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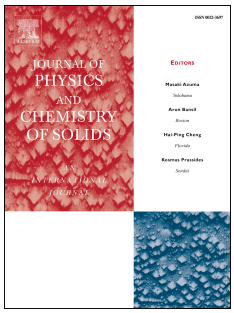

One-pot hydrothermal synthesis of $CuCo_2S_4$/RGO nanocomposites for visible-light photocatalytic applications

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One-pot hydrothermal synthesis of $CuCo_2S_4$/RGO nanocomposites for visible-light photocatalytic applications

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Abstract

$CuCo_2S_4$/reduced graphene oxide (RGO) nanocomposites with varying amount of RGO loadings were synthesized using a simple hydrothermal method. L-Cysteine has been used as a bio-sulfur source to synthesize $CuCo_2S_4$ nanoparticles. Scanning electron microscopy (SEM) and high resolution transmission electron microscopy (HRTEM) images showed that the $CuCo_2S_4$ nanoparticles uniformly decorated the entire surface of the RGO sheets. The results of photo electrochemical studies revealed that the incorporation of RGO could improve the effective electron transportation, which leads to higher photocatalytic activity. The highest degradation efficiency toward photodegradation of malachite green was achieved with 3% of RGO loading in the $CuCo_2S_4$ matrix. Furthermore, based on experimental results, the underlying mechanism for photocatalysis was proposed and discussed. This study demonstrates that the $CuCo_2S_4$/(RGO) nanocomposites could be used as a green photocatalyst for environmental applications.

Keywords: $CuCo_2S_4$, L-Cysteine, Graphene oxide, Hydrothermal synthesis, Photocatalyst

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