

Self-Assembly and Two-Dimensional Spontaneous Resolution of Cyano-Functionalized [7]Helicenes on Cu(111)

T. Ivas¹ A. Shchyrba¹ M. Stöhr² S. Boz¹ M. Schär³ M. T. Nguyen⁴
D. Passerone⁴ F. Diederich³ T. A. Jung¹

¹University of Basel

²University of Groningen

³ETH Zürich

⁴EMPA, Swiss Federal Laboratories for Material Science and Technology

Supramolecular recognition of the chiral molecules in two dimensions is expected to occur more readily due the symmetry breaking induced by the surface, which enhance the chiral interactions[1,2]. The spontaneous resolution of racemic compounds into separate enantiomeric assemblies serves as an indicator for the enantioselective intermolecular and molecule substrate interactions. For the first time we provide the evidence of spontaneous chiral resolution of a helicene on the Cu (111) surface due the enantioselective intermolecular interactions [3]. Racemic 6,13-dicyano[7]helicene forms fully segregated domains of pure enantiomers (2D conglomerate) on Cu(111). The propensity of the system to optimize intermolecular CN–HC(Ar) hydrogen bonding as well as CN–CN dipolar interactions translates into chiral recognition with preferential assembly of homochiral molecules. In addition to the spontaneous resolution in 2D layers, a discussion of the effect of chirality on the nucleation and formation of helicene chains shall be presented.

[1] R. Fasel, M. Parschau, K.H. Ernst, *Nature* **439**, 449 (2006).

[2] L. Perez-Garcia, D.B. Amabilino, *Chem. Soc. Rev.* **31**, 342 (2002).

[3] M. Stöhr et al., *Angew.Chem.Int.Ed.Engl.* **50**, 9982 (2011).