

Seminar

Accessing sp^3 -Rich 3D Molecular Architecture via Visible Light Energy Transfer Catalysis

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In the last decade, the ‘escape from flatland’, i.e., from 2D to 3D molecular architecture, has been highly popularised among synthetic and medicinal chemists. Introducing sp^3 -rich three-dimensionally into medicinal molecules often improves their biological activity, physicochemical qualities, and metabolic profiles. Dearomative cycloaddition reaction is a blueprint for creating sp^3 -rich 3D molecular topology from flat-aromatic compounds. However, the reaction involving the arene system is highly challenging because of the high chemical stability inherent due to aromaticity. Further, severe reactivity, selectivity, and reversibility issues make this process arduous. One such process to overcome these challenges is the photochemical approach that induces the loss of aromaticity. Herein, we describe visible-light-induced triplet-triplet energy-transfer catalysis for the dearomative *meta*- and *para*-cycloaddition reaction of feedstock naphthalene molecules with tethered alkenes and vinyl benzenes. We performed DFT studies, photoluminescence, electrochemical, UV-VIS, and triplet energy quenching studies to understand the mechanism of those cycloaddition reactions. The scope of the reaction is very broad, tolerating larger functional groups. The reaction can be scaled up to a gram scale and is also amicable for late-stage modification of various complex bioactive molecules. The research shed insight into visible light energy transfer catalysis, which is in the early stages of chemical synthesis.

Thursday, Jul 17th 2025

16:00 Hrs (Tea / Coffee 15:45 Hrs)

Auditorium, TIFRH