

CHM5642 Supramolecular Chemistry

Course Description:

This course provides an overview of fundamental concepts and essential applications of supramolecular chemistry. This course covers two parts. The first part focuses on the fundamental concepts, including a brief history of supramolecular chemistry, characterization of supramolecular systems, noncovalent interactions and ion binding, templated synthesis and self-assembly as well as inclusion complexes. The second part focuses on the application of supramolecular chemistry, discussing selected supramolecular systems and introducing important examples of applying supramolecular chemistry in materials sciences and biology.

Prerequisite:

Organic Chemistry for undergraduates

Main Course Outline (for reference only):

1. What Is Supramolecular Chemistry: History and Concepts
2. Noncovalent interactions and Ion Binding
 - (1) Noncovalent interactions
 - (2) Cation Binding
 - (3) Anion Binding
3. Synthesis of Supramolecules: Templated Synthesis and Self-Assembly
4. Inclusion Complexes: Cavitates and Clathrates
5. Selected Supramolecular Systems
 - (1) Surfactants and Interfacial Self-Assemblies
 - (2) Liquid Crystals
6. Selected Applications of Supramolecular Chemistry
 - (1) Molecular Switches, Sensors and Machines
 - (2) Learning from and Mimicking Biological Systems
 - (3) Crystal Engineering and Its Applications