



Preparation and characterization of TiO₂/ZnO/CuO nanocomposite and application for phenol removal from wastewaters

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ABSTRACT

The TiO₂/ZnO/CuO nanocomposite is prepared using mechanical mixing and wet impregnation under low-temperature conditions and characterized by scanning electron microscopy. The results indicate that the TiO₂/ZnO/CuO nanocomposite exhibits an appreciable photo-catalytic activity, which can mainly be attributed to the extended photo-responding range and the increased charge separation rate. Phenol removal is also measured as a function of irradiation time by using UV–vis spectrophotometer. The results show that phenol removal takes place more effectively in the presence of the nanocomposite under solar irradiation in comparison with UV irradiation. The influence of several parameters has investigated on the photo-catalytic removal of phenol such as pH and various synthesis techniques. The results show that the degradation rate decreases by increasing the pH value. The highest degradation rate is observed at 100 min after the beginning of the reaction and wet impregnation is proved to be more effective than mechanical mixing.

Keywords: Photo-catalytic removal; TiO₂/ZnO/CuO nanocomposite; UV irradiation; Solar irradiation

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