

A JOURNEY TO EXPLORE SOME UNPRECEDENTED COORDINATION CHEMISTRY OF ZINC(II)

Debasis Das

Department of Chemistry, University of Calcutta, 92 A. P. C. Road, Kolkata-700 009, India

e-mail: dasdebasis2001@yahoo.com

Zinc which was regarded as a boring and featureless element has become of focal interest to the coordination chemists in recent years mainly for its amazing bio-compatibility. Our continuous effort to unveil the mechanistic pathways of zinc containing metalloenzymes via model study has given us an opportunity to find out several new findings in coordination chemistry of zinc(II). The purpose of this lecture is to share some of those findings. For the first time, we have noticed that, in the presence of zinc(II), the condensation reaction between 2,6-diformyl-4-methylphenol and N-(hydroxyalkyl)ethylenediamine does not produce any “end-off” compartmental ligand as could be expected, but rather, a very unique cyclization process takes place with the generation of an 18-membered macrocycle having oxazolidine (in complexes **1** and **3**) or oxazine (in **2**) side rings.^[1] One interesting aspect of those cyclization is the genesis of four chiral centers in each case. The study of bio-activity of those complexes reveals that all have promising anticancer activity where complex **3** shows the highest efficiency. In an another work we have observed that both di- and mono nuclear Zn^{II} complexes of some selected Schiff-base ligands as a model of catechol oxidase, the activity mainly confined to dicopper(II) complexes and thereby we have established the radical pathway as reasonable alternative.^[2] Interestingly, in an another work it has been explored how very small difference in the ligating backbone of the two tridentate Schiff-base ligands may affect the structural features and properties of the resulting Zn^{II} complexes by exploiting the versatile coordinating property of coligands acetate, thiocyanate, dicyanamide, and azide.^[3,4] Unusual Mannich base ligand synthesis followed by their uncommon reaction with Zn(II) and investigation of their bio-relevant catalytic activities are also a fascinating part of this lecture.^[5,6]

References

1) Banerjee, A.; Ganguli, S.; Chattopadhyay, T.; Banu, K. S.; Patra, A.; Bhattacharaya, S.; Zangrando, E.; Das, D. *Inorg. Chem.* **2009**, *48*, 8695.

- 2) Guha, A.; Chattopadhyay, T.; Paul, N. D.; Mukherjee, M.; Goswami, S.; Mondal, T. K.; Zangrando, E.; Das, D. *Inorg. Chem.* **2012**, *51*, 8750.
- 3) Chakraborty, P.; Adhikary, J.; Samanta, S.; Escudero, D.; Castro, A.C.; Swart, M.; Ghosh, S.; Bauza, A.; Frontera, A.; Zangrando, E.; Das, D., *Cryst. Growth Des.* **2014**, *14*, 4111.
- 4) Chakraborty, P.; Adhikary, J.; Sanyal, R.; Khan, A.; Manna, K.; Dey, S.; Zangrando, E.; Bauza, A.; Frontera, A.; Das, D., *Inorg. Chim. Acta* **2014**, *421*, 364.
- 5) Sanyal, R.; Guha, A.; Ghosh, T.; Mondal, T. K.; Zangrando, E.; Das, D., *Inorg. Chem.* **2014**, *53*, 85.
- 6) Sanyal, R.; Zhang, X.; Kundu, P.; Chattopadhyay, T.; Zhao, C.; Mautner, M. A.; Das, D., *Inorg. Chem.* **2015**, *54*, 2315.