One-Dimensional Organization of Copper Nanoparticles

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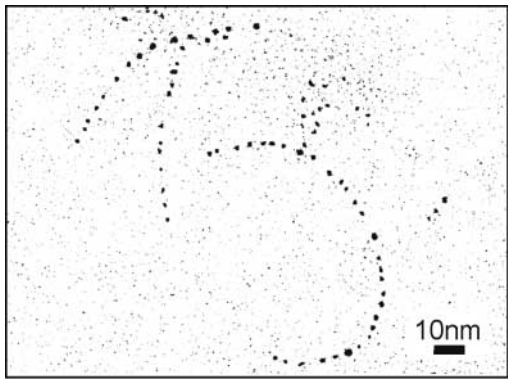
One-dimensional copper nanoparticles have been easily organized by one-step wet chemical technique. Dicarboxylic peptide bolaamphiphile coordinated with copper ions to form metal-lipid hybrid nanofibers in water. When copper ions were reduced by hydrazine using hybrid nanofiber as a template, a gray colloidal dispersion was obtained. TEM of the colloidal dispersion show the existence of fibrous assemblies and large aggregates. High-magnification TEM also clarified that nanoparticles with diameters of 1-3 nm are organized one-dimensionally at intervals of 2-5 nm.



TEM image of the colloid

A New Method to Construct Single-Molecular Arrays

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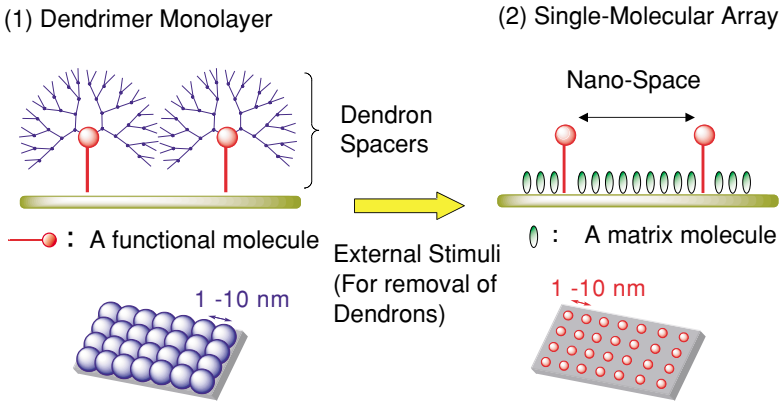
We have developed a new method to construct nanospace around a single molecule using dendrimer architectures on surfaces so that the individual molecules can function without intervention from the neighbors, like electrical cross-talk, mechanical contact and so on.

Our new method is as follows: First, a self-assembled monolayer of dendrimers having a functional molecule with a sticky group on the surface is formed on Au or Si surface. The functional molecule is focally-substituted with the dendrons through bonding labile to external stimuli such as a base, light, etc. Second, the dendron spacers are removed by external stimuli so that a single-molecule-array with a lattice spacing dependent on the size of the dendron is left on the surface.

Taking advantage of this new method, we are now developing complicated single-molecular devices.



A new method to construct single-molecular arrays using dendron spacers