SOCIÉTÉ CHIMIQUE DE GENÈVE

Synthesis and surface chemistry of organometallic nanoparticles

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Organometallic nanoparticles are prepared by decomposition in mild conditions of organometallic precursors in solution. The decomposition is preferably achieved under dihydrogen which results in the formation of a clean surface, covered with hydrides and able at performing further chemistry or growth processes. Addition of various ligands may modify both the physical and the chemical properties of the particles as well as the growth process allowing the formation of particles of defined sizes and shapes. In this respect, nanospheres, nanorods, nanocubes, nanowires of iron and cobalt or nano-arrows, nanocubes and dendritic particles of platinum can be obtained. Some of these nano-objects organize into super-lattices.

The surface characterization may be achieved by standard techniques of material science (XPS, WAXS, HRTEM) as well as by the use of NMR (solid state, solution and gas phase). In particular, static solid state ^{2}D NMR and MAS ^{13}C NMR are particularly efficient to locate and study the dynamics of surface ligands as well as to study the reactivity of the particles, in particular towards H/D exchange in complex organic molecules, hydrogenation and oxidation reactions.

The lecture will first present the synthesis and characterization of ruthenium nanoparticles stabilized by phosphines, phosphites and N-heterocyclic carbene ligands, the characterization of these particles, their surface reactivity towards CO and alkenes and the influence of the ligands on styrene hydrogenation, CO oxidation and CO hydrogenation. In addition, the lecture will present the synthesis, surface reactivity and catalytic activity of new iron and iron carbide nanoparticles and the coupling between physical and chemical properties.

Conférence présentée le

LUNDI 14 OCTOBRE 2013 à 17h30

Université de Genève – Bâtiment Sciences II
Auditoire A. Pictet – A100
30, quai Ernest-Ansermet, Genève

La conférence est publique

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