National Institute of Technology Rourkela

Synopsis Seminar

Seminar Title	: Functionalized g-C3N4 quantum dots based fluorescent sensors for detection of toxic metal ions
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Supervisor	: Prof. Garudadhwaj Hota
Venue	: Seminar Room Dept. of Chemistry
Date and Time	: 27 May 2024 (11,00 AM)
Abstract	: Exposure to toxic metal ions, such as mercury, lead, and cadmium, poses severe threats to human health. These metals have been widely investigated, and their impacts on human health are periodically assessed. Therefore, the development of fluorescent sensors with exquisite sensitivity and selectivity for the detection of these metal ions has become increasingly important these days. Quantum dots, free of heavy metals with excellent photoluminescence properties are mostly anticipated in the field of fluorescence sensing. Among different quantum dots, the g-C_3N_4 quantum dots (g-C_3N_4 QDs) are the most effective for sensing applications in terms of their significant quantum confinement and edge effects, blue emission, high quantum yield, resistance against photobleaching and high ionic strength. The main focus of this doctoral research work is to design functionalized g-C_3N_4 QDs for sensing toxic metal ions in aqueous phase. In relevance to this approach, the primary focus of this doctoral research is centered on the design of low cost g-C_3N_4 QDs-based functional materials for the purpose of sensing toxic metal ions. Our goal is to dope g-C_3N_4 QDs framework with heteroatoms or to functionalize their surface with organic ligands so as to detect target metal ions. We have designed different nanosensors, named silver nanoparticles embedded sulfur doped graphitic carbon nitride quantum dots (Ag-S-gCN QDs), L-Glutathione (GSH) modified g-C_3N_4 QDs (GSH@g-C_3N_4 QDs), and L-Cysteine functionalized boron doped gC_3N_4 QDs (L-Cys/B-gC_3N_4 QDs) for detection of highly toxic Hg^{2+}, Pb^{2+}, and Cd^{2+} ions, respectively in aqueous medium.