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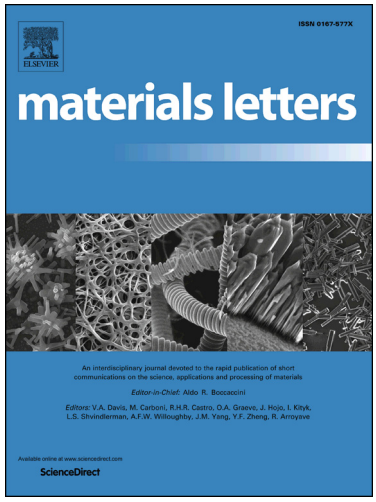

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Facile one-step synthesis of $Cu_{1.96}S/g\text{-}C_3N_4$ 0D/2D p-n heterojunctions with enhanced visible light photoactivity toward ciprofloxacin degradation

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Abstract: Novel $Cu_{1.96}S/g\text{-}C_3N_4$ 0D/2D p-n heterojunctions were successfully synthesized *via* a facile one-step calcination approach using thiocarbamide as both precursor and sulfur source. The $Cu_{1.96}S$ nanoparticles with sizes of 3-10 nm were closely anchored on the surface of $g\text{-}C_3N_4$ with good dispersion and the $Cu_{1.96}S/g\text{-}C_3N_4$ nanocomposites were used as a photocatalyst for photodegradation of ciprofloxacin (CIP) under visible light. The experimental results demonstrated that the visible light photocatalytic activity of the $Cu_{1.96}S/g\text{-}C_3N_4$ 0D/2D p-n heterojunction was significantly enhanced in comparison with pure $g\text{-}C_3N_4$ and the degradation rate was up to about 3.2 times that of pure $g\text{-}C_3N_4$. The increased photocatalytic activity of the $Cu_{1.96}S/g\text{-}C_3N_4$ nanocomposites could be attributed to the formation of the heterojunctions between $g\text{-}C_3N_4$ and $Cu_{1.96}S$, which were conducive to avert the aggregation of small $Cu_{1.96}S$ nanoparticles and suppresses the recombination of photoinduced charge. Moreover, the $Cu_{1.96}S/g\text{-}C_3N_4$ photocatalyst exhibited high stability for CIP degradation even after seven successive cycles.

Keywords: $Cu_{1.96}S/g\text{-}C_3N_4$; Semiconductors; Heterojunctions; Nanocomposites; Ciprofloxacin; Visible light photocatalysis.

1. Introduction

During the past several decades, aqueous organic contaminants such as dyes, antibiotics, and agrochemicals, discharged from hospitals, industrial activities and households, have become increasingly harmful to human health and the eco-environment [1]. Of the various

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