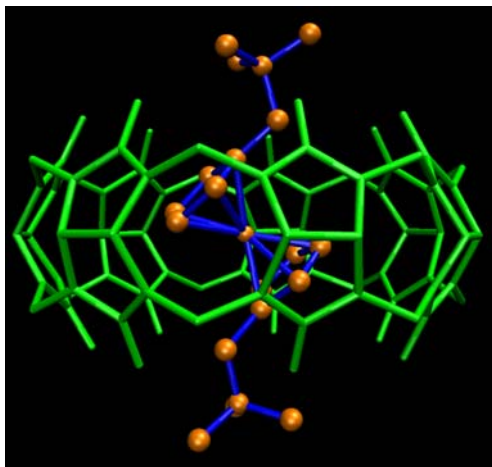


Can Supramolecular Chemistry Rival Biology?

Angel E. Kaifer

*Department of Chemistry and Center for Supramolecular Science,
University of Miami, Coral Gables, FL 33124-0431
akaifer@miami.edu*

The cucurbit[n]urils (CBn) constitute a promising family of synthetic molecular receptors that are easily prepared by condensation of cheap chemicals, glycoluril and formaldehyde, in acidic media. Their molecular 'container' structures afford a well-defined, barrel-like internal cavity that guest molecules can access through two identical portals lined with carbonyl groups.



CBn hosts form stable inclusion complexes with a growing variety of guest molecules, but the most stable complexes are with hydrophobic cations. In this lecture, I will focus on the binding interactions between simple ferrocene derivatives and the heptameric host, CB7. In the most striking examples, complexes with equilibrium association constants (K) in the range of 10^{12} - 10^{15} M^{-1} are formed. These highly efficient,

picomolar-to-femtomolar binding affinities rival those found in biological systems, i.e., in the complexes formed by avidin-biotin pairs. I will address the origin of this unusually high binding affinity and describe our current attempts to control it on demand.