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Research paper

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# In-situ growth of $\text{ZnIn}_2\text{S}_4$ decorated on electrospun $\text{TiO}_2$ nanofibers with enhanced visible-light photocatalytic activity

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**Abstract:** A series of  $\text{ZnIn}_2\text{S}_4$  nanosheets/ $\text{TiO}_2$  nanofibers heterojunctions were fabricated through an electrospinning-hydrothermal two-step process. The  $\text{ZnIn}_2\text{S}_4$  nanosheets were intensively and uniformly covered on the surface of  $\text{TiO}_2$  nanofibers. The  $\text{ZnIn}_2\text{S}_4/\text{TiO}_2$  heterojunctions exhibited enhanced visible-light photocatalytic activity compared to the individual  $\text{TiO}_2$  nanofibers and  $\text{ZnIn}_2\text{S}_4$  nanosheets in the photodegradation of methyl orange, especially, when the molar ratio of  $\text{ZnIn}_2\text{S}_4$  to  $\text{TiO}_2$  was 20:100, the  $\text{ZnIn}_2\text{S}_4/\text{TiO}_2$  catalysts exhibited the optimum photocatalytic activity. The improved visible-light photocatalytic performance was ascribed to a Z-scheme photocatalytic process, abundant active sites of  $\text{ZnIn}_2\text{S}_4$  nanosheets as well as efficient photogenerated charge separation.

**Keywords:**  $\text{ZnIn}_2\text{S}_4$  nanosheets;  $\text{TiO}_2$  nanofibers; Z-scheme photocatalyst; Heterojunctions; Methyl orange

## 1. Introduction

Titanium dioxide ( $\text{TiO}_2$ ) was firstly introduced to photoelectrochemically splitting water under UV irradiation in the pioneering work of Fujishima and Honda in 1972 [1]. Since then,  $\text{TiO}_2$  as a potential photocatalyst was extensively studied on the fields of energy development and environment remedy due to its high reactivity,

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