INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study	:	Ph.D.

Thesis Title: **Supramolecular Assembly of Amino Acid/Peptide Based Small Molecules and Some Applications**

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SHORT ABSTRACT

The thesis **"Supramolecular Assembly of Amino Acid/Peptide Based Small Molecules and Some Applications"** deals with the understanding of mechanistic details of supramolecular assembly process in amino acid/peptide based molecules to create different soft materials and their utilization.

Chapter 1 is a brief introduction of peptide based soft materials created by supramolecular assembly and applications with up to date literature review.

Chapter 2 describes the rational design, synthesis, and hydrogelation of a peptide amphiphile. The gelation mechanism is studied in detail to understand the supramolecular assembly.

Chapter 3 deals with the formation of a tryptophan based redox active supramolecular polymer using 'ternary' complexation of CB[8]. The formation and reversible transformation of hetero polymer to homo- polymer and vice versa are studied.

Chapter 4 describes the self-assembly of a symmetric conjugate of perylenediimide and PhePhe peptide in different solvent compositions. The kinetic and thermodynamic control over the self-aggregation of the conjugate in different environment is revealed. The formation mechanism of helical nano-fibers and nano-rings in these solvent systems is studied in detail.

Chapter 5 is about applying the soft-materials prepared during these studies. The nano-fibers obatined from the hydrogelator described in Chapter 2 is used as a template to prepare different types of silica nanotubes. The nano-structures obtained from perylenediimide-PhePhe conjugate are tested for their semi-conducting properties in order to utilize them in organic-electronics.