



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study : Ph.D.

Thesis Title: ***Self-assemblies of Cobalt (II) and Zinc (II) Complexes of Amide, Urea-Based Ligands and Their Ions, Molecular Recognitions***

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SHORT ABSTRACT

This thesis described the self-assembling and physicochemical aspects of a series of pyridyl group containing amide, and urea derivatives as well as their salts, cobalt (II) and zinc (II) complexes. The structural features of fluorescent zinc(II) nitro-benzoate complexes having auxiliary ligands of positional isomers of pyridyl amides, each having differences in coordination geometry, nuclearity, and composition, were shown. Aggregation-induced emission of these zinc(II) complexes in solid and solution states was depicted. The role of non-covalent interactions in the salts of mineral acids in the self-assemblies of pyridyl urea compounds influencing dual emissions was shown. The release of urea or salts from different composites of naphthyl-urea with calcium oxide was presented. The subtle changes in the schemes of hydrogen bonds resulting in self-assemblies of coordination polymers of zinc-terephthalate, succinate, or fumarate, each having pyridyl urea as an auxiliary ligand, were discussed. The changes in the supramolecular assembling of the coordination polymers were implicated in the adsorptions of dyes. Anion-guided synthesis of *cis*-isomer and *trans*-isomer of a pyridyl urea-based cobalt(II) nalidixate complex and the mechanism of *cis-trans* conversion was described with data obtained from experimental studies and theoretical energy optimizations. Aggregation- induced helical

chirality of the *cis*-isomer in solution showing positive and negative Cotton effects were presented.

