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Research Proposal Seminar

3d-4f SCHIFF BASE COMPLEXES AND THEIR APPLICATIONS

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Guide: Dr. Kartik Chandra Mondal

3:00 PM (CB 310)

Polynuclear coordination complexes based on 3d/4f metals and polydentate organic ligands have attracted increasing interest because of their fascinating electronic and optical properties leading to the applications in various fields including conventional catalysis,¹ imaging,² molecular magnetism³ and luminescence.⁴ Schiff base ligands with their multiple coordination sites and flexibility, serve better to accommodate both 3d and 4f metal ions. Research on Molecular magnetic or single molecule magnetic materials (SMM) have received great attention over the past decades for their high potential applications in high-density information storage device, quantum computer, spintronics. With the combination of high spin ground state 3d and highly anisotropic 4f metal centers, 3d-4f coordination complexes have the potential to become superior SMM. Wide range of 3d-4f heterometallic clusters were synthesized exhibiting diverse molecular structures with interesting topologies and various interesting magnetic properties.⁵ Apart from magnetic applications considerable interest in the chemistry of luminescent lanthanide materials and catalysis is on rise due to potential applications in biology, medicine organic synthesis and materials science. However, challenges remain in the rational design and controlling topologies in the synthesis of 3d-4f complexes to enhance their applications. In this seminar, I will discuss the differences of bulk and molecular magnetism, synthetic strategies to control topology and 3d-4f complexes of different topologies. Further, their magnetic, luminescent and catalytic properties will be discussed along with some preliminary results on magnetic and catalytic applications.

References

- (1) Maayan, G.; Christou, G. *Inorg. Chem.* **2011**, *50*, 7015.
- (2) Amoroso, A. J.; Pope, S. J. A. *Chem. Soc. Rev.* **2015**, *44*, 4723.
- (3) Chandrasekhar, V; Pandian, B. M; Azhakar, R; Vittal, J. J; Cle'rac, R. *Inorg. Chem.* **2007**, *46*, 5140.
- (4) Yang, X; Jones, R. A; Huang, S. *Coord. Chem. Rev.* **2014**, *273-274*, 63.
- (5) Liu, K; Shi, W; Cheng P. *Coord. Chem. Rev.* **2015**, *289-290*, 74.



Signature of the Guide



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