Fully conjugated [4]chrysaorene. Redox-coupled anion binding in a tetraradicaloid macrocycle.

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Streszczenie

[4]Chrysaorene, a fully conjugated carbocyclic coronoid, is shown to be a low-bandgap π-conjugated system with a distinct open-shell character. The system shows good chemical stability and can be oxidized to well-defined radical cation and dication states. The cavity of [4]chrysaorene acts as an anion receptor toward halide ions with a particular selectivity toward iodides (K_a = 207 ± 6 M^{-1}). The interplay between anion binding and redox chemistry is demonstrated using a ^{1}H NMR analysis in solution. In particular, a well-resolved, paramagnetically shifted spectrum of the [4]chrysaorene radical cation is observed, providing evidence for the inner binding of the iodide. The radical cation–iodide adduct can be generated in thin solid films of [4] chrysaorene by simple exposure to diiodine vapor.

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