Microwave-assisted one-pot method for preparation of ZnO/AgI nanocomposites with highly enhanced photocatalytic activity under visible-light irradiation

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ABSTRACT

In the present work, a microwave-assisted one-pot method was applied for preparation of the ZnO/AgI nanocomposites. One-pot, large-scale, and short preparation time are main advantages of this method. Photocatalytic activity of the nanocomposites in degradation of rhodamine B under visible-light irradiation is remarkably depended on mole fraction of AgI and the superior activity was seen for the nanocomposite with 0.342 mol fraction of silver iodide. The degradation rate constant over this nanocomposite is about 10-fold higher than that of the ZnO nanostructures. Photoluminescence spectra confirmed that separation of the charge carriers in the nanocomposites is more intensive than the ZnO nanostructures. Furthermore, it was observed that the microwave irradiation time, calcination temperature, and scavengers of the reactive species have considerable influence on the degradation reaction. More importantly, the photocatalyst retains about 80% of its activity after using for five cycles.

Keywords: ZnO/AgI; Microwave-assisted method; Visible-light-driven; Photocatalyst

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