Electronic Supplementary Information

Height dependent molecular trapping in stacked cyclic porphyrin nanorings

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Sample Preparation and Electrospray Deposition

Porphyrin nanorings c-P12 and c-P24 with octyloxy- sidechains were synthesised and purified as reported recently [M. C. O'Sullivan, et al., Nature 2011, 469, 72 and D. V. Kondratuk, et al., Angew. Chem. Int. Ed. 2012, 51, 6696]. A solution containing the dissolved nanorings was prepared with a concentration of 100 µg/mL in a methanol:toluene mixture (1:3 by volume). The solution was passed at a flow rate of ~10 µL/min through a stainless steel emitter held at ~1.8 kV under atmospheric conditions. The highly directional jet of droplets then enters the vacuum system via a narrow capillary tube, and then passes through differentially pumped chambers before impinging on the gold substrate. A system provided commercially by Molecularspray is used for these experiments. During the deposition the pressure in the preparation chamber rises to the high 10^{-6} mbar range. C_{60} (supplied commercially by Sigma Aldrich) is deposited from a Knudsen cell at 1 nm/min.

The Au(111) on mica sample (thickness 300 nm; supplied commercially by Georg Albert Physical-vapour deposition) was cleaned before deposition by Ar-sputtering for 30 min at 0.8 keV and 10^{-5} mbar Ar-pressure, followed by annealing at 400 °C for 1 hour using a piece of highly doped silicon under the gold/mica sample as a heater. The sputter-anneal-cycle is repeated until the herringbone reconstruction is clearly observed in images acquired using a scanning tunnelling microscope (STM). STM images were acquired at room temperature using electrochemically etched tungsten tips in constant current mode.