National Institute of Technology Rourkela

Defence Seminar

Seminar Title	: Graphitic Carbon Nitride (g-C3N4) Based Heterostructure Matters for Photocatalytic Environmental Applications under Natural Sunlight Illumination
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Supervisor	: Prof. Aparna Mondal
Venue	: Chemistry Seminar Room (Hybrid mode)
Date and Time	: 28 Dec 2024 (4 PM)
Abstract	: This thesis addresses the growing issue of environmental pollution, particularly water contamination, caused by expanding industries. It focuses on visible light-responsive photocatalysis using semiconductors, specifically graphitic carbon nitride (g-C_3N_4), as a sustainable solution for environmental remediation. The study explores the synthesis and photocatalytic use of g-C_3N_4-based composite materials, combined with other semiconductors to form binary hybrid heterostructures. These heterostructures enhance photoelectrochemical properties and optical absorption, making them highly effective for degrading pollutants when activated by visible light, such as sunlight. The research focuses on developing several binary hybrid nanocatalysts: g-C_3N_4/ZrO_2 (CZ) composed of spherical zirconium oxide nanoparticles on g-C_3N_4, g-C_3N_4/CuS (CS) featuring hexagonal copper sulfide nanoplates, and g-C_3N_4/BiOBr (BCN) with round-shaped bismuth oxy bromide nanoplates. These nanocatalysts are designed for efficient photocatalytic degradation of persistent organic and inorganic contaminants such as Cr(VI), methyl orange, methylene blue, and rhodamine B in aqueous solutions under sunlight exposure. In summary, the research on g-C_3N_4-based nanohybrid matters in this dissertation opens promising avenues for efficient nanocatalysis in the field of photocatalytic environmental remediation technologies. These advancements contribute in developing sustainable solutions to mitigate water pollution, ensuring a cleaner and healthier environment for the future.