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Single Molecules and Surface Induced Nanopattern in Ultrathin Blockcopolymer Films - Scanning Force Microscopy

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Supramolecular self-organization is a powerful tool for producing nanostructured patterns as an alternative to lithographic techniques. Block copolymers from incompatible fragments are well known for their ability to self-assemble into well-ordered periodic structures at a length scale of 10 100 nm. Besides length, composition, and the type and number of the constituent blocks, branching and chemical transformation provides a further parameter for controlling the molecular conformation and structure. In this work we describe a new approach to prepare polymeric supramolecular complexes using wedge-shaped amphiphilic molecules, which are able to self-assemble into cylindrical supramolecular structures. Scanning force microscopy on single macromolecules is demonstrated to provide a powerful tool to characterize the supramolecular complexes and structure formation in ultrathin films. The self-assembly properties of their complexes with homopolymers as well as block copolymers will be discussed.