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Fabrication of sophisticated two-dimensional organic nanoarchitectures thought hydrogen bond mediated molecular self assembly[1] FABIEN SILLY, CEA Saclay — Complex supramolecular two-dimensional (2D) networks are attracting considerable interest as highly ordered functional materials for applications in nanotechnology. The challenge consists in tailoring the ordering of one or more molecular species into specific architectures over an extended length scale with molecular precision. Highly organized supramolecular arrays can be obtained through self-assembly of complementary molecules which can interlock via intermolecular interactions. Molecules forming hydrogen bonds (H-bonds) are especially interesting building blocks for creating sophisticated organic architectures due to high selectivity and directionality of these bindings. We used scanning tunnelling microscopy to investigate at the atomic scale the formation of H-bonded 2D organic nanoarchitectures on surfaces. We mixed perylene derivatives having rectangular shape with melamine and DNA base having triangular and non symmetric shape respectively. We observe that molecule substituents play a key role in formation of the multicomponent H-bonded architectures. We show that the 2D self-assembly of these molecules can be tailored by adjusting the temperature and molecular ratio. We used these stimuli to successfully create numerous close-packed and porous 2D multicomponent structures.

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