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Covalent assembly of molecular building blocks by "on-surface-synthesis" LEONHARD GRILL, Fritz-Haber-Institut, LEIF LAFFERENTZ, CHRISTIAN BOMBIS, Free University Berlin, Germany, MATTHEW DYER, MATS PERSSON, University of Liverpool, England, MAIKE PETERS, HAO YU, STEFAN HECHT, Humboldt University Berlin, Germany — A key challenge in the field of molecular electronics is the bottom-up construction of stable molecular networks with pre-defined topology and shape, whereas covalent bonds are desired due to stability and charge transport requirements. We have developed the method of "on-surface-synthesis," which allows the formation of covalent bonds by controlling the synthetic process directly on the surface. This technique has been used successfully for the controlled formation of covalently bound networks of porphyrin molecules on a gold surface, which were then characterized by low temperature scanning tunnelling microscopy (STM). The covalent character of the intermolecular bonds has been proven by manipulation and spectroscopy and is in agreement with calculations. We demonstrate that the dimensions and shape of these nanostructures can be precisely engineered, because the resulting nanostructures directly reflect the chemical structure of the individual building blocks, which makes this method highly interesting for functional molecules. Very recently, we have deposited ultrathin NaCl films on the metallic surface in order to achieve the interesting hybrid configuration of molecular wires on insulating films.

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