

Nanocomposite Materials for Degradation of Pollutants in Wastewater

ABSTRACT

Solar energy is a plentiful, cost-effective, and sustainable resource with immense potential for application as a clean and economical energy source in organic transformations. The efficient conversion of solar energy into chemical energy, known as visible-light-driven photocatalysis, has emerged as a rapidly advancing field over the past two decades due to its environmental and economic benefits. Among various photocatalytic materials, graphite-like graphitic carbon nitride (g-C₃N₅) and its magnetically functionalized derivative g-C₃N₅@ Metal oxide have attracted significant research interest. In response to the growing demand for green and sustainable synthesis routes, the visible-light-assisted reduction of nitrobenzene to corresponding amines has become particularly appealing, as it proceeds efficiently under mild and ambient conditions. This study presents a versatile approach for the synthesis and photocatalytic evaluation of g-C₃N₅nanocomposites

decorated with metal oxide nanoparticles. The resulting metal oxide-doped $g\text{-C}_3\text{N}_5$ materials were characterized using various analytical techniques and demonstrated potential applications in the CO_2 photo reduction, degradation of organic pollutants, and their reusability and recyclability in photocatalytic processes.