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The design of molecular species capable of undergoing self-organization into a well-defined structure opens the way to the spontaneous but controlled generation of highly complex chemical architectures. This molecular self-organization process is directed by the structural and conformational information encoded in the molecule and operated through intramolecular noncovalent interactions. We have previously reported that alternating pyridine-pyrimidine strands undergo such programmed molecular self-organization into helical superstructures both in solution and in the solid state.1 In this study, we examined hierarchical two-dimensional self-assembly of the helical superstructure on the surface. STM investigation of alternating pyridine-pyrimidine strand 1 possessing peripheral long alkyl chains at the 1,2,4-trichlorobenzene/graphite interface revealed a highly ordered lamellae structure (Figure 1a). A proposed model for the arrangement of 1 on the surface is shown in Figure 1b. The interdigitated alkyl chains are well adsorbed on graphite and visible in the darker moiety. The brighter moiety is attributed to the aromatic rings which should be organized into one-turn helices. The alternating arrangement of right-handed and left-handed helices allows a better slight stacking between the neighbouring aromatic rings.

Figure 1. STM image of 1 on HOPG (a) and proposed model (b).