

## Supramolecular and Transition Metal Coordination Chemistry

The area of supramolecular chemistry involves non-covalent chemical interactions between molecular and/or ionic species. Such interactions are, for example, behind the complex, beautiful structure of DNA, often referred to as the double helix. In this case the major “glues” holding the helix together are hydrogen bonds, although other supramolecular attractions derive from electrostatic, pi-pi interactions, hydrophobic effects, among others. Research in our group has primarily involved an examination of supramolecular interactions related to the host-guest chemistry of anions. Such an area is of interest due to the global prevalence of anions such as halides, fluoride, chloride, and others; oxo anions, nitrate, phosphate, sulfate, perchlorate, and the very deleterious arsenate (a major problem in ground waters in developing countries). More complex anions such as dicarboxylates and other anions prevalent in biological systems are also appropriate for supramolecular targeting. In our group we design “hosts” or ligands to sequester and bind various of these ions selectively. Students joining the group would learn methods of host (organic) synthesis, characterization (particularly mass spectrometry, nuclear magnetic resonance spectroscopy, and X-ray crystallography), and techniques involved in NMR titrations to determine binding constants. Examples of anion complexes published in this group are shown below. On the left an encapsulated hydrated fluoride ion and on the right an encapsulated terephthalate ion with water escorts on the side.

