ZnO NANOSTRUCTURES *VIA* CHEMICAL BATH DEPOSITION FOR APPLICATIONS IN DYE-SENSITIZED SOLAR CELLS

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This study is concerned with the development of a chemical bath deposition technique for the preparation of nanostructure architectures of ZnO on the F^--doped SnO_2 (FTO) conducting glass plates, and their characterization and applications of the ZnO nanostructures in dye-sensitized solar cells (DSCs). A slight change of the temperature of the chemical bath and the control of the annealing temperature allow the selective formation of ZnO nanorods (NRs) and ZnO nanoflowers (NFs) on the FTO surfaces. Lower temperature (80 °C) of the chemical bath and the subsequent annealing on the hotplate give NRs while a slightly higher temperature (90 °C) of heating in an oven gives the NFs. The XRD studies confirm the purity of the ZnO in both NRs and NFs. The annealing temperature and the number of growing processes were varied in order to identify the optimum annealing temperature and the process for the preparation of ZnO NRs and NFs. The best annealing temperature that gives the highest efficiency for both the NRs and NFs is found to be 350 °C while the best growing process is the 3rd one. The D358 dye gives the maximum conversion efficiencies of 1.11% and 1.9%, respectively, for ZnO NR-based DSCs and for ZnO NF-based DSCs employing the I^-/I_3^- based electrolyte. Indoline D358 dye-based DSCs give higher conversion efficiencies (η) when compared to those of the N719 dye-based DSCs.