Ag loaded TiO_2 coupled onto reduced graphene oxide for enhanced visible-light photocatalytic activity

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TiO_2 is the semiconductor of choice for the degradation of numerous pollutants. However, its performance is limited due to its wide band gap and its high electron-hole recombination rate. Lately, the development of materials for visible-light driven photocatalysis has attracted particular attention and many approaches are being considered, such as the coupling of TiO_2 with noble metals [1] and carbonaceous materials [2]. In this work, silver nanoparticles were loaded onto TiO_2 by chemical reduction. Furthermore, TiO_2 and Ag-TiO_2 were deposited onto reduced graphene oxide (rGO). Characterization of the samples was conducted by UV-Vis and Raman spectroscopy, scanning and transmission electron microscopy, Fourier transform infrared (FTIR) spectroscopy and X-ray diffraction. The photocatalytic performance of the samples was evaluated by assessing the conversion of methylene blue under visible light irradiation. The rate of removal at first increases with Ag loading, but drops above a threshold loading value, while, the composite materials present enhanced photocatalytic activity compared to that of conventional TiO_2 (Fig. 1).

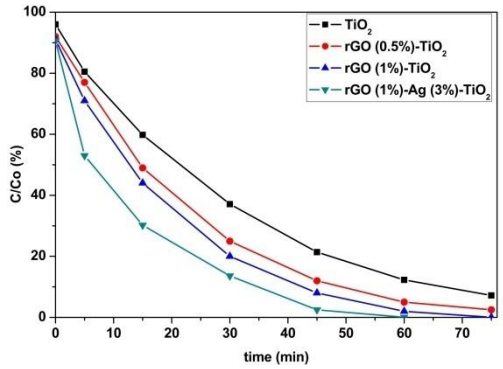

Figure 1: Photocatalytic performance of TiO_2 and Ag-TiO_2 coupled with rGO

References

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