Uni-directional rotation of molecular motors on Cu(111) — Monika Schied[1], Deborah Prezzi[2], Dongdong Liu[3], Peter Jacobson[1], Elisa Molinari[2], James M. Tour[3], and Leonhard Grill[1] — [1]Department of Physical Chemistry, University of Graz, Austria — [2]Nanoscience Institute of CNR, S3 Center, Modena, Italy — [3]Department of Chemistry, Rice University, USA

Artificial molecular motors that convert external energy into controlled motion have seen great developments in the last decades [1]. While many studies exist in solution, little is known how such functional molecules behave on a surface. However, such a solid support can be advantageous as it offers fixed points of reference as well as confinement in two dimensions, making it easier to study the directionality of their motion.

We have studied single molecules with a so-called Feringa motor [2,3] on a Cu(111) surface by low-temperature scanning tunnelling microscopy (STM). It was found that rotations of individual molecules can be induced over rather long distances by voltage pulses with the STM tip. Importantly, these rotations show high directionality (clockwise or anticlockwise), which will be discussed in view of their specific chemical structure and adsorption.

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