

Molecules: Nanosacle Functional Units

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Molecules are the smallest objects still providing an almost infinite structural diversity, making them to promising nanoscale building blocks which are designed and assembled by synthetic chemistry. Furthermore, the experimental tools to investigate these objects even on the single molecule level have been developed by experimental physicists providing an outstanding basis for the inspiring and fruitful cooperation between scientists from these two disciplines.

Integrated in electronic circuits the ability of single molecules to modulate the transport current is investigated. In particular the synthesis of series of compounds of well defined structural variations followed by their transport investigations improved the comprehension of the structure/property relationship considerably. First examples of single molecule devises have been developed successfully like e.g. a single molecule rectifier or electrochemically triggered single molecule switches. Current investigations are geared towards new switching concepts and memory devices.

New approaches to nanoscale objects and functional materials based the organization ability of tailor-made molecules will be presented. While multidentate ligands display promising features as templates for rather monodisperse metal nanoparticles, the 2d self assembly of molecules is investigated as tool to preorganize reactants