Fabrication of Rh-doped TiO_2 nanofibers for Visible Light Degradation of Rhodamine B

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ABSTRACT

The synthesis and application of environmentally benign, efficient and low cost heterogeneous catalysts is increasingly important for affordable and clean chemical technologies. Nanomaterials have been proposed to have new and exciting properties relative to their bulk counterparts due to the quantum level interactions that exist at nanoscale. These materials also offer enormous surface to volume ratios that would be invaluable in heterogeneous catalysis. Recent studies point at titanium dioxide nanomaterials as having strong potential to be applied in heterogeneous photocatalysis for environmental remediation and pollution control. This work reports the use of surface modified anatase TiO_2 nanofibers with rhodium (Rh) nanoparticles in the photodegradation of rhodamine B (RH-B), an organic pollutant. The dimensions of TiO_2 nanofibers were 150±50 nm in diameter and the size of the Rh nanoparticles was ~5 nm. The Rh-doped TiO_2 catalyst exhibited an enhanced photocatalytic activity in photodegradation of rhodamine B under visible light irradiation, with 95 % degradation within 180 minutes reaction time. Undoped TiO_2 did not show any notable phocatalytic activity under visible light.