

# Supramolecular Nanomaterials: Novel Design and Unorthodox Approaches

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Nanomaterials have attracted considerable interest and have been recently investigated in a number of research groups. Nanosized building blocks have been found to be important and versatile synthons both in nanoscience and supramolecular chemistry. The use of these building blocks in conjunction with other molecules such as organic macrocycles and hydrophilic polymers allows designing and developing novel concepts for the synthesis of supramolecular nanomaterials using unorthodox approaches. Such novel and unorthodox design concepts are presented and highlighted both as synthetic approaches and in the context of their applications.

The building blocks can stem from different types of molecule classes including synthetic and semi-synthetic molecules as well as biopolymers. Typical examples are the families of cyclodextrins, calixarenes, and cucurbiturils as well as hydrophilic polyesters, peptides and DNA for macromolecular synthons. Nanosized building blocks include spherical clusters such as different fullerenes with an emphasis on fullerene and also carbon nanotubes. As a further example for the nanoencapsulation of fullerenes the supramolecular interaction with peptides has been studied. A survey of fundamental designs for novel nanomaterials is presented and discussed in view of their potential and perspectives on the basis of recent research examples.

Several model systems with carbon nanotubes have been also studied and examples of interaction products based on different types of reactions and syntheses are given. The nanosized supramolecular conjugates presented are based on the use of single- and multi-walled carbon nanotubes for the supramolecular constructs. The novel nanomaterials are expected to have an application potential in many areas such as the biomedical and electronic areas.

## REFERENCES

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