Preparation of g-C₃N₄/ Zn₃In₂S₆ Composite Materials as Photocatalysts for the Highly Efficient Degradation of Antibiotic

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We designed and succeeded in synthesising a sequence of g-C₃N₄/Zn₃In₂S₆ (ZIS) composite photocatalysts by means of one-step hydrothermal synthesis, which integrated different amounts of g-C₃N₄ into ZIS. The prepared products are characterized by means of various characterization methods to determine their structure, morphology and physicochemical properties. Their photocatalytic activities were assessed according to the performance of tetracycline (C₂₂H₂₄N₂O₈, TC) degradation experiments with light radiation. This consequence of experiments showing that the g-C₃N₄ (0.5 wt.%) /ZIS photocatalyst is most effective for the photodegradation of TC. Moreover, results from the cyclic tests confirm the stability of the g-C₃N₄ (0.5 wt.%) /ZIS composite, which remained active after five cycles of repeated photocatalysis experiments. We can get the conclusion that •O₂⁻, •OH and h⁺ all played roles during the degradation process from the figures of ESR tests and active species trapping experiments. And the corresponding degradation mechanism of g-C₃N₄/ZIS composites is proposed. High specific surface areas, desirable absorption capability, suppression of charge recombination should be put down to its nice photocatalytic performance. Thus, it can be considered that g-C₃N₄/ZIS composites have broad potential application prospects in photocatalysis degradation.

Keywords: Zn₃In₂S₆, degradation, g-C₃N₄, TC, photocatalytic

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