



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI  
SHORT ABSTRACT OF THESIS

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Programme of Study : Ph.D.

Thesis Title : Development of New Self-Assembly Driven Chemo-Sensors for Various Important Analytes

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Key words for description of Thesis Work : Supramolecular Chemo-Sensors

**SHORT ABSTRACT**

The thesis "**Development of New Self-Assembly Driven Chemo-Sensors for Various Important Analytes**" deals with the development of new fluorescent chemo-sensors based on the aggregation dis-aggregation phenomenon.

**Chapter 1** is a brief introduction of aggregation dis-aggregation based chemo-sensors with up to date literature review.

**Chapter 2** describes the efficacy of a viologen perylenediimide (**PDI**) conjugate towards base in solution phase and solid crystalline phase. Also, this bola-amphiphilic viologen-**PDI** conjugate showed solvatochromism with generation of distinguishable colors in different solvents.

**Chapter 3** deals with the tandem sensing of  $\text{Pd}^{2+}$  and  $\text{CN}^-$  ions utilizing a perylenediimide-peptide conjugate based on aggregation dis-aggregation phenomenon.

**Chapter 4** describes the sensing of histone, a DNA binding protein. A series of naphthalenediimide (**NDI**) derivatives are subjected to DNA binding studies for the sensing of histone. The strong binding affinity of histone toward DNA lead to release of the **NDI** molecules from the **NDI**-DNA complex

resulting in enhancement of the fluorescence intensity and used as an efficient “turn-on” sensor for histone.

**Chapter 5** describes the sensing of picric acid (PA), a well-known explosive based on a pyrene based short peptide gelator. The gelator molecule shows its efficacy and selectivity towards PA in solution phase, gel phase as well as in paper based systems with high sensitivity. In addition to that, the test strips can detect PA vapors in sub ppb level and are effective for detection of PA contamination in ground water.

