Supramolecular Chemistry of Carbon Nanostructures: Concave-convex Interactions

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The readily available electron donor exTTF molecule has proved its efficiency for the design of unprecedented receptors for fullerenes and other carbon nanoforms. In this regard, custom-made tweezers and, particularly, macrocyclic receptors for fullerenes are proving a valuable alternative to achieve the affinity and selectivity required to meet goals such as the selective extraction of higher fullerenes, their chiral resolution or the self-assembly of functional molecular materials.

In this presentation some of the important breakthroughs based on electroactive TTF-type derivatives as supramolecular receptors for fullerenes and carbon nanotubes (CNTs) will be highlighted. Bowl and belt-shaped fullerene receptors based on this concave-convex complementarity principle will be presented. Other related and more sofisticated supramolecular assemblies formed by macrocycles endowed with exTTF concave geometry and covex fullerene surfaces will be discussed.[1] This will open the question if the concave-convex interactions really exists.

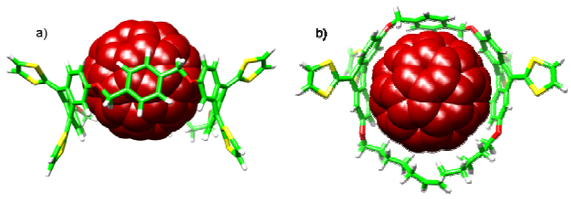
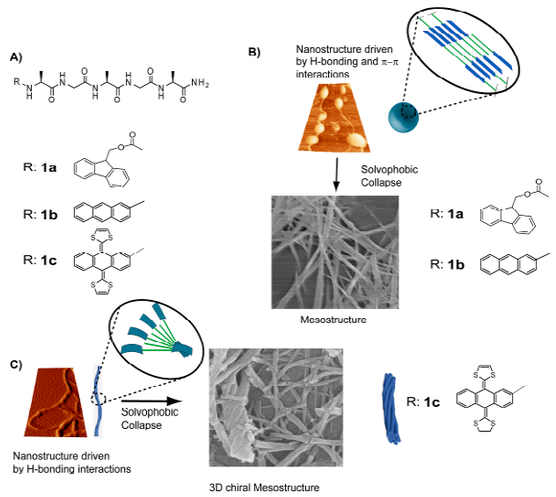


Figure. Side view (a) and top view (b) of the exTTFmacrocycle·C_{60} associate.

The recognition motives have also been applied to carbon nanotubes with the aim of modifying their electronic properties,[2] as well as for the hierarchical organization of nano and mesoscopic 3D helical fibers.[3]



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