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Abstract

Au/ZnO Nanocomposites Obtained at Different Au Precursor Concentration for Highly Efficient Photo-Degradation of Methylene Blue under UV Light †

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Abstract: Au/ZnO nanocomposites were successfully synthesized by a facile and low cost methods. ZnO nanoparticles and Au/ZnO samples growth at different Au precursor ($HAuCl_4$) concentrations were obtained by hydrothermal synthesis and chemical reduction method, respectively. The influence of Au content in morphological and optical properties were analyzed by scanning electron microscopy (SEM) with energy dispersive X-ray (EDS) spectrometer, Raman and UV-Vis spectroscopy. Photocatalytic activity of ZnO nanoparticles and Au/ZnO nanocomposites were evaluated in the photo-degradation of methylene blue (MB) solution under UV irradiation. Compared with ZnO nanoparticles, Au/ZnO nanocomposites showed enhanced photocatalytic activity for degradation of MB under UV light irradiation, due to the charge transfer that occurs between ZnO and Au interface. The Au/ZnO sample with lowest $HAuCl_4$ concentration (0.5 mM) showed the best photocatalytic performance, reaching a MB degradation rate of 99.99% within 60 min, which exhibits an enhancement of 60% compared with ZnO nanoparticles.

Keywords: Au/ZnO nanocomposites; photodegradation; methylene blue

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