



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study : Ph.D.

Thesis Title: Synthesis, Characterization and Applications of Aqua-Stable Metal-Organic Frameworks and their Composites for the Environmental Remediation and Bio-Molecule Sensing

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SHORT ABSTRACT

This thesis investigates the development of aqua-stable Metal-Organic Frameworks (MOFs) designed for potential applications in environmental remediation and bio-molecule detection. It delves deeply into the intricate structures of various functionalized Zr(IV) metal ion-containing MOFs. The functionality of these MOFs was deliberately integrated into their linkers, enabling their practical application in fluorescence-based detection and quantification of bioactive compounds and organo-toxins. Furthermore, the research explores synthetic methodologies aimed at producing hydrophobic MOFs specifically tailored for the selective and efficient adsorption of oil spills from oil-water mixtures. The findings presented in this thesis are critical for advancing sustainable environmental practices and for improving the accurate diagnosis of diseases associated with the uncontrolled release of specific biomolecules.