

Molecular Printboards

David N. Reinhoudt

*Laboratory of Supramolecular Chemistry and Technology,
MESA⁺ Research Institute for Nanotechnology, University of Twente, P.O. Box 217,
7500 AE Enschede, The Netherlands
Email: D.N.Reinhoudt@tnw.utwente.nl*

Nanotechnology is a part of the chemical domain, because the ultimate goal is to build nanostructures with precision at the molecular level. This requires the ability to manipulate and modify molecules individually level rather than in the bulk. There are many challenges for chemists and in particular for supramolecular chemistry. In our group we are studying several aspects that may contribute to the bottom-up approach to nanostructures. Firstly, we will discuss molecular printboards that can be used to confine molecules in space. These printboards are self-assembled monolayers of receptor molecules on flat services. The regular molecular assemblies offer anchoring points for (individual) molecules that are immobilized (and erased) by supramolecular host-guest interactions. Suitable different printboards are calixarenes, cavitands and cyclodextrine receptors for derivatives, immobilized on gold or glass surfaces. By force-distance spectroscopy we can analyse the forces involved between guest molecules and these receptors. Subsequently we can write or print guest molecules like dendrimers on these printboards by softlithographic techniques (microcontact printing and dip pen or nano-imprint lithography). We can also use layer-by-layer assembly processes and metal deposition in order to extend patterns to 3D-objects. By using these assembly processes we are able to fabricate electronic devices.

References:

- (1) *J. Am. Chem. Soc.* **2005**, *127*, 7594-7600.
- (2) *J. Am. Chem. Soc.* **2004**, *126*, 17050-17058.
- (3) *J. Am. Chem. Soc.* **2004**, *126*, 12266-12267.