

Assembling Molecules, Nano-objects, and Living Systems

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The creation of nano/microstructures based on molecular components possessing defined functionalities is a very fascinating field at the cross point of different disciplines. Our effort, in this talk, focuses on the assembly of luminescent molecules to form crystalline or amorphous, rigid or soft materials. I will describe the use of iridium complexes able to assemble in porous non-covalent linked crystalline materials hosting molecules. The framework possesses photo- and electroactive components which are able to monitor the inclusion of the guest [1]. The use of other crystalline porous scaffolds, zeolites L, which are transparent, stiff, nanocontainers will be illustrated. The most important characteristic of such material is that their structure is made of hundreds of parallel aligned unidimensional channels, which can be filled with molecular dyes or other responsive molecules and their tunable sizes and shapes. The selective and spatial resolved functionalization of these nanocontainers can lead to multifunctional systems [2]. Furthermore the selective functionalization of the channel entrances, lead to the self-assembling of the zeolites, and the assembly process can be extended to living organism such as bacteria [3]. The use of appropriate light responsive components in combination with the smallest zeolites (30 nm) has been very successfully applied for the labeling targeting and killing of antibiotic resistant bacteria [4]. Finally the assembly of the nano-containers on different surfaces will be discussed showing that nano-patterning can lead to very interesting optical and surface properties[5].

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