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Low-Temperature Grown ZnO Nanoflakes for Dye Sensitized Solar Cell Application

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Abstract

Herein, we report the simple and facile synthesis of well-crystalline ZnO nanoflakes and their use as an anode material to fabricate dye-sensitized solar cell (DSSC). The nanoflakes were synthesized by simple low-temperature solution method and characterized by several techniques to examine the morphological, structural, optical and compositional properties. The structural characterizations confirmed that the synthesized nanoflakes are well-crystalline and possessing wurtzite hexagonal phase of ZnO. The morphological investigation revealed that the synthesized material possess flakes shaped morphologies which are grown in high-density. The compositional properties of nanoflakes confirmed the pure phase of ZnO. UV-Vis spectroscopy was used to determine the optical properties of as-synthesized ZnO nanoflakes. The as-synthesized ZnO nanoflakes were used as anode materials for the fabrication of dye-sensitized solar cell (DSSC) which exhibited an overall light-to-electricity conversion efficiency of similar to 1.32%, open-circuit voltage (VOC) of 0.702 V, short-circuit current (J(SC)) of similar to 2.97 mA/cm(2) and fill factor (FF) of 0.63.

Keywords

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