SUPRAMOLECULAR ROTOR-STATOR SYSTEMS LEADING TO A MULTI-POSITION ROTARY DEVICE

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In recent years, attempts to build artificial functional devices from single molecules were strongly in the focus of nanoscience. The majority of these resulted in large thermodynamic ensembles of functional systems within fluids or the 3D bulk. Nevertheless, for technological applications, a simple way to produce vast amounts of supramolecular devices in an ordered and easily accessible structure, like a two-dimensional lattice, is needed.

Herein we report on highly complex supramolecular host-guest systems, that allow the guest to rotate. These are fabricated on an atomically clean surface following a "bottom-up" approach. Two distinctively different synthetic pathways to form porous host networks are demonstrated: On the one hand a functionalised porphryin [1] and on the other hand a thermally activated perylene compound [2] form extended porous layers. Within one network, the formed cavities are identical by their atomic arrangement and their characteristics, but the two networks differ in the pore size and their borders. Therefore, they serve as specific hosts for molecular guests of different types. These guests can rotate inside their cells and this rotation can be studied in its thermodynamic activation. The systems reveal the basis for the architecture of addressable multi-position rotary switching systems [3, 4].

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