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Green chemical route: enhanced photocatalytic degradation of malachite green under UV irradiation using Ag/g-C₃N₄ composite

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Silver-graphite carbon nitride (Ag/g-C₃N₄) was designed and synthesized through a simple and cost effective green chemical route. Structural and morphological features of the Ag/g-C₃N₄ photocatalyst was comprehensively characterized by Fourier transform infra-red (FT-IR), X-ray diffraction (XRD), high-resolution transmission microscopy (HR-TEM), energy dispersive X-ray spectroscopy (EDS) and X-ray photoelectron spectroscopy (XPS) and the specific surface area was calculated from Brunauer-Emmett-Teller (BET) analysis. The HR-TEM and XRD results indicate that the synthesized Ag nanoparticles, spherical like nanoparticles with an average size of ~6 nm were randomly loaded on the surface of g-C₃N₄. Graphitic carbon nitride (g-C₃N₄) is a well-known semiconductor material with a graphite-like layered structure. It has been used extensively in electrochemical water splitting and as a photocatalyst for hydrogen generation and pollutant degradation due to its band gap energy (~2.7 eV), high thermal and chemical stability, non-toxicity, easy preparation, abundance, and environmental benignity. In addition, the Ag/g-C₃N₄ nanocomposites exhibited 2.5 times higher photocatalytic activity than pristine g-C₃N₄ for the degradation of malachite green (MG) dye under UV-light irradiation.

Recent Publications

1. Vattikuti S V P (2018) Tiny MoO₃ nanocrystals self-assembled on folded molybdenum disulfide nanosheets via a hydrothermal method for supercapacitor. *Materials Research Letters* 6:432.
2. Nagajyothi P C (2018) Green synthesis, characterization and anticancer activity of yttrium oxide nanoparticles. *Materials Letters* 5: 58–62.
3. Vattikuti S V P (2018) Hydrothermally synthesized Na₂Ti₃O₇ nanotube-V₂O₅ heterostructures with improved visible photocatalytic degradation and hydrogen evolution-Its photocorrosion suppression. *Journal of Alloys and Compounds* 740:574–586.
4. Nagajyothi P C (2017) Enhanced photocatalytic activity of Ag/g-C₃N₄ composite. *Separation and Purification Technology* 188:228–237.
5. Pandurangan M (2017) Renal-protective and ameliorating impacts of omega-3 fatty acids against aspartame damaged MDCK cells. *BioFactors* 43:847–857.

Biography

P C Nagajyothi received her PhD in Environmental Science from SV University, India, in 2008, under the supervision of Professor T Dhamodharam. After five years of Postdoctoral Research experience at Hanyang and Dongguk University, South Korea, she joined in College of Mechanical Engineering, Yeungnam University, South Korea as International Research Professor. Her research interest is in green synthesis of metal and metal oxide nanoparticles, and their biological and photocatalytic applications.

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