MONDAY

COLLOQUIUM

Redox Mediated Synthesis of Main-Group Based Open-Shell Compounds

Anukul Jana (TIFR, Hyderabad)

21 Oct 2024 (Monday) | 16:00 Hrs (Tea / Coffee 15:45 Hrs) | Venue: TIFRH Auditorium

In molecular chemistry, the redox (reduction/oxidation) processes are crucial for various synthetic transformations. At the same time, open-shell compounds (those having half-filled orbital(s)!!) are very important for various purposes, from their application in synthetic chemistry to advanced materials such as high-spin molecular systems. The molecules must contain electron-donor and/or electron-acceptor motif(s) to participate in redox reactions. Therefore, by designing judicious redox reactions, it is possible to create various classes of open-shell compounds by controlling the injection or removal of a particular number of electrons at the redox-active motif(s) and resulting in the centre(s) of an odd number of electrons(s).

In this talk, I shall discuss the effort of our research group in designing and developing convenient modular routes for synthesising compounds that contain mono-/bis-alkenes as electron-donor motifs and mono-/bis-cyclic/acyclic carbocations/iminium cations along with boranes/boryl-cations as electron-acceptor motifs, subsequently its utilisation as synthons for isolating various open-shell compounds: radicals, radical-cations, (cationic)-diradicals, radical-trications, and (cationic/heteronuclear)-diradicaloids under redox (reduction/oxidation) reaction conditions will be elaborated. Moreover, I shall discuss the pivotal role of the spin-carriers and spin-couplers in the resulting electronic situation of the open-shell molecules.

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