INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title: Dual Fluorescence of a Few Organic Molecules: Intramolecular Charge Transfer and Intramolecular Proton Transfer

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SHORT ABSTRACT

The thesis reports the investigation of a few organic molecules those undergo intramolecular charge transfer (ICT) or intramolecular proton transfer. The introduction to the thesis is presented first, followed by details of the materials, methods and instrumentation. The mechanism for the dual emission of 2-(4'-*N*,*N*-dimethylaminophenyl)imidazo[4,5-c]pyridine (DMAPIP-c) is investigated and found that the relay of proton by solvent molecules induces the twisted ICT (TICT) emission in DMAPIP-c. The spectral characteristics of neutral and monocationic (MC) of *N*,*N*-dimethylaminophenyl)imidazopyridines (DMAPIPs) in aqueous cucurbit-7-uril (CB-7) are also studied. Both the molecules form a 1:1 complex with CB-7 and pyridoimidzole rings are present inside the cavity. Both double proton transfer and the relay proton transfer induced TICT emissions are also observed in CB-7. The effect of CB-7 on the monocationic equilibrium of DMAPIPs are also explored. All three MCs of DMAPIPs present in the ground state in CB-7. However, the monocationic equilibrium shifts in CB-7 medium. An almost exclusive excited state intramolecular proton transfer (ESIPT) is reported. In the next chapter, an exclusive aggregation induced enhanced tautomer emission of a newly synthesized ESIPT molecule is described. The of studies on 2-(4'-amino-2'-hydroxyphenyl)-1H-imidazo-[4,5-c]pyridine revealed that when intramolecular hydrogen bond is introduced, it suppresses the

TICT emission even in protic solvents and only tautomer emission is observed along with normal emission.