

In this study, structure, microstructure, optical properties and photocatalytic degradation of Rhodamine B (RhB) have been investigated in an aqueous heterogeneous media containing pure and Ag doped TiO<sub>2</sub> nanostructures thin films which were prepared by a simple sol-gel route. Thermal analysis demonstrated that Ag content decreased the temperature of anatase-to-rutile phase transformation. X-ray diffraction analysis confirmed that the prepared nanostructures crystallize within anatase-type structure and that the dopant Ag ions were not fully incorporated within TiO<sub>2</sub> host lattice, meanwhile both the refractive index and optical band gap were affected by Ag concentration. The photodegradation of Rhodamine B under UV-C radiation by using pure and Ag-doped TiO<sub>2</sub> nanostructures showed that Ag played an important role in a significant improvement of the photodegradation efficiency and that the optimum content of Ag ions was found to be 0.5% molar ratio.