

Abstract Submitted
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Structure Formation and Transition Mechanism in Two-Dimensional Molecular Chiral Phases¹ YE-LIANG WANG, BING YANG, NAN JIANG, HUAN-YAO CUN, SHI-XUAN DU, Institute of Physics, Chinese Academy of Sciences, Beijing100190, China, YUE WANG, Jilin University, Changchun 130023, China, KARL-HEINZ ENRST, Empa, CH-8600 Dubendorf, Switzerland, HONG-JUN GAO, Institute of Physics, Chinese Academy of Sciences, Beijing100190, China — The self-assemble behavior of prochiral species, QA16C molecules, on a Au(111) surface and the induced chirality by 2D confinement on solid surfaces as well as its chiral transferring process will be presented in this presentation. Initial stages of a chiral phase transition in the monolayer of QA16C molecules on the Au(111) surface were investigated by scanning tunneling microscopy (STM) at submolecular resolution. The prochiral molecules form a homochiral lamella phase at low coverages upon adsorption. A transition to a racemate lattice is observed with increasing coverage. Enantiomers of a homochiral lamella line become specifically substituted by opposite enantiomers such that a heterochiral structure evolves. To explain this phenomenon, we propose a “chiral replacement” model: enantiomers replace QA molecules in enantiopure phase, leading to racemic one. Our findings are significant for the understanding and control of chiral phase transitions in related molecular systems like liquid crystals.

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