Synthesis of Visible Light Active $CuFe_2O_4$/g-C_3N_4 Photocatalyst for Water Splitting

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Abstract

A facile g-C_3N_4 supported $CuFe_2O_4$ composite photocatalyst has been prepared by a simplistic one-pot calcination approach using urea and a $CuFe_2O_4$ gel as precursors. The compounds obtained were analysed with Raman Spectroscopy, X-Ray Diffraction (XRD), X-Ray Photoelectron Spectroscopy (XPS), Scanning Electron Microscopy(SEM) and Energy Dispersive Spectroscopy (EDS) in order to obtain their morphological and structural properties. Optical behaviour was studied by UV–vis Spectroscopy. In this composite, $CuFe_2O_4$ was finely dispersed in g-C_3N_4 matrix, resulting in much improved efficiency of $CuFe_2O_4$/g-C_3N_4 heterojunction in photocatalytic H_2 production by water splitting under visible light. The peak 104 µmol h^{-1} was obtained at optimized loading amount of 3% $CuFe_2O_4$ in the composites, which was about 4 times of that on the pure g-C_3N_4 obtained from urea. This remarkable improvement can be attributed to the enhanced visible light absorbance, improved surface area and charge carrier separation and transfer ability.