SUPPORTING INFORMATION FOR
Alkoxylated dehydrobenzo[12]annulene on Au(111): From single molecules to quantum dot molecular networks†

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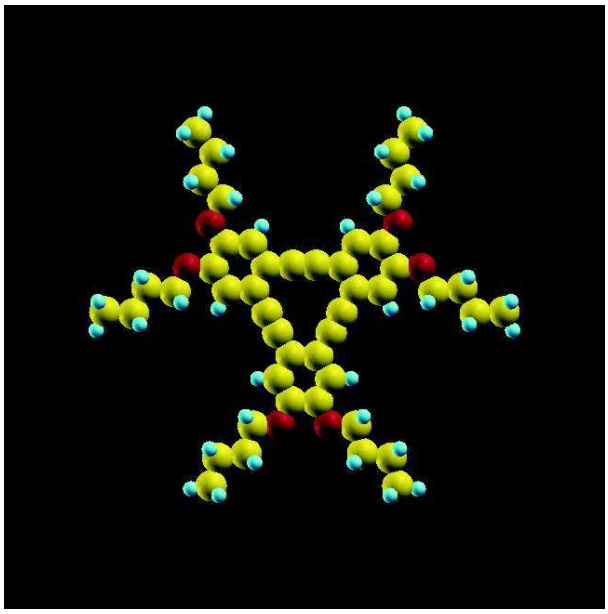

Fig. 1 Chemical model structure of DBA-OC_4. The DBA molecule consists of a triangular core with three benzene rings that, in case of the derived DBA-OC_4, each have two butoxy groups. Carbon, oxygen and hydrogen atoms are colored yellow, red and blue, respectively.

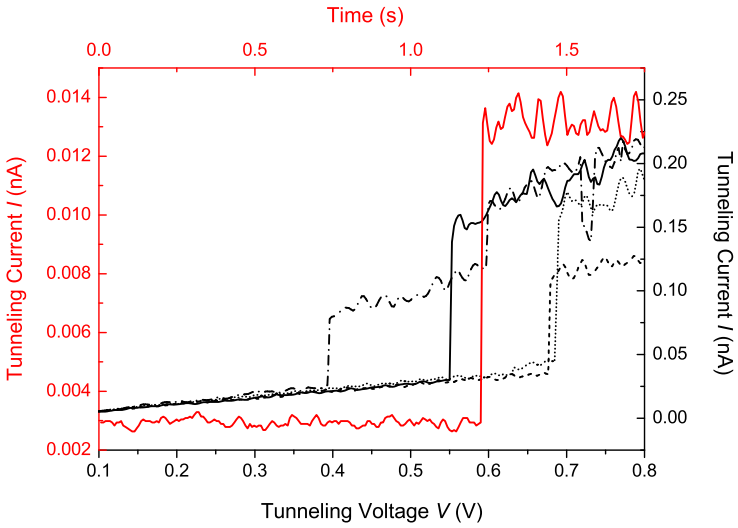

Fig. 2 STS spectra during molecule manipulation. (right vertical axis) *I*-*V* measurements of single DBA-OC_4 molecules on Au(111) that reveal a sudden jump (or sometimes two successive jumps, as is the case for the molecule represented by the dash-dot line)) in the tunneling current. Such jumps are accompanied by a reorientation of the molecule as observed in STM topographies [see Fig. 1 (b) in the manuscript]. (left vertical axis) Molecule reorientation can also be achieved by applying a (sufficiently high) constant voltage to the molecule. A jump in the time-resolved recorded current is accompanied by a reorientation of the molecule. The applied voltage for this spectrum is 1.0 V.

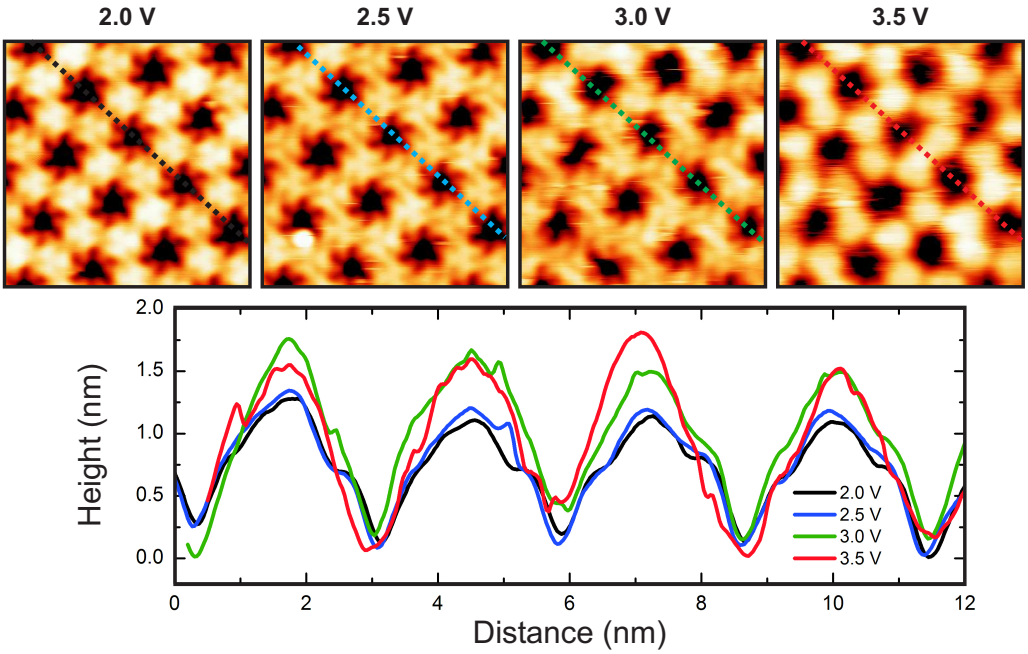

Fig. 3 Voltage-dependent STM topographies and height profiles. (top) Series of STM topographies of a DBA-OC_4 nanoporous network on Au(111) recorded at the indicated positive sample voltages (empty states regime). The appearance of the molecules changes in the 2.5 to 3.5 V range. $I = 0.01\,\mathrm{nA}$ for all images. Image sizes are $10 \times 10\,\mathrm{nm}^2$. (bottom) Voltage-dependent height profiles taken along the lines indicated in the corresponding topographies, revealing an increase of the molecule height in the 2.5 to 3.5 V range. This voltage-dependent behavior may be explained by orbital-mediated tunneling and points to the existence of the lowest unoccupied molecular orbital (LUMO) around 3.0 V.

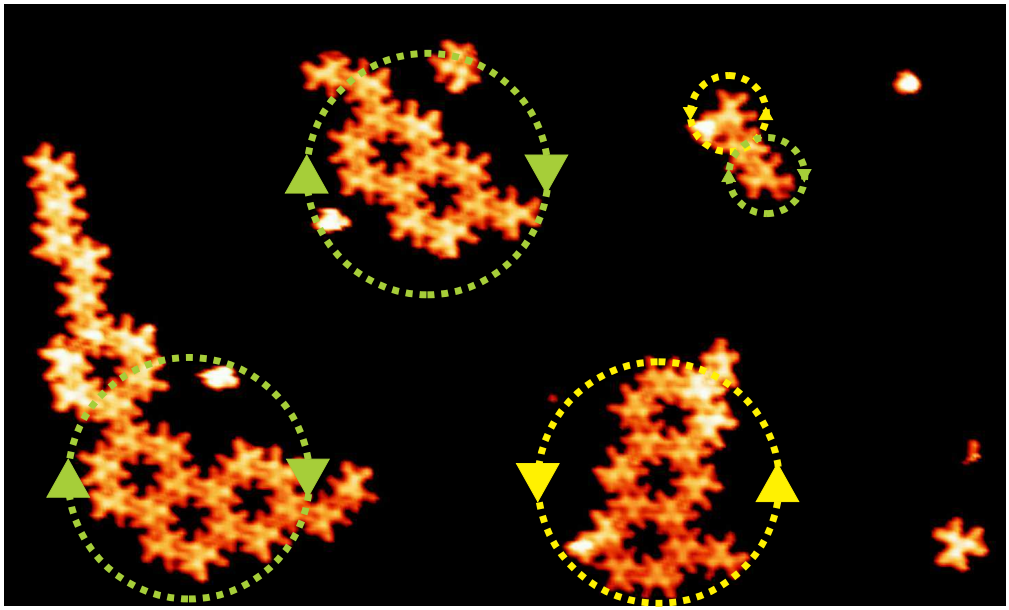

Fig. 4 Clockwise and counterclockwise chirality. STM topography of small DBA-OC_4 nanoporous networks with clockwise (green dotted circles) and counterclockwise (yellow dotted circles) chirality. Image color height scale was adjusted to optimally resolve the chirality of the networks. Image size is $44 \times 27\,\mathrm{nm}^2$. $V = +0.30\,\mathrm{V}$ and $I = 0.01\,\mathrm{nA}$.

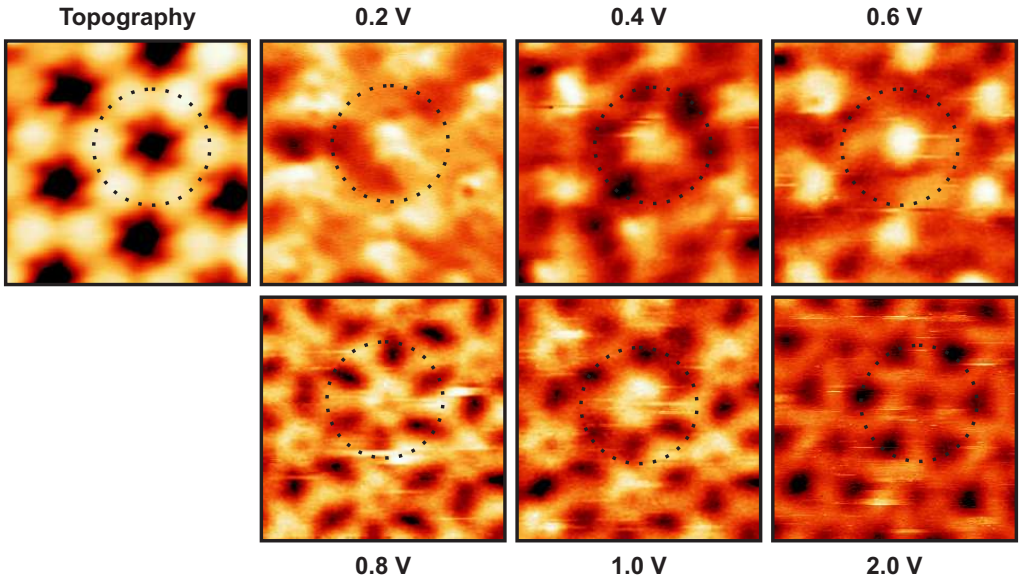

Fig. 5 Additional dI/dV maps of nanopores. STM topography of a DBA-OC_4 nanoporous network on Au(111) ($V = +0.20$ V and $I = 0.25$ nA), after annealing to about 460 K for about 90 minutes, and a series of corresponding constant-current dI/dV maps at the indicated sample voltages ($I = 0.25$ nA). Image sizes are $7 \times 7\,\mathrm{nm}^2$. A dotted circle enclosing one pore is added to each of the images as a guide for the eye. At low voltages, the highest intensity is observed in the center of the pores. At voltages around 0.8 V a ring of higher intensity is observed in the pores, with a local minimum at the center of the pore. These features are related to confinement of surface state electrons in the pores. At higher voltages, no further electronic features can be resolved inside the pores.