



**SCHOOL OF CHEMISTRY
UNIVERSITY OF HYDERABAD**



SEMINAR

Name of the Speaker	Prof. Pradip K. Chakraborty, IIT Kharagpur
Title of the Talk	Stimuli-responsive Structure-property Interplay in Fe(II)-based Spincrossover Materials: Fascinating Diversity at the Fundamental Level
Date & Time	21.08.2026 (Friday) 3 PM
Venue	Seminar Hall, SoC

ALL ARE INVITED

Date: 04/08/2026

Faculty In-charge

Abstract:

Spin-crossover (SCO) molecular materials are distinctive systems capable of undergoing reversible modifications in their spin state configuration. This phenomenon involves stimuli-responsive, composition-specific transition between two electronic states, governed by the reorganization of electrons within d-orbitals of transition metal centers. The transition occurs between the high-spin (HS) and low-spin (LS) states, corresponding to the maximum and minimum number of unpaired electrons, respectively. At molecular level, the short-range switching is primarily influenced by ligand-field tunability, degree of covalency, and non-covalent interactions such as π - π stacking and hydrogen bonding. On the other hand, long-range switchability is dictated by electron-phonon coupling, which is mediated through elastic interactions within the crystal lattice, leading to cooperative effects. These effects emerge as a superposition of short- and long-range interactions. Since cooperativity plays a critical role in SCO networks, understanding and controlling it-particularly in terms of hysteresis width, transition completeness, and multistep behavior- is of paramount importance. Therefore, fundamentally and from an application standpoint, it is essential to explore the stimuli-responsive structural diversity of the compositionally-tuned SCO coordination networks and their connection with the variation in SCO/magnetic properties with a focus on understanding the origin of cooperative effects (if any) for the designing of functional materials useful for the construction of sensors, spintronic and memory devices. In this talk, I will present a detailed discussion on the stimuli-responsive structures and the associated magnetic and photophysical behaviors of selected Fe(II)-based SCO coordination networks.