[60]-FULLERENE AS CORE OF

PROGRAMMABLE MOLECULAR COMPONENTS

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The unique spheric nature of the symmetric carbon compound [60]-fullerene can be exploited as a basis for the build-up of organic compounds, which show a rigid and well defined three dimensional structure.

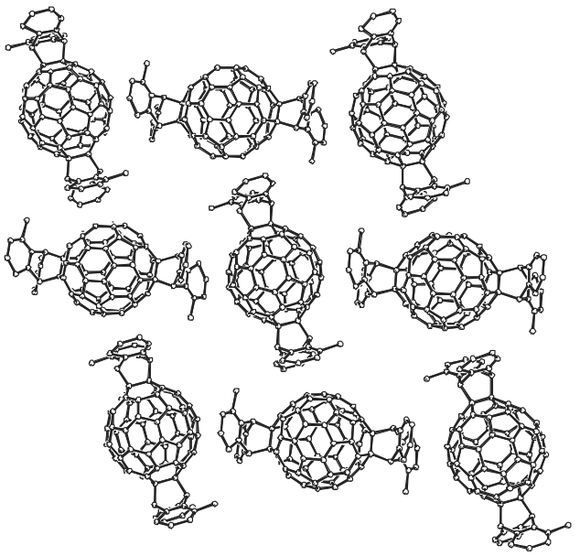

Figure 1. Molecular structure of the antipodal bisadduct of 9-methyl-anthracene with [60]-fullerene according to x-ray analysis

Derivatives of [60]-fullerene with rigid concave addends can be prepared by simple [4+2]-cycloaddition reactions with cyclic dienes in solution or in the solid state. The molecular shapes of the resulting concave and spheric moieties may be roughly complementary, leading to unusual packing in the solid state. The ensemble of the regularly structured mono-, bis-, tris-adducts and higher adducts between [60]-fullerene and anthracene and conjugated monocyclic dienes, which are accessible by simple cycloaddition reactions near room temperature, can be considered to constitute a "library of programmed" hydrocarbon building blocks. Depending upon their shape (addition pattern) these may be suitable for assembly in the solid state, in which the packing is "programmed" in one, two and three dimensions.

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