# Synthesis of Nanocoral Structured $TiO_2$ and Its Photoelectrical Performance in Dye and Quantum Dot Sensitized Solar Cells

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$TiO_2$ nanorods with multidirectional coral-like structure were synthesized through a facial hydrolysis and condensation method by using titanium oxysulfate ($TiOSO_4$) as the precursor. The effects of experimental parameters including reaction time, growth temperatures, substrates, and reactant concentrations will be discussed. $TiO_2$ nanorods were continuously formed on substrates in aqueous $TiOSO_4/H_2O_2$ solution, which results in the deposition of amorphous films. The phase transformation of $TiO_2$ to anatase can be achieved through a sintering treatment. The morphology and crystalline properties of the samples were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), high-resolution transmission electron microscopy (HRTEM) and UV-Vis spectroscopy. In addition, the dye and quantum dot sensitized solar cells (DSSC and QDSCs) were fabricated using the nanocoral structured $TiO_2$ as the photoanode. External quantum efficiency (EQE) and photoelectrical conversion efficiency were measured to evaluate the performance of the DSSCs and QDSCs.

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