

# Molecular Assembly and Self-Assembly: Molecular Nanoscience for Future Technologies

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**Abstract:** In this review the emerging science of single molecules is discussed from the perspective of nanoscale molecular functions and devices. New methods for the controlled assembly of well-defined molecular nanostructures are presented: self assembly and single molecular positioning. The observation and selective modification of conformation, electronics, and molecular mechanics of individual molecules and molecular assemblies by scanning probes are demonstrated. To complement this scientific review, some of the possible consequences and visions for future developments are discussed, as far as they derive from the presented systems. Here, the prospects of nanoscale science to stimulate technological evolution are exemplified.

**Keywords:** Conformational switch · Molecular adsorption · Molecular nanotechnology from the bottom-up · Molecular self-assembly