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Synthesis and characterization of ZnO/g-C₃N₄ hybrid nanofibers photocatalyst for the removal of organic pollutants from water

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Abstract

ZnO/g-C₃N₄ hybrid nanofibers containing different concentrations of g-C₃N₄ nanosheets were prepared using electrospinning technique; this was followed by annealing at 460 °C for one hour in a box furnace. Based on scanning electron microscopy (SEM) image analysis, the mean diameter of the nanofibers was measured to be ~ 55 nm. Fourier transform infrared (FTIR) spectroscopy confirmed the presence of ZnO and g-C₃N₄ in the prepared nanofibers. The photocatalytic activity of the nanofibers was examined under UV photoirradiation, showing that the ZCN0.5 nanofibers containing 0.5 wt% of g-C₃N₄ exhibited the highest performance, as compared to other photocatalysts. The observed improvement in photodegradation over the optimized photocatalyst could be due to retardation in the charge carriers' recombination rate in the ZCN0.5 photocatalyst sample, as compared with the pure ZnO and pure g-C₃N₄.

Keywords: hybrid ZnO/g-C₃N₄ nanofiber, electrospinning, photocatalytic activity, UV light

For full article, refer to the Persian section