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An Addressable Supramolecular Rotary Switch Featuring Distinguishable Positions Embedded In A Two-Dimensional Porphyrin-Based Porous Network MEIKE STOEHR, NIKOLAI WINTJES, HANNES SPILLMANN, ANDREAS KIEBELE, SERPIL BOZ, University of Basel, Switzerland, THOMAS JUNG, Paul-Scherrer-Institute, Switzerland, FUYONG CHENG, DAVIDE BONIFAZI, FRANCOIS DIEDERICH, ETH Zuerich, Switzerland — In recent years, the attempts to build artificial functional devices from single molecules by the "bottom-up" approach were strongly in the focus of surface nanoscience. First experiments with molecules manually arranged by the STM tip gave first hints on the powerful possibilities of such a device. Nevertheless, a simple way to produce supramolecular devices parallel in vast amounts has never been shown before. Herein, we report on a highly complex supramolecular device that reminds of a mechanical rotary switch. It is fabricated on a Cu(111) surface following the "bottom-up" approach. Self-assembly of a specially designed porphyrin molecule leads to the formation of porous networks featuring chiral cavities which serve as molecular stators for multi-state molecular rotors. By STM, this rotational behavior was analyzed in detail while the energy barrier for rotation was estimated to be 0.28 eV.

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