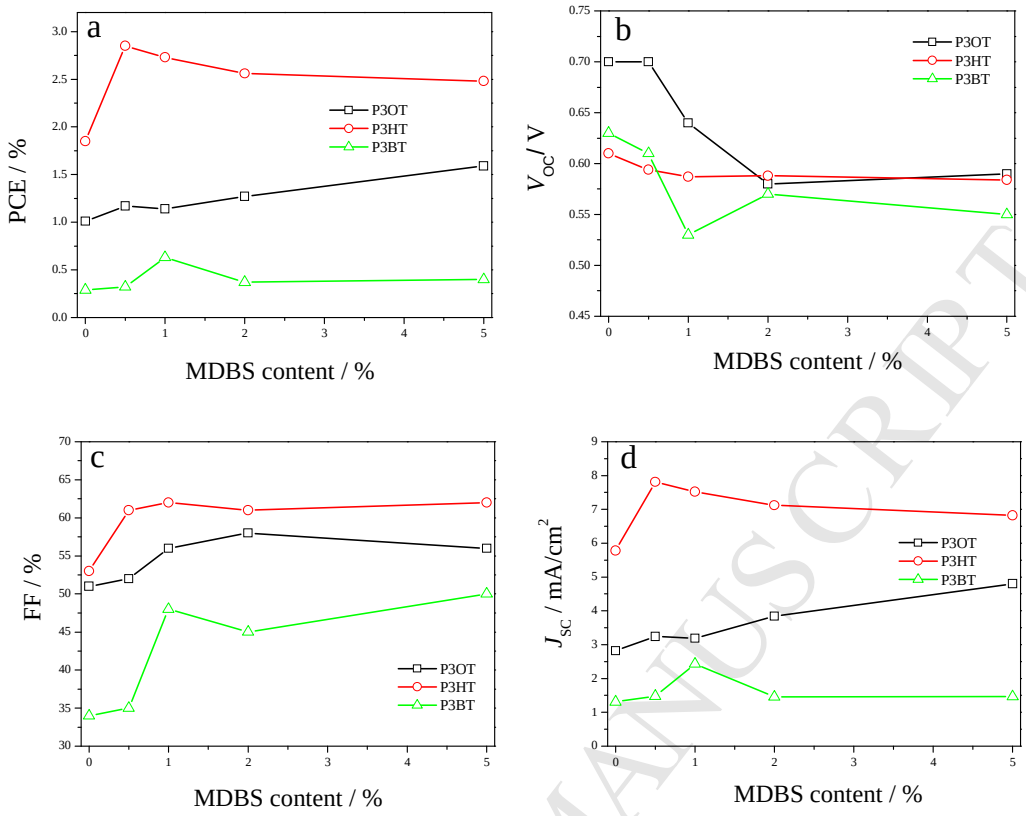

1,2,3,4-bis(*p*-methylbenzylidene) sorbitol (MDBS) is a nucleating agent for both poly(3-alkylthiophene)s (P3ATs) and [6,6]-phenyl C_{61}-butyric acid methyl ester (PCBM), but the intermolecular interaction between P3AT and MDBS is stronger than that between PCBM and MDBS. MDBS regulates the crystallization kinetics of P3AT in P3AT/PCBM blend films, resulting in the acceleration of the crystallization rate, and the decrease of the crystallinity and crystallite size of P3AT. This directly causes the decrease of the open circuit voltage (V_{OC}) and the increase of both the fill factor (FF) and the short circuit current (J_{SC}) with the addition of MDBS. Based on the variation of V_{OC}, FF, and J_{SC}, the power conversion efficiency (PCE) of P3AT/PCBM BHJ OPV devices improves with the addition of MDBS.