ARCHITECTURAL COMPLEXITY WITHIN THE SECONDARY COORDINATION SPHERE

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The function of metal complexes is linked directly to the local environment (that is, their secondary coordination sphere) in which they are housed. It is now apparent that the placement of compounds within different local environments produces changes in key properties that affect reactivity. It is thus possible to understand function, and dysfunction, of a metal complex within the context of properties associated with their secondary coordination sphere, regardless of system type or length-scale. This presentation will describe architectural features within the secondary coordination sphere that are instrumental in regulating function at a metal center. Protein systems will be briefly described to illustrate the complexity of molecular structures necessary to promote function, specifically the importance of non-covalent interactions. Synthetic compounds will be discussed to demonstrate attempts to emulate some of these architectural features, with emphasis on the challenges involved in designing molecular systems that incorporate non-covalent interactions within their secondary coordination spheres. Methods to develop artificial metalloproteins will also be described that includes an approach in which synthetic complexes are confined at specific locations within protein hosts. Data will be presented to suggest this approach can produce constructs whereby control of both the primary and secondary coordination spheres is achieved.