2D supramolecular self-assembly at the liquid-solid interface by scanning tunneling microscopy

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SEMINAIRE

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Supramolecular self-assembly based on non-covalent interactions has been widely employed as an efficient strategy for controllable fabricating surface nanopatterns. Scanning tunneling microscopy (STM) allows the atomic scale characterization of two-dimensional (2D) molecular packing at room temperature and at the solid/liquid interface, which is essential to assess the intermolecular interactions. Combing STM with density functional theory (DFT), we have systematically studied the competition and cooperation of non-covalent interactions effect on the controllable fabrication of nanostructures. We demonstrated that the polar substituted group in the molecules act as the key role to determine the formation of the nanopatterns.[1] We fabricated different hydrogen-bonded chiral nanostructures by adjusting the solution concentration and solvent.[2] Recently, the competition mechanism between the formation of hydrogen bond and halogen bond in molecular self-assembly was focused due to their strength, directionality, and high selectivity. By designing the molecules, we found that the position and sort of the halogen atom had important influence in the formation of intermolecular halogen bonds.[3-5] The controllable chiral patterns were fabricated by halogen bonding. These studies will provide new insights to fabricate complex polymorphic nanostructures and understand the formation mechanism of halogen bonds.

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