

Organometallic approach to magnetic metal nanoparticles of controlled shape and organization

Bruno Chaudret *

Laboratoire de Chimie de Coordination CNRS, 205 route de Narbonne, 31077 Toulouse, France.

The use of organometallic precursors allows the synthesis in mild conditions of metal nanoparticles displaying a controlled size, shape and surface environment. This method has been extended to the synthesis of bimetallic magnetic nanoparticles of controlled anisotropy. We have evidenced recently the ability of these particles to change their size or shape according to the properties of the surface ligands present.

The lecture will focus on the synthesis of the particles and the demonstration of the presence and role of the different ligands in the chemistry of the particles. In a second step, the lecture will focus on the physical properties of the particles (magnetic, electrical, optical) and on the role of the coordination chemistry to orientate the growth of the particles to control their monodispersity and shape (spheres, rods, cubes, wires). A special point will be devoted to the organization of the particles through self-organization and through formation of 3D super-lattices of nanoparticles, a true crystallization process.

[1] F. Dumestre, B. Chaudret, C. Amiens, P. Renaud, P. Fejes, *Science*, 2004, 303, 821.

[2] K. Philippot, B. Chaudret *Dendrimères et Nanosciences* (D. Astruc Ed), *Compte-Rendus Acad Sciences* 2003, 6, 1019.

[3] K. Soulantica, A. Maisonnat, M.-C. Fromen M.-J. Casanove, B. Chaudret, *Angew. Chem. (Int Ed)* 2003, 42, 1945.

[4] F. Dumestre, B. Chaudret, C. Amiens, M. Respaud, P. Fejes, P. Renaud, P. Zurcher, *Angew. Chem. (Int Ed)* 2003, 42, 5213.

[5] M. Monge, M. L. Kahn, A. Maisonnat, B. Chaudret, *Angew. Chem. (Int Ed)* 2003, 42, 5321.

* Corresponding author. Tel. 33 (0) 5 61 33 31 81. FAX 33 (0) 5 61 55 30 03.
Email address: chaudret@lcc-toulouse.fr (Bruno Chaudret).