

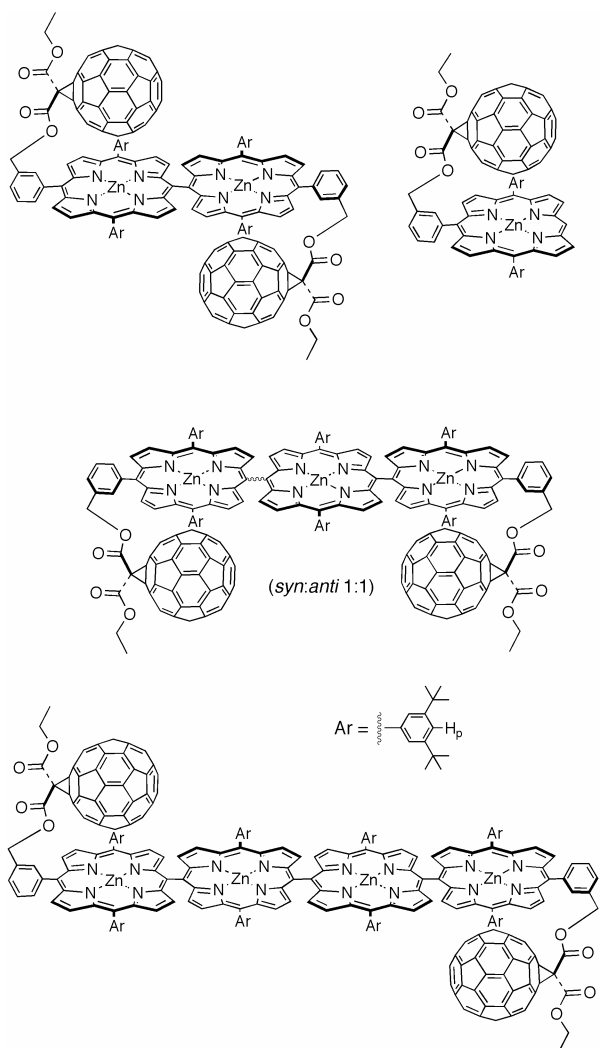
New Fullerene Architectures and their Potential Applications in Molecule-based Devices.

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C₆₀ is one of the most widely used electron acceptor components in molecular dyads and much effort has been put into development of porphyrin-C₆₀ conjugates. Two main types of directly connected multiporphyrin arrays have been reported lately which include *meso,meso*-linked (Figure) and triply fused porphyrins.[1] The porphyrins linked by a single bond adopt a nearly orthogonal conformation that tends to minimize the electronic interactions between the neighboring chromophores while triply fused porphyrins stay in conjugation and display a planar tape-shaped structure. Both systems show fascinating properties such as rapid transmission of singlet excitation along the array.



Here, we describe the new family of fullerene-porphyrin conjugates (Figure), consisting of linear *meso,meso*-linked oligoporphyrin scaffolds with two

fullerene moieties attached to the outer porphyrins by short linkers.[2] Distinct conformational effects were observed as a result of strong fullerene-porphyrin interactions, which also lead to efficient quenching of the luminescence in all arrays. Variable-temperature ¹H NMR spectroscopy was applied to quantify the tangential fullerene-porphyrin interactions. By monitoring the coalescence of *b*- and aromatic protons, we evaluated the ground state interaction between the two chromophores to be 12 kJ/mol. The characteristic porphyrin fluorescence bands in all systems are *c.a.* 100 times weaker compared to the emission bands of non-covalently linked fullerene porphyrin dyads.

We are now conducting a quantitative investigation of the photophysical properties of these hybrid systems and exploring their potential in the construction of new non-linear diodes.

[1] A. Tsuda, A. Osuka, *Science* **2001**, 293, 79.

[2] D. Bonifazi, F. Diederich, *Chem. Comm.* **2002**, 2178.