INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
PhD-17 SHORT ABSTRACT OF THESIS

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Thesis Title: Smart Applications of Tunable Colours from Stimuli-Sensitive Molecules

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Thesis Submitted to the Academic Division	:	Chemistry
Date of completion of Thesis Viva-Voce Exam	:	20.02.2026
Key words for description of Thesis Work	:	Colours, Stimuli-Responsive, Non-equilibrium, Information Encryption

SHORT ABSTRACT

The thesis entitled "Smart Applications of Tunable Colours from Stimuli-Sensitive Molecules" explores techniques and approaches for implementing stimuli-responsive colours obtained from organic dyes, emissive molecules and luminescent assemblies in designing modern applications with unconventional properties. **Chapter 1** introduces the importance of stimuli-responsive chemical colours in building smart optical materials, control over stimuli and the progress accomplished so far in the field of advanced optical materials. **Chapter 2** demonstrates the application of a host-guest-based green phosphorescent probe for the qualitative and quantitative detection of clinically important bioanalytes, Heparin and Protamine. **Chapter 3** deals with time-encoded information encryption achieved with a broad-spectrum transitory emission produced from the temporal regulation of a pH-responsive supramolecular assembly. **Chapter 4** focuses on emulating bioluminescent lights through the temporal control of a pH-dependent assembly with multi-colour emissions and subsequent applications in time-locked encryptions. **Chapter 5** highlights the significance of parallel time domains in time-controlled information encryption strategies, accomplished through the temporal variation in colours attained with multi-stimuli-responsive common organic dyes. The underlying works in the thesis aim at developing systems that show stimulus-responsive changes in chromatic properties and explain how those features can be implemented in modern and advanced applications relying on colour transitions.