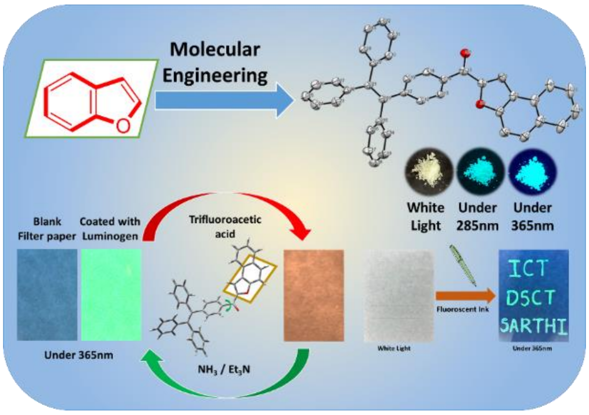
Design and Development of Tetraphenylethene Incorporated Benzofuran Scaffold As Stimuli Responsive Aggregation Induced Emissive Luminogens

Gauravi Yashwantrao, Roshani Patil, and Dr. Satyajit Saha*
Department of Speciality Chemicals Technology,
Institute of Chemical Technology, Mumbai, Matunga 400019

Abstract: Benzofuran scaffold belongs to the category of oxygen containing fused heterocycles having planar structure with diverse application in the field of dyes, pharmaceutical chemistry, fluorescent materials etc. However, such molecules are non-emissive in the solid state, which limits the application of this scaffold. The strong π-π interactions existing between the electron rich aromatic ring are responsible for Aggregation Caused Quenching (ACQ) effect in solid state. But emission in the solid state is a much desirable property with remarkable applications in sensing, bioimaging, biomarkers etc.[1] Emission in solid state is generally observed with molecules comprising twisted molecular structure with rotor like geometry. A series of rationally designed benzofuran derivatives by infusing -COAr in to the benzofuran scaffold were synthesized with solid-state emissive properties.[2] The synthesized molecules exhibited interesting photophysical properties along with reversible acidofluorochromism. Fluorescence ON-OFF was observed for those molecules when exposed to trifluoroacetic acid (TFA) followed by ammonia vapour allowing those molecules to be used as fluorescent security inks.



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