Abstract

Multi-metallic complexes with N,O-donor reduced Schiff base ligands: Synthesis, structure, self-assembly and catalytic activity

Submitted by: SAIKAT MIRDYA ***Index Number No. 37/19/chem./26.***

N,O donor Schiff bases have been used as ligands to synthesize transition and non transition metal complexes since long. Their enduring popularity is certainly related with their easy synthetic routes, stability, and versatile complexing ability. Many such complexes were found to have interesting application in catalysis, magnetism and opto-electronic devices. Schiff bases can easily be reduced with a suitable reducing agent. Complexes of these reduced Schiff bases are also known to have different applications. However, compared with the huge reports on the complexes of first row transition metals with Schiff bases, their reduced counter parts are relatively less explored. In the present work, several di- and poly-nuclear complexes have been synthesized with reduced analogous of several salicylidene Schiff base ligands. The complexes were characterized by elemental analysis, spectral study and single crystal X-ray diffraction analysis. The supramolecular interactions in their solid state structure have also been analyzed energetically using DFT calculations and several computational tools. The existence of interesting tetrel bonding has been explored in detail. The noncovalent interactions have been studied further using density functional theory (DFT) calculations. Some of the complexes have also been found to be efficient photo-catalyst for the degradation of methylene blue.

Saikat Mirdya

(Signature of candidate & date)

13.06.2023

Shouvik Chattopadhyay

(Signature of supervisor & date)

Dr. Shouvik Chattopadhyay
Professor
Department of Chemistry
Jadavpur University
Kolkata-700032

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