

Spin-Coated Inorganic/Polymer Film Resistivity Measurement using the TLM Method

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Inorganic semiconductor CdSe nano-crystals were synthesized by solution method and then the thin active layers of CdSe/P3HT were prepared onto ITO glass by spin-coating process. The CdSe concentration in CdSe/P3HT composite varied from 0 to 95 wt%, and the loading amount of CdSe/P3HT composite in chlorobenzene/pyridine binary solvent changed from 5 to 30 mg/ml.

Electrical and structural properties of active layers were systematically investigated by various techniques including the TLM (transmission line method), AFM, SEM/TEM and XRD. The CdSe cubic structure was confirmed by XRD for every case of loading amount. The TLM experiments have suggested that the electrical percolation pathway would be developed at the critical loading amount of P3HT/CdSe composite, evidenced by the abrupt decrease of sheet resistance and significant increase in power conversion efficiency of ITO/PEDOT:PSS/(CdSe/P3HT)/Al solar cell.

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