Exploring Molecular Assembly at Surfaces

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The adsorption and self–assembly of organic molecules at surfaces has recently been investigated extensively, both because of the fundamental interest and for prospective applications in nanoelectronics [1,2]. Molecule–molecule and molecule–substrate interactions can be tuned by appropriate choice of substrate material and symmetry. Upon molecular adsorption, surfaces typically do not behave as static templates, but often rearrange to accommodate different molecular species [3,4]. We review recent experiments using Scanning Tunnelling Microscopy, providing new insight into fundamental properties such as molecular diffusion [5,6] and self–assembly via surface templating [7-9] and H-bonding driven by co-adsorption [10-12]. Our approach is to modify surfaces providing suitable surface cues, that may guide the assembly of adsorbates and more complicated building blocks like living cells on biomaterials [13-15]. We jokingly call this approach 'Playing Tetris at the Nanoscale' [16].

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