

# Bruno CHAUDRET



Born : 25 Décembre 1953, Férolles (45, France)  
Married, 3 children

**Directeur de recherches C.N.R.S.**  
**Member of "Académie des Sciences"**

Laboratoire de Chimie de Coordination C.N.R.S.  
205 Route de Narbonne 31077 Toulouse France  
Tel. : (33) 05 61 33 31 81.  
FAX : (33) 05 61 55 30 03.  
chaudret@lcc-toulouse.fr

## Studies

- \* 1975 Ingénieur Ecole Nationale Supérieure de Chimie de Paris
- \* 1977 Ph.D. Imperial College, London (Dir. thesis, G. Wilkinson)
- \* 1979 Doctorat d'Etat U.P.S.Toulouse (Dir. thesis, R. Poilblanc)

## Work Experience

- |   |           |
|---|-----------|
| * C.N.R.S.-Royal Society Fellowship, London     | 1975-1977 |
| * Attaché de Recherches C.N.R.S., Toulouse      | 1977-1981 |
| * Chargé de Recherches C.N.R.S., Toulouse       | 1981-1988 |
| * Directeur de Recherches C.N.R.S. , Toulouse : |           |
| - 2 <sup>nd</sup> Class                         | 1988-1998 |
| - 1 <sup>st</sup> Class                         | 1998-2008 |
| - Classe exceptionnelle                         | 2009      |

## Distinctions

- \* "Chimie de Coordination" Award of "Société Chimique de France" 1982.
- \* Médaille d'Argent (Silver Medal) CNRS, 1997.
- \* 1st Price 18<sup>ème</sup> Concours Régional Innovation Midi-Pyrénées (1998)
- \* Miguel Catalan - Paul Sabatier Award of "Real Sociedad Espanola de Quimica" / "Société Française de Chimie" 1999
- \* Elected at "Académie des Sciences" (november 2005)
- \* Humboldt - Gay-Lussac Award 2006
- \* Sir Geoffrey Wilkinson lectureship RSC 2008
  
- \* Seaborg Lecturer, University of California Berkeley 2002
- \* EastChem visiting Professor (Saint-Andrews, Edinburgh) July 2006

\* Editorial Board member of : *past* New Journal of Chemistry ; Journal of the Chemical Society, Dalton Transactions; Organometallics; *present* VCH-Small, Journal of Organometallic Chemistry, Oil&Gas Science and Technology

## Main Functions

- \* Directeur de Recherche CNRS since 1988
- \* Director of the Laboratoire de Chimie de Coordination C.N.R.S. 2007 –
- \* President of the Scientific Council of the "Institut Français du Pétrole" since 2007.
- \* Deputy-Director of the Laboratoire de Chimie de Coordination C.N.R.S. 2000-2006
- \* Director of graduate studies in Inorganic Chemistry at Université Paul Sabatier Toulouse ("DEA Chimie et Physicochimie des éléments de transition") 1998- 2004.
- \* Member of "Comité National de la Recherche Scientifique" (1987-1991, 1994-1995, 2001-2005)
- \* Member of Regional Scientific Councils (2001 - 2006)
- \* Director of a research group (presently: "Nanostructures and Organometallic Chemistry) composed in average of 25 persons among which 7 permanent positions.

## Scientific Production

- \* Co-author of over 330 publications in refereed journals
- \* 14 patents (7 international extensions), 1 licence giving rise to industrial production.
- \* 62 invited lectures in international conferences, 47 in national conferences and 138 in universities and research centers.

## Scientific Training

- \* 30 PhD students + 7 "co-tutelle" theses with Berlin, Essen, Amsterdam, Caracas, ...
- \* 25 Post-Doc fellows
- \* ca 50 undergraduate students and short stays of various origins

## Research Interests

Bruno Chaudret, born on December, 25, 1953, was educated at the École Nationale Supérieure de Chimie de Paris. He received his Ph. D. from the Imperial College of London in 1977 with Nobel Prize Winner Geoffrey Wilkinson. He obtained the degree of a "Docteur ès Sciences" at the University of Toulouse in 1979. Today he is director of research at the CNRS in Toulouse, director of the "Laboratoire de Chimie de Coordination CNRS" and a member of the French Academy of Science.

Bruno Chaudret is a specialist of organometallic chemistry, in particular of interactions between hydrogen and transition metals. He developed an original method of synthesis of metal or metal-oxide nanoparticles and developed applications in very different domains such as catalysis, magnetism and microelectronics.

After having been trained in organometallic chemistry in Wilkinson's group, Bruno Chaudret interests turned to develop methods of synthesis of hydrogen-rich compounds. He was one of the first scientists who synthesized molecules where hydrogen is bound to a metal without dissociation of the H-H bond. This coordination mode is the reason for the process of hydrogen exchange which can follow a classical or a quantum-mechanical pathway. These studies have been extended to the coordination of other simple groups such as C-H and Si-H, and allowed him to develop a creative chemistry as well as new catalytic processes.

In the early nineties, Bruno Chaudret developed a similar method for the synthesis in organic solvents of nanoparticles of transition metals or of their oxides by condensation of metal atoms in solution. The very mild conditions used allowed him to control the different stages of the particle nucleation and the particle growth, and hence the particle size and the particle size distribution. The most important aspect of this method is the control of particle surface species (hydrides, organic or inorganic molecules). These particles exhibit physical properties, in particular magnetic properties, similar to those studied using high-vacuum methods. A second chemical reaction step with organic molecules allows one to increase the size of the particles, and to give them precise shapes (spheres, cubes, rods, wires, fractal structures) and to assemble them into two- or three-dimensional super-crystals in which the particles diameters can vary between 1 and 15 nm, and where they are arranged as atoms in classical crystals.

These new nano-objects display interesting properties in various domains such as catalysis, magnetism, optics, micro- and nanoelectronics. The presence of surface ligands allows one for example to modify the reactivity of the particles and to lead them to catalyze enantioselective reactions. These regular objects also display magnetic and transport properties for nanoelectronics. Finally, the most promising applications may be achieved in current procedures of micro-electronics to construct sensors and other electronic devices. Some devices have lead to practical applications (gas sensors in cars for example).