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Professor Masaru Ichikawa is head of the Laboratory of Advanced Catalyst Design, Catalysis Research Center, Hokkaido University, Japan. His main interests are in the molecular design of heterogeneous catalysts using metal cluser complexes, the "ship-in-bottle" synthesis of metal/alloy clusters and nanowires in micro/mesoporous spaces and their catalysis for C1 reactions, and methane conversion to benzene and hydrogen.

Colloidal Gold/Platinum Building Blocks

There is current interest in producing large anisotropic molecular structures which can self assemble and take part in catalytic reactions. One way of doing this would be to use anisotropic nanoparticles as building blocks.

Scientists at The Pennsylvania State University have recently developed a method to produce anisotropic multirods of colloidal particles with controllable surface chemistry via spacial self assembled monolayers (SAMs) (B. R. Martin, D. J. Dermody, B. D. Reiss, M. Fang, L. A. Lyon, M. J. Natan and T. E. Mallouk, *Adv. Mater.*, 1999, **11**, (12), 1021–1025). Striped nanorods of Au/Pt and Au/Pt/Au colloidal particles were sequentially electroplated from Au and Pt plating solutions inside a porous template membrane in an ultrasonication bath, which together with a temperature control bath, aided the mass transport of ions and gases through the membrane. Rods 200–300 nm long were produced. Attaching SAMs with appropriate tail groups to the metals enhances the suspension of the rods and allows their manipulation. The Au and Pt in the rods were derivatised with 1-butaneisocyanide with thiol groups, which are attracted to Au, 2-mercaptoethylamine and finally Rhodamine-B isothiocyanate. Fluorescence microscopy showed that only the Au rods fluoresce.

Thus, the surface chemistry of these single multimetal colloidal particles is controllable via orthogonal self assembled molecules and the chemical manipulation of these building blocks represents a first step towards anisotropic mesoscale assembly and possible electrical and optical applications.