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Incorporation of copper nanorods in organic solar cells

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In this study, the plasmonic effect of copper nanorods (Cu NRs) inside PTB7-Th:IEICO-4F to improve light scattering in organic solar cells have been investigated. Copper nitrate (CuNO_3) is reduced with poly(vinylpyrrolidone) (PVP) in which the solution is heated in an autoclave to obtain Cu NRs. Cu NRs are deposited in PTB7-Th:IEICO-4F and spin coated on top of glass substrate followed by the blend poly(3-hexylthiophene): phenyl-C61-butyric acid methyl ester (P3HT:PCBM). The transmission electron microscopy (TEM) results show cylindrical shapes of Cu NRs with grain size of 50.3 ± 0.5 nm. The UV-Vis spectroscopy revealed that NRs are absorbing in the visible range by showing plasmonic resonance at around 570 nm along with peaks of PTB7-Th:IEICO-4F, PCBM and P3HT at 950, 333 and 445 nm respectively. The X-ray diffraction (XRD) confirmed the FCC structure of Cu NRs with (111), (200), (220), and (310) phases in which the (111) peak was the most intense. Raman has also confirmed the existence of P3HT:PCBM, PTB7-Th:IEICO-4F and Cu NRs by showing the peaks of each structure. From this study, Cu NRs have a potential application in organic solar cells.

Keywords: Nanorods, solar cell, light scattering, PTB7-Th:IEICO-4F, P3HT:PCBM

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

PhD

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