

### Synopsis Seminar

Seminar Title	: Aggregation induced emission (AIE) based smart donor- $\pi$ -acceptor (D- $\pi$ -A) fluorophores: Design, synthesis, and their broad-spectrum applications
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Venue	: Chemistry Seminar Room
Date and Time	: 04 Jul 2025 (11.00AM)
Abstract	: Aggregation-induced emission (AIE) has emerged as a transformative photophysical phenomenon that counters traditional fluorescence quenching in the aggregated state. Unlike conventional luminophores, AIE-active materials exhibit enhanced emission upon aggregation due to restricted intramolecular motions. This unique behavior has unlocked diverse multifunctional applications across fields such as bioimaging, optoelectronics, sensors, and theranostics. Recent advances have focused on engineering AIE luminogens (AIEgens) with tailored structures to achieve tunable emission, high photostability, and biocompatibility. Owing to the importance of the AIEgens, the present research work aims at employing tetraphenylethylene (TPE) and/or triphenylethylene (TPA) as AIE active units in a simple organic framework to develop D- $\pi$ -A push-pull dipolar AIEgens, namely <b>TPASCNPy</b> , <b>TPESCNPY</b> , <b>TPESCNPY<sup>+</sup></b> , <b>PI-Ph-<i>p</i>-CH<sub>3</sub>-TPE</b> , <b>PI-Ph-TB-TPE</b> , <b>PI-Ph-<i>m</i>-CF<sub>3</sub>-TPE</b> , and <b>PI-Ph-<i>m</i>-CN-TPE</b> . In this thesis, attempts have been made to apply AIEgens for the fabrication of white light-emitting diodes and organic light emitting diodes as an alternative to rare earth materials. Special emphasis has been given to enhance the organic light-emitting diode efficiencies by proper synchronization of AIE and hybridized locally excited charge transfer core. The suitability of these synthesised molecules towards pH sensing, vapourluminescence, latent fingerprint detection, and as a fluorescent probe to the self-aggregation of micellar systems have also been explored.