National Institute of Technology Rourkela

Defence Seminar

Seminar Title	: Enhancement of Fluorescence Emission Intensity in the Derivatives of tri(biphenyl-4-yl)amine by Breaking of Aggregates via Solid-state Grinding with Various Metal Salts: Chemosensing and Light-Emitting Diode Applications.
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Venue	: Seminar Hall (Department of Chemistry) Hybride mode: google meet link: https://meet.google.com/dns-fnhs-vxy
Date and Time	: 10 Dec 2024 (04:00 PM)
Abstract	: Solid-state fluorescent materials are in massive demand due to their potential applications in LEDs, sensors, recognition, and imaging. However, the molecular aggregations in the solid state limit their usage in practical applications. Manipulation in the molecular aggregates has become essential in order to achieve the highest fluorescence emission from fluorescent materials. Although several techniques have been developed for manipulating molecular aggregation, in this report, simple solid-state grinding with the inorganic metal salt technique has been adapted to break the supramolecular interactions. Here, we synthesized tri(biphenyl-4-yl)amine derivatives and characterized them with different spectroscopic methods. The synthesized tri(biphenyl-4-yl)amine derivatives exhibited J-aggregates in the solid state compared to the solution form, disrupted through simple solid-state grinding with the different inorganic metal salts, which enhanced fluorescence emission. The DFT calculation revealed that dipole-ion interactions were the driving force for breaking the aggregation in TBA derivatives. At the same time, the micro/nanometer-sized salt crystal particles serve as templates for the molecules of TBA derivatives, and in the broad sense, the salt crystal surfaces act as a &ldquosolid-state solvent.&rdquo Further, the green emissive TBA-derivatives were investigated for electroluminescence properties, which displayed green light emission upon coating the green-emissive TBA derivative (COC1 or TBA-2HP) doped polymer film over the surface of a near-ultraviolet LED and thin layer of COC1 or TBA-2HP along with a red phosphor doped polymer on the surface of a blue LED resulted in white light emission. Moreover, the tri(biphenyl-4-yl)amine derivatives have been investigated for potential chemosensing applications.