Complex supramolecular systems via subcomponent self-assembly

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The use of chemical self-assembly as a synthetic technique can simplify materials preparation by shifting intellectual effort away from designing molecules, and towards the design of *chemical systems* that are capable of self-assembling in such a way as to express desired properties and functions. Below are shown the subcomponent precursors and structures of three of products that can form functional constituents of these systems (Figure 1).

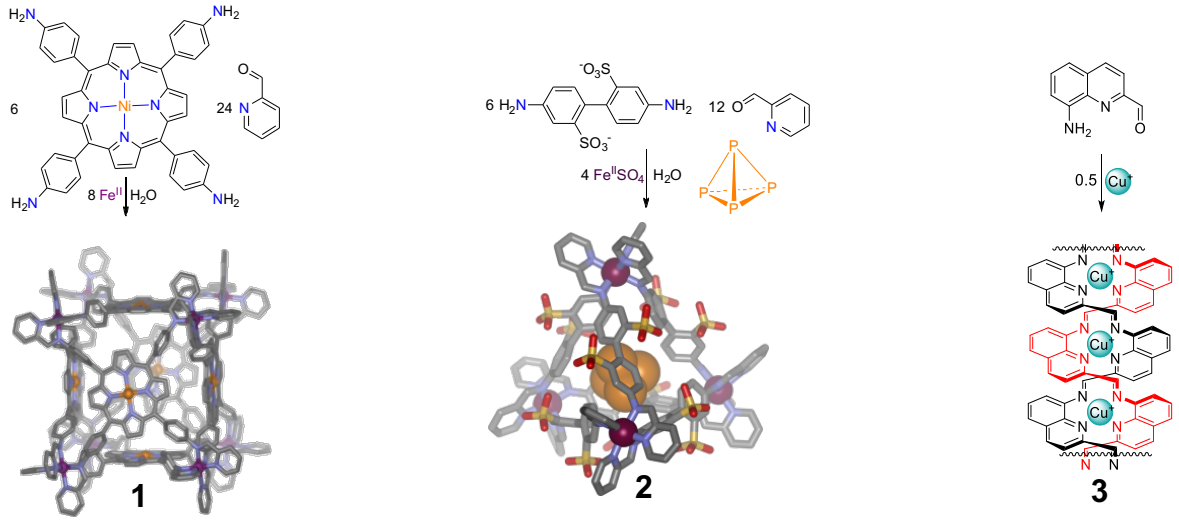

Figure 1. *Fe$^{II}_8$ cubic cage* ***1****,[1] Fe$^{II}_4$ tetrahedral cage* ***2****,[2] and electroluminescent Cu$^{I}_n$ double-helical polymer* ***3***[3]

Current challenges involve inducing multiple structures to form in parallel,[4] such that they may act in concert to achieve a catalytic goal.[5] Our techniques thus provide a point of entry into the emerging field of *systems chemistry*.[6] Functional systems that we have recently developed include a fuel-controlled self-assembly process[7] and a series of cages that can phase-segregate[8] and transit between liquid phases.[9]

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