

Device Efficiency with Varying Solvent Concentrations in Bulk Heterojunction Organic Photovoltaics

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Abstract: Further developments for organic photovoltaic (OPV) cells require improvements to device efficiency and stability while maintaining cost effectiveness. Bulk heterojunction (BHJ) photoactive materials, such as poly(3-hexylthiophene-2,5-diyl) (P3HT) and [6,6]phenyl-C61-butric acid methyl ester (PCBM), are promising candidates as high-efficiency, low-cost materials. Photovoltaic cells function by converting the energy of light into electricity caused by the excitation of an electron or other charge-carrier to a higher energy state. In this effort, device geometry of substrate/ITO/PEDOT:PSS/Active Layer/Ca/Al were investigated and illuminated under 100mW/cm² [Air Mass (AM) 1.5G] solar irradiation. An active layer of 1:1 weight ratio of P3HT and PCBM were made in various concentrations of different solvents. The current-voltage (I-V), fill factor (FF) and power conversion efficiency (PCE) characteristics were measured and reported on.