

PORPHYRINOID PLATFORMS FOR [60]-FULLERENE

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Various porphyrins have been shown to form non-covalent complexes with fullerenes in the solid state and in solution. We have investigated the synthesis and the structural properties of a series of biconcave porphyrins, which are roughly shape complementary with fullerenes and show regular packing interactions with [60]-fullerene in the solid state (1). Chiral biconcave porphyrins have also been studied as chiral shift reagents for substituted [60]-fullerene in solution of various organic solvents.

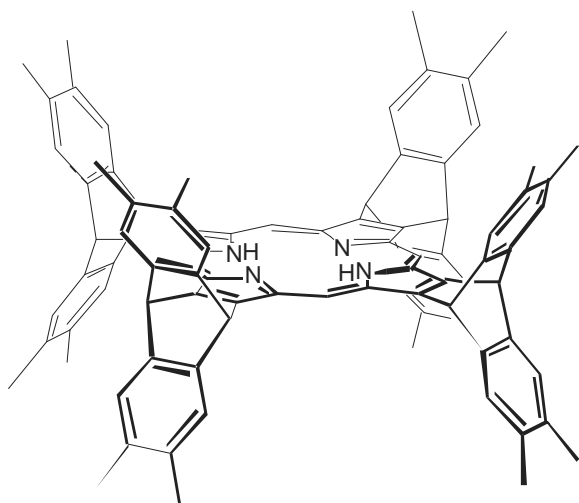


Figure 1: Model of the three-dimensional structure of a biconcave porphyrin (1)

More stringent spatial prerequisites are present in the molecular cavities generated by so called calix-porphyrins, which provide a basis for size selective association of the porphyrins with spherical compounds, such as fullerenes and other spherical (hydro-) carbon molecules (2). Again, chiral versions of the calix porphyrins provide a means of detecting weak but specific inter-molecular interactions in solution by NMR-spectroscopy.

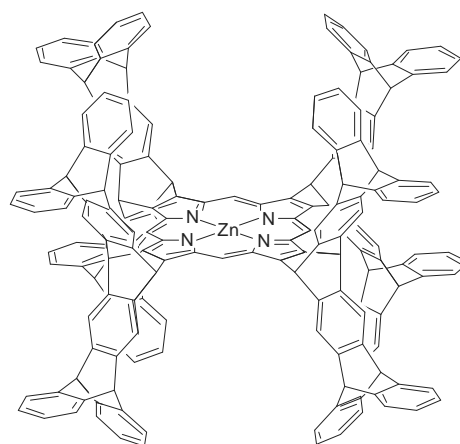


Figure 2: Model of the three-dimensional structure of the Zn^{II}-complex of a calix porphyrin (2)

Fullereno-porphyrins, in which fullerene moieties are fixed to the porphyrins core by covalent bonds, represent nanometer sized molecules with intriguing structural and electronic properties. We have worked-out a systematic synthetic approach to fullereno-porphyrins with a symmetric arrangement of fullerene and porphyrins moieties.

ACKNOWLEDGEMENTS

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