Field-Assisted Nanopatterning

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The fabrication of nanostructures is of great importance for the continued development of nanodevices and molecular electronics. While microfabrication techniques are relatively established, nanometer-scale fabrication methods are still under development. Because the probe tip-surface interaction is confined to the nanoscale, atomic force microscopies (AFM) are becoming increasingly important for the fabrication of nanostructures. We have developed a new AFM-based soft lithography method called Field-Assisted Nanopatterning (FAN). Using a conventional AFM, the FAN controllably patterns solid or liquid organic molecules and inorganic materials onto substrate surfaces in the air under ambient conditions and there is no need to perform a surface pre-treatment or derivatization of the probes or the substrates prior to patterning. Nearly any pattern can be produced with feature sizes that range from microns to sub-25 nm.

Fullerene on graphite

Naphthalene/fullerene on graphite

Manganese dioxide on thiol-coated Au

Magnesium oxide on ITO