Chiroptical Sensing and Chiral Nanostructures from Binaphthyl-Based Molecular Modules

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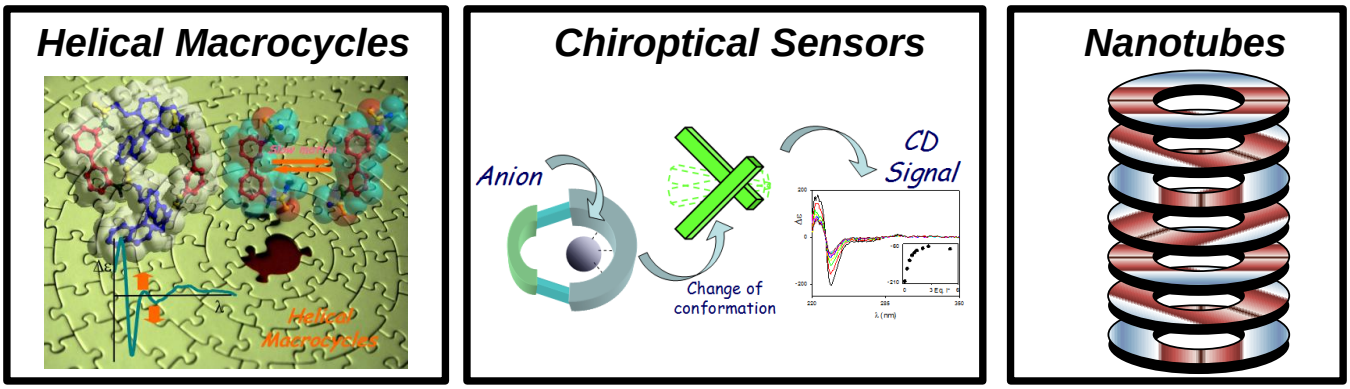
The presentation will illustrate our use of binaphthyl-based molecular modules, acting as a "robust" source of chirality, for the construction of chiroptical sensors and of chiral nanostructures, with potential applications in the areas of chiral separation and sensing, molecular confinement and directional transport, and electrooptic materials.[1] We have synthesized and characterized a series of novel homochiral macrocycles, incorporating 2 or 3 enantiopure binaphthyl moieties, and investigated their properties in terms of helical molecular conformation, using a combination of Circular Dichroism and NMR spectroscopies.[2] Selected systems have demonstrated effective recognition and sensing ability towards anionic, cationic, and neutral species (such as C_{60}) in organic and/or aqueous solvent systems. The detection is in some instances truly chiroptical, since an ample CD response exist upon binding even without significant variations of the UV/Vis absorbance; this response can be directly related to conformational changes in the dihedral angle of the binaphthyl units.[3-4] The formation of organic nanotubes, through chiral macrocycles in which suitable functionalities, disposed within the macrocyclic backbone, induce helical supramolecular assembly and nanoscale chiral organization, will also be discussed.[5]



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