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Silver Oxide/Graphene Oxide as Efficient Photocatalysts for Photocatalytic Degradation of Organic Pollutants.

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ABSTRACT

Synthesis of efficient photocatalysts such as Ag_2O/GO nanocomposite for oxidative decomposition of organic dyes mainly focuses on (a) increase in surface area of the photocatalyst and (b) enhancement in the separation of photogenerated charge carriers. These graphene oxide nanocomposite were successfully synthesized by an in-situ method without the use of any stabiliser or surfactant using GO and silver nitrate as the starting material. The as-synthesised nanocomposites were characterised by different characterisation techniques like X-ray diffraction (XRD), tunnelling electron microscopy (TEM), and FTIR spectroscopy. The average crystallite size of the nanocomposites was calculated from XRD data using Scherrer's formula and was found to be around 13.0 nm and correlated well with the particle size obtained from TEM analysis. We evaluated the photocatalytic efficiency of Ag_2O/GO nanomaterials for degradation of organic dyes using Rhodamine-B (Rh-B) as test organic pollutant. These nanocomposites exhibited remarkable photocatalytic activity for organic dye degradation compared to that of pure Ag_2O nanoparticles and P25 (a commercial TiO_2 as a benchmark photocatalyst). The enhancements of photocatalytic activity can be attributed to the suppression of charge carriers recombination and promotion of charge seperation resulting from the interaction between Ag_2O and GO.

Keywords: Photodegredation; Photocatalyst; Nanocomposites; silver oxide; Graphene oxide;