

Photocatalysis for improved H₂ production, organic compound reduction and toxic pollutant degradation under visible/solar light irradiation

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This seminar presentation deals with the fabrication and application of various prospective nanostructure of different size and shape involving plasmonic metal (Au/Ag/Cu)-loaded TiO₂, graphene oxide (GO) coated Fe(III)@SrTiO₃, reduced graphene oxide rGO@Ag-TiO₂, C₃N₄ passivated Au-TiO₂, bimetallic core-shell Pd@Ni and Cu@Zn deposited TiO₂, Au/Ag/Cu-loaded CdS and ZnS etc. photocatalysts. These hybrid nanocomposites (1-12) have been found to exhibit superior photocatalytic activity for H₂ evolution from water splitting and dehydrogenation of waste alcohols, Nitro-aromatic/organic reduction and removal of toxic environmental pollutants in waste water under UV/Visible/Solar irradiation. The detailed surface structural morphology and physicochemical properties of these nanomaterials evaluated by different instrumental techniques namely, XRD, Raman, FE-SEM, HR-TEM, XPS, BET, EDS-mapping, PL, and DRS will be discussed along with the quantitative analysis using GC, GC-MS, HPLC and HRMS etc. for several photocatalytic reactions. The beneficial influence of metal co-catalyst deposition, graphene oxide loading, effect of core and shell composition, and the nature of semiconductor materials on the enhanced photocatalytic activity for H₂ generation from water splitting/dehydrogenation waste alcohols, nitro-aromatic reduction and organic pollutant degradation will be presented in this talk.

References

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Biography: Dr. Bonamali Pal obtained his Masters degree in Physical Chemistry from Central University of Viswa Bharati, West Bengal, India in 1991 and did PhD from Indian Institute of Technology, Bombay, India 1998. He is currently a Professor (2014-2023) and worked as a Head (March, 2014 - May, 2017) in the Department of Chemistry and Biochemistry Thapar University Patiala (Pb) India. He received prestigious Monbusho Fellowship, Kyushu Institute of Technology, Kyushu, Japan and worked as a research Scientist for 6 years in the Catalysis Research Centre, Hokkaido University, and Japan Science and Technology Agency. He presented his research work in different international and national conferences in Japan, Malaysia, Switzerland, Dubai and India. His research interest includes synthesis, characterization of noble metals and semiconductors nanoparticles of different shapes and sizes for various photocatalytic applications under UV/solar irradiation. He guided 18 Ph.D. students (currently 09 PhD students) and 55 Master thesis/students, published 168 SCI research papers in the most reputed journals, granted 03 Japanese patents and got many sponsored research projects (Rs. 3.0 Cores) from DST, DBT, CSIR and UGC Government of India. He reviewed international research project submitted to natural science foundation of Austria and Spain and 9 PhD thesis from different reputed Universities of India.

