MAR09-2008-000692

Abstract for an Invited Paper
for the MAR09 Meeting of
the American Physical Society

Patterned molecular nanostructures

KLAUS KERN, Max Planck Institute for Solid State Research and EPFL (Switzerland)

Surfaces and interfaces not only determine to a large extent the properties of small-scale materials due to their high surface-to-volume ratio, they are also an ideal platform for the design, fabrication and device integration of nanostructures. Both, top-down and bottom-up methods have been developed for the handling of matter at the molecular and atomic scale. In the present talk I will demonstrate how the remarkable progress in controlling atomic and molecular interactions at surfaces has provided the unique ability to engineer supramolecular architectures of well-defined size, shape, composition and functionality. Using noncovalent interactions as hydrogen bonding, ionic bonding and metal-ligand interactions, molecular building blocks can be rationally combined into desired functional architectures. The potential functionalities comprise molecular magnetism, novel heterogeneous catalysis, selective host-guest interactions and new concepts of nanoscale mechanics.