Exploring structural and electronic properties of helical molecules on surfaces.

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Molecules with helical structure fascinate chemists for many years due to their nonplanar structure, which introduces inherently chirality and it exhibits interesting optical and electronic properties. We will present two different studies of helicene molecules on metal surfaces to explore: i) chirality transfer driven by on-surface reaction and ii) their mechanical response to an external field. In the first case, we will demonstrate that transfer chirality from a homochiral helical precursor to enantiofacially adsorbed prochiral products through a cascade of stereoconservative on-surface reactions is possible [1]. Detailed molecular structure of intermediates and final products of the chemical reactions, including their chirality, are identified by means of high-resolution SPM images supported by extensive theoretical DFT-based analysis. In the second case, we will report simultaneous tunneling current and force through helicene molecules deposited on Ag(111) surface. We will show that simultaneous AFM/STM measurements together with DFT calculations reveals strong piezoelectric effect detected on a single molecule on metal surface.

[1] O. Stetsovych et al, , *Nature Chemistry* 10.1038/nchem.2662 (2016).