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Synthesis of WO_3 nanorods and their photocatalytic degradation of organic contaminants(Article)(Open Access)

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Abstract

In this present investigation, we report a novel tungsten trioxide (WO_3) nanorods were successfully synthesized by the simple hydrothermal environment. The as-synthesized rod-like WO_3 were characterized by various spectroscopic and analytical techniques such as X-ray diffraction (XRD) UV-vis spectroscopy analysis (UV-DRS). The structural morphology and their elements were confirmed by scanning electron microscopy (SEM) and energy-dispersive X-ray spectroscopy (EDX). It was found that the rod-like structure of WO_3 was successfully confirmed by transmission electron microscopy (TEM). The synthesized WO_3 exhibits an excellent photocatalytic activity which may be attributed to the improved charge separation and complete degradation of RhB dye solution within 70 min. The photocatalyst efficiency was further tested towards the effect of dye concentration and effect of different catalyst weight. The involvement of.OH in the photocatalytic reaction was evidenced using radical quenching experiment with employing different scavengers. A possible degradation mechanism was proposed for the semiconductors and possible reasons for the enhancement of visible-light photocatalytic efficiency were discussed. This study could provide a new approach to construct a novel photocatalysts and a promising candidate catalyst for poisonous wastewater treatment in the near future.

Author keywords

Hydrothermal | Photocatalyst | RhB dye | The mechanism | WO_3

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