



Improving the current density $J(SC)$ of organic solar cells P3HT:PCBM by structuring the photoactive layer with functionalized SWCNTs

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Résumé en anglais	<p>Several works concerning the incorporation of carbon nanotubes (CNTs) in bulk polymer RR-P3HT (regio-regular poly(3-hexylthiophene-2,5-diyl)):PCBM (methanofullerene phenyl-C-61-butyric-acid-methyl-ester) heterojunction have been already reported by a number of research groups. The optical and electrical properties of organic cells have been extensively studied. We investigated the incorporation of functionalized single wall carbon nanotubes (SWCNTs) into the matrix of P3HT:PCBM photovoltaic (PV) cells. The photovoltaic characteristics of the cells depend on the concentration of SWCNT. The incorporation of low concentrations of SWCNT in the photoactive layer increases the current density $J(SC)$ before annealing and it can reach above 9 mA/cm². We attribute the improved PV performances to partial crystallization of the RR-P3HT. As revealed by XRD studies and confirmed by the absorbance spectra, which exhibit the typical shoulder at 600 nm and absorbance in the near infrared region. Interestingly, we observe also that doping the P3HT:PCBM active layer by the functionalized SWCNTs increases the open circuit voltage V_{oc}. (C) 2010 Elsevier B.V. All rights reserved.</p>
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