# Abstract

ZnO thin films were deposited onto glass substrate by sol–gel dip coating method. The initial sol concentrations were varied from 0.2 to 0.5 M. Zinc acetate dihydrate, ethanol and Diethanolamine (DEA) were used as staring material, solvent and stabilizer respectively. The evolution of structural, optical properties and methylene blue (MB) photodegradation of the as-deposited films on sol concentration was investigated. Rietveld refinements of x-ray patterns reveal that all the as-prepared thin films have a Zincite-type structure with grain orientation along to *c*-axis. The strongest sol concentration is favorable for the highest crystallization quality. However, the high preferred orientation factor (POF) occurs for 0.3 M sol concentration. The field emission scanning electron microscopy observations reveals nanofibrous morphology with different lengths. The nanofibers density increases with increasing sols concentrations until forming a flower-like morphology. The EDS analysis confirms the high purity of the as-deposited ZnO films. It is found that all films present good transparency greater than 95% in the visible range; the optical band gap is slightly reduced with the increase in sol concentration. The photocatalytic degradation is enhanced by 90% with the sol concentration. The $K_{app}$ rate reaction increased with increasing sol concentration. The films stability is found to slightly decrease after the third cycle, especially for 0.5 M sol concentration.