عنوان مقاله:

A Comparative Study between Photocatalytic activity of ZnO/ bentonite Composites Prepared by Precipitation, Liquid-state IonExchange and Solid-state Ion Exchange Methods

محل انتشار:

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خلاصه مقاله:

The purpose of this research is to produce ZnO/bentonite nanocomposites with precipitation,liquid-state ion exchange (LSIE) and solid-state Ion exchange (SSIE) methods and compare theirphotocatalytic activity. The physicochemical properties of the prepared photocatalysts weredetermined by scanning electron microscope (SEM), energy dispersive X-ray (EDX) and diffusivereflective spectroscopy (DRS) analysis. The Photocatalytic activity was evaluated by degradationof methyl orange (MO) with prepared photocatalysts. SEM images showed that the ZnO particleswere successfully distributed on the bentonite in the samples prepared by precipitation method.Nevertheless, after ion exchange-based methods, no particles were formed on the bentonitesurface. The EDX analysis showed that the Zn contents in the ZnO/bentonite were 0.39, 0.44 and0.66% prepared with LSIE, SSIE and precipitation methods, respectively. Based on changes in theUV–vis spectrum of Parent zinc chloride and bentonite, the DRS analysis confirmed the formation ofZnO/bentonite composites. The photo-degradations of MO were 85, 87 and 84% for the compositesprepared by LSIE, SSIE and precipitation methods, respectively. Finally, the photocatalytic compositesprepared by the solid-state method were very bright due to their simple production, low price andshort time due through direct heating of the reaction.

کلمات کلیدی:

Liquid-state Ion Exchange, Photocatalytic activity, Precipitation Method, Solid-state Ion Exchange, ZnO/bentonite Composites