

Application of intermolecular interactions on catalysis, dynamic combinatorial chemistry, and fuels for molecular machines

1) In the frame of Dynamic Combinatorial Chemistry (DCC) reversible reactions are used to generate libraries of compounds able to interconvert under equilibrium conditions. With the addition of proper templates we try to amplify the production of selected receptors for the templates themselves, studying the operation mechanisms of such amplification.

2) In the field of supramolecular catalysis we study the efficiency of biomimetic complexes of Fe and Mn in the oxidation of non-activated C-H bonds. We try to obtain artificial systems with regio- and stereo-selective features, which are lacking in the case of the strong oxidant commonly used to carry out these reactions.

3) Eventually, part of our research work is focused on the development of molecular fuels which can be used as energy source for the motions of molecular machines. In particular we are studying decarboxylative fuels for molecular machines based on the acid/base reaction.

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