INORGANIC SEMINAR

Peptide Frameworks as Microcosms of Proteins

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The chemistry that enables protein function remains to be fully elucidated. To better understand how proteins developed their chemistry, we examine the hypothesized ancestors of proteins: peptide assemblies. Our long-term goal is to answer the question “can peptide assemblies behave and evolve like proteins?” If simple peptides recapitulate the basic properties of proteins, then not only do we learn how complexity is generated bottom-up, but it also enables easy-to-make bio-inspired materials for many applications. Our main focuses are on (1) how peptide assemblies acquire new structures and (2) using the assemblies to design functional and model systems to understand proteins and metalloproteins. Towards this goal, we have developed porous frameworks composed of peptides, which are highly crystalline and evolvable scaffolds that enable the routine use of X-ray crystallography to elucidate structure-function relationships. In this talk, I will describe how peptide framework topologies evolve in complexity, as well as their applications in catalysis, bioorganic, and bioinorganic chemistry.

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