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Design and Fabrication of a Novel Metal-Free SiO₂/g-C₃N₄ Nanocomposite: A Robust Photocatalyst for the Degradation of Organic Contaminants(Article)

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Abstract

Abstract: Development of novel and efficient nanostructured materials for the waste water treatment is a great challenge for the researchers. In this regard, we report a novel SiO₂/g-C₃N₄ nanocomposites were tailored via simple solvothermal route and characterized by various spectroscopic and microscopic techniques such as XRD, FT-IR, UV-Vis DRS, SEM, TEM and XPS. The photocatalytic performances of the as-prepared SiO₂/g-C₃N₄ nanocomposites were evaluated for the removal of hazardous rhodamine B (RhB) and crystal violet (CV) organic dyes in aqueous solution under visible light irradiation. Interestingly, the UV-Visible spectroscopy results revealed that the as-synthesized SiO₂/g-C₃N₄ nanocomposite showed superior photocatalytic activity for the degradation of RhB and CV dyes could degrade 99 and 98% under visible-light irradiation respectively. The enhanced photocatalytic activity of SiO₂/g-C₃N₄ nanocomposites could be mainly attributed to the proficient separation of photo-induced charge carriers. A plausible degradation mechanism for the controlled visible-light photocatalytic activity of SiO₂/g-C₃N₄ nanocomposites was strongly evidenced by the trapping experiment by employing different scavengers. The present research findings may open up a new platform for the g-C₃N₄ based photocatalyst for the degradation of organic pollutants. Graphical Abstract: Proposed degradation mechanism of the SiO₂/g-C₃N₄ photocatalyst. © 2017, Springer Science+Business Media, LLC.

Author keywords

[Scavenger](#) [SiO₂/g-C₃N₄ nanocomposite](#) [Solvothermal synthesis](#) [Visible-light photocatalyst](#)

Indexed keywords

Engineering controlled terms:

[Degradation](#) [Dyes](#) [Image enhancement](#) [Irradiation](#) [Light](#) [Nanocomposites](#) [Organic pollutants](#) [Photocatalysis](#) [Photocatalysts](#) [Rhodium compounds](#) [Silica](#) [Solutions](#) [Stripping \(dyes\)](#) [Waste treatment](#) [Wastewater treatment](#) [Water treatment](#)

Engineering uncontrolled terms

[Degradation of organic contaminants](#) [Photocatalytic activities](#) [Photocatalytic performance](#) [Scavenger](#) [Solvothermal synthesis](#) [Spectroscopic and microscopic techniques](#) [Visible light photocatalytic activity](#) [Visible-light photocatalysts](#)

Engineering main heading:

[Photodegradation](#)

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