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Preparation and characterization of mesoporous ZnO by polystyrene microemulsion

Yumin Liu*, Lv Hua, Shuangqing Li, Guoxi Xi

College of Chemistry and Environmental Science, Henan Normal University, Xinxiang, Henan 453007, P.R. China
Tel. +86 373 3326335; email: ymliu2007@163.com

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ABSTRACT

A simple route to synthesize mesoporous ZnO nanoparticle was reported by using polystyrene microemulsion system composed of cetyltrimethylammonium bromide/styrene/zinc nitrate/ammonium persulfate. The samples were characterized by thermogravimetry and differential thermal analysis (TG-DTA), X-ray diffraction, scanning electron microscope and mercury porosimeter. Experimental results showed that the specific surface area and pore volume of the synthesized mesoporous zinc oxide were 11.013 m^2/g and 0.1551 cm^3/g, respectively. On the basis of the experimental results, the possible mechanism of pore formation was proposed. Moreover, the photocatalytic activities of the synthesized ZnO were also evaluated in the photodegradation of methylene blue in aqueous solutions under UV irradiation, and all of the synthesized ZnO exhibited high photocatalytic activities.

Keywords: ZnO; mesoporous materials; microemulsion; polystyrene

*Corresponding author.