

Nanocrystalline ZnO Flakes for Photovoltaic Device Applications

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Abstract

Nanocrystalline ZnO flakes were synthesized at low-temperature via solution process by using zinc acetate and diethyl amine under refluxing at 85 °C for 4 hrs. It was observed from the compositional and morphological examinations, done by FESEM equipped with EDS, that the synthesized products are ZnO flakes and grown in large quantity. The detailed structural characterizations confirmed that the synthesized products are well-crystalline and possessing wurtzite hexagonal phase. The optical property, composition and quality of the as-synthesized ZnO flakes were examined by using UV-visible, FTIR and Raman-scattering, respectively. For the photovoltaic device applications, synthesized ZnO flakes were used as photo-anode materials to fabricate the dye sensitized solar cells (DSSCs). The fabricated DSSC exhibited an overall light to electricity conversion efficiency of 0.99 %. A short-circuit current of 2.33 mA/cm², open-circuit voltage of 0.670 V and fill factor of 0.59, was achieved from the fabricated nanocrystalline ZnO flakes based DSSCs.