



Degradation of wastewaters containing organic dyes photocatalysed by zinc oxide: a review

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ABSTRACT

Organic dyes are one of the largest groups of pollutants discharged into wastewaters from textile and other industrial processes. Owing to the potential toxicity of the dyes and their visibility in surface waters, removal and degradation of them have attracted considerable attention worldwide. A wide range of approaches have been developed, amongst which the heterogeneous photocatalysis involving zinc oxide (ZnO) emerges as a promising new route for water purification process. For the first time, we attempt to review and summarize the recent research on ZnO photocatalytic systems for organic dyes degradation. The photocatalysis on modified ZnO is also discussed, in particular aiming at enhancing the degradation efficiency and activity in visible region as well as solar irradiation. The effects of key operational parameters on the photocatalytic performance in terms of the degradation and mineralization of dyes are detailed. This review also highlights the utilization of multivariate analysis to determine the optimum operational parameters so as to improve process performance and photodegradation efficiency. Brief discussions on the analysis techniques and identification of reaction intermediates that are generated during dye degradation are presented. Finally, the real-world process scenarios for the potential practical utility of this technique are summarized and discussed.

Keywords: ZnO; Dye; Photocatalysis; Parameter; Multivariate analysis; Intermediates

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