



A facile synthetic method of ZnO nanoparticles and its role in photocatalytic degradation of refractory organic matters

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ABSTRACT

Treatment of refractory organic dyeing wastewater is a serious issue in the chemical industry and environmental protection. ZnO nanomaterials have a good potential for dyes removal from wastewater. To optimize the synthetic technology for ZnO and improve the photocatalytic activity for hazardous organic matters, an improved route of ZnO were proposed via microwave-assisted co-precipitation method using polyethylene glycol 400 (PEG 400) as a surfactant. The facile and moderate synthesis conditions of ZnO nanoparticles (NPs) were confirmed owing to lower reaction temperature (35°C) and quick reaction time (5 min microwave irradiation). The as-prepared ZnO NPs exhibited excellent photocatalytic degradation performance for refractory dyes crystal violet (CV) and Congo red (CR) in terms of rapid degradation rate, high degradation efficiency and broad pH range. In summary, the study is very useful for optimizing the synthetic conditions for the ZnO NPs and enhancing the potential applications in photocatalytic degradation for refractory organic pollutants.

Keywords: ZnO nanoparticles; Microwave radiation; Crystal violet; Congo red; Photocatalytic degradation

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