INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title: Role of Kinetic Lability on the Recognition of Achiral and Chiral Amines on the Scaffold of Co(III)/Fe(III) Complexes Through Non-Covalent Interactions

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SHORT ABSTRACT

In this thesis, we investigated guest (achiral, chiral ammonium ions, and secondary metal cations) induced structural changes of chiral octahedral metal complexes of l-tryptophan derived ligand. We synthesized a kinetically inert anionic chiral Co(III) complex having multiple H-bond capable sites and used it to bind a series of achiral and chiral ammonium cations. The anionic Co(III) complex adopts different shapes to recognize different achiral and chiral ammonium ions. The change in shape, at least in one case, involves the reorganization of coordination bonds despite the inert nature of the complex. Structural reorganization of the complexes could be monitored in solution using 1D and 2D NMR spectroscopy. Recognition of enantiomer was also observed when racemic amino alcohols were used. To understand the role of kinetic inertness in these recognitions and transformations, we synthesized a labile but structurally analogous Fe(III) complex and repeated some of the transformations. In some cases, the Fe(III) complex adopts a very different shape where ligand coordination on the Fe(III) center has changed completely. The thesis contains detailed investigations and our conclusions.