INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title: Recognition of anionic guests with benzimidazole and benzothiazole functionalized acyclic hosts: solution phase and solid state studies

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SHORT ABSTRACT

Concisely, the thesis entitled “Recognition of anionic guests with benzimidazole and benzothiazole functionalised acyclic hosts: solution phase and solid state studies” portrays a sequential plethora of systematic development in the field of chemosensing as well as solid state study. The thesis is divided into five chapters based on the results of experimental work performed during the research period. Chapter 1 provides general introduction and comprehensive literature survey in context with the thesis title. The citation of the previously reported work in this field and general idea for the thesis objective is described nicely. It gives a concise overview regarding background of the proposed work as well as literature survey of “anion coordination chemistry”. Chapter 2 encompasses the comprehensive information about the various materials used in the synthesis of the receptors/probes along with specifics of the synthetic procedures, binding studies, minutes of crystallization, specifications of the analytical instruments used for the characterization of the synthesized compounds. In the chapter 3, a novel non-symmetric tripodal receptor (**L_1**) decorated with two symmetric arms containing benzimidazole moiety along with an amide linked π acidic nitrophenyl moiety and its anion binding studies in solid as well as solution phase. Chapter 4 chapter deals with another rationally designed non-symmetric tripodal receptor (**L_2**), which has been reported as a fluorescent chemosensor for the fluoride ions in solution phase as well as sulfate anion binding receptor in solid state. The highlight of the chapter 5 is the comparative anion sensing abilities of three analogous benzothiazole based Schiff bases (**L_3/ L_4/ L_5**). In chapter 3 and 4, introduction of novel non-symmetric tripodal receptors has enabled us to explore the anion recognition chemistry with new directions in receptor designing and the recognition events through

efficacious anion binding in both solid as well as solution phase, which the typical tripodal receptors have been missing. In the core of each Schiff base design in chapter 5, the imine bonds join the specific chromophore and the 2-hydrazineylbenzothiazole unit for extending conjugation. Our works on distinctions of anions with analogous chemical properties viz. F^- in presence of OAc^- or vice versa have been achieved by tuning smart designs of receptors, which in turn, would help in distinguishing such anions in a physiological medium as well.