

Direct Growth of ZnO Nanosheets on FTO Substrate for Dye-Sensitized Solar Cells Applications

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Abstract:

ZnO nanosheets were directly grown on fluorine-doped tin oxide (FTO) substrate via simple solution process at low temperature by using zinc chloride and hexamethylenetetramine (HMTA). The morphological characterizations by SEM and TEM confirmed that the deposited structures are nanosheets in which some are assembled in flower-shaped morphologies. The detailed structural investigations revealed that the deposited nanosheets are pure and crystalline ZnO and composed of Zn and O only. The obtained ZnO nanosheets on FTO substrate was used as a photoanode to fabricate the dye sensitized solar cells (DSSCs). The fabricated DSSCs exhibited an overall light-to-electricity conversion efficiency of 1.45 %. A short-circuit current of 4.51 mA/cm², open-circuit voltage of 0.610 V and fill factor of 0.53, was achieved from the fabricated ZnO nanosheets based DSSCs.

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