

Curriculum vitae



Dr. Guy Lavigne

Directeur de recherches, [CNRS](#)

[Laboratoire de Chimie de Coordination du CNRS,](#)

205 route de Narbonne, 31077 Toulouse Cedex 04, France

Tel: Int. code + (33)5 61 33 31 71

Fax: Int. code + (33)5 61 55 30 03

Guy.Lavigne@lcc-toulouse.fr

Education

1969-71 Maîtrise de chimie : 1969 ; DEA : 1970 ; 3rd cycle thesis : 1971, [Université Paul Sabatier](#).

1979 Doctorat d'Etat es Sciences, [Université Pierre & Marie Curie](#) (Prof. [Y. Jeannin](#))

1983-84 Post-Doctoral studies at [UCLA](#), Los Angeles CA (with [Herbert D. Kaesz](#))

Professional advancement at the CNRS

1973-75 CNRS researcher (Attaché de recherche (AR2)), [Université Paul Sabatier](#)

1976-79 CNRS researcher, (AR2) [Université Pierre & Marie Curie](#) (Paris VI)

1980-83 CNRS researcher (AR2) at LCC-CNRS, Toulouse

1983-84 CNRS/NSF post-doctoral research associate at [UCLA](#), Los Angeles (Prof. Herbert D. Kaesz)

1985-87 CNRS researcher (CR1), at LCC-CNRS, Toulouse

1988- CNRS senior scientist (DR2), Coordination Chemistry Laboratory (LCC-CNRS), Toulouse

2003- Head of the group "[Molecular design of transition-metal pre-catalysts](#)", LCC-CNRS

Professional activities

2010... Member of the Administration Council of the "[Société Chimique de France](#)"

2009... Organizing Committee of [EuCOMS XIXth EuCheMS Conference on Organometallic Chemistry](#)

2009... Member of the International Advisory board of the [FIGIPAS](#) meeting (Palermo)

2007... [EuCheMS](#): Member of the European [board of the Division of Inorganic Chemistry](#)

2006-09 President of the *Coordination Chemistry Division*, "[Société Chimique de France](#)"

2005... General Secretary, « Cercle des [Chaires d'excellence Pierre de Fermat](#) », [Midi-Pyrénées](#) region.

2005... Member of the Editorial Committee, [Magazine Scientifique de l'Université Paul Sabatier](#)

2001-06 Coordinator of the LCC's European [Marie Curie Training site](#) (2001-2006)

2002 Member of the Organizing Committee of **SFC Eurochem 2002** (Toulouse, 8-11 Juillet 2002)

2002 Chairman of the Coordination Chemistry and Catalysis Symposium at **SFC Eurochem 2002**

2000 Member of the Organizing Committee of **Eurobic V** (Toulouse, 17-20 Juillet 2000).

1998... Chairman of [« Paul Sabatier » lectures and seminars](#) at the LCC- CNRS, Toulouse

Research interests

* Fundamental and applied aspects of transition-metal chemistry in relevance to catalysis.

* Synthetic organometallic chemistry of Ruthenium

* Homogeneous catalysis: C-C bond forming reactions, C-H/olefin coupling, Olefin metathesis

* Ligand design (N-heterocyclic carbenes)

* Base-promoted reactions of metal carbonyls

* Cluster chemistry (early pioneering studies)

Selection of a few representative research achievements and relevant leading references

- 1 *Discovery of the first catalytic "anion-promoted" CO substitution by phosphines into Ru₃(CO)₁₂:*
Lavigne, G.; Kaesz, H. D. *J. Am. Chem. Soc.* **1984**, *106*, 4647
- 2 *Original report of a "halide-promoted" reaction of alkynes with Ru₃(CO)₁₂:*
Lavigne, Lugan et al. *J. Am. Chem. Soc.* **1989**, *111*, 8959.
- 3 *Original observation of a hydrogen-promoted opening of phosphido bridges relevant to catalysis:*
Lugan, Lavigne, Bonnet, Tkatchenko et al. *J. Am. Chem. Soc.* **1988**, *110*, 5369-5376
- 4 *Unique observation of a cluster-mediated hydrovinylation of an alkyne*
Lugan, Lavigne et al. *J. Am. Chem. Soc.* **1990**, *112*, 8607
- 5 *Key observations on the Ru-catalyzed hydroesterification of ethylene with methyl formate*
Lavigne et al. *J. Am. Chem. Soc.* **1992**, *114*, 10669; *Angew. Chem., Int. Ed. Engl.* **1997**, *36*, 1092-1095.
- 6 *Construction of a full ruthenium-catalyzed hydroformylation cycle based on isolated intermediates*
Lavigne, Lugan et al. *Organometallics* **1999**, *18*, 187-196
- 7 *Modern variations on the Hieber base reaction*
Lavigne et al. *Angew. Chem., Int. Ed. Engl.* **1999**, *38*, 518-522.
- 8 *Systematic generation of unprecedented polymeric halo-carbonyl Ru(I) polyanions*
Lavigne et al. *Angew. Chem., Int. Ed. Engl.* **1999**, *38*, 3710-3713.
- 9 *Discovery of a novel "base-promoted" preparation of Ru₃(CO)₁₂*
Lavigne et al. *Chem. Commun.* **2003**, 1578.
- 10 *Discovery of an original "instant" procedure for the fast reduction of Ru(II) to Ru(0)*
Lavigne, Lugan et al. *J. Am. Chem. Soc.* **2005**, *127*, 14554
- 11 *Discovery of a New Generation of Advanced Olefin Metathesis catalysts (joint project, K. Grela)*
Lugan, Lavigne, Grela et al. *J. Am. Chem. Soc.* **2006**, *128*, 13652
- 12 *Conceptual design of anionic N-heterocyclic carbenes and their zwitterionic complexes*
Cesar, Lugan, Lavigne *J. Am. Chem. Soc.* **2008**, *130*, 11286.

Selected recent publications (over the past 10 years)

- 1 *Cluster-mediated conversion of diphenylacetylene into α -phenylcinnamaldehyde...*
Nombel, P.; Lugan, N.; Donnadiou, B.; Lavigne, G. *Organometallics* **1999**, *18*, 187.
- 2 *Reactions of a transient hydrido chloro-carbonyl ruthenium complex with ethylene, alkynes and CO...*
Faure, M.; Maurette, L.; Donnadiou, B.; Lavigne, G. *Angew. Chem., Int. Ed. Engl.* **1999**, *38*, 518-522.
- 3 *Novel polymeric carbonylhaloruthenium (I) polyanions: rational design and re-organization...*
Maurette, L.; Donnadiou, B.; Lavigne, G. *Angew. Chem., Int. Ed. Engl.* **1999**, *38*, 3710-3713.
- 4 *New insight into a convenient "base-promoted" synthesis of Ru₃(CO)₁₂.*
Faure, M.; Saccavini, C.; Lavigne, G. *Chem. Commun.* **2003**, 1578.
- 5 *Instant Base-Promoted Generation of Roper's type Ru(0) compd..* Sentets, S. ; Rodriguez-Martinez, M. ; Vendier, L.; Donnadiou, B.; Huc, V.; Lugan, N.; Lavigne, G. *J. Am. Chem. Soc.* **2005**, *127*, 14554.
- 6 *Advanced fine-tuning of Grubbs/Hoveyda olefin metathesis catalysts: a further step toward an optimum balance between antinomic properties.* Bieniek, M.; Bujok, R.; Cabaj, M.; Lugan, N.; Lavigne, G.; Artl, D.; Grela, K. *J. Am. Chem. Soc.* **2006**, *128*, 13652
- 7 *An Anionic N-heterocyclic carbene and its zwitterionic complexes.* César, V.; Lugan, N.; Lavigne, G. *J. Am. Chem. Soc.* **2008**, *130*, 11286.

Reviews and Book Chapters

- 1986** G. Lavigne, H. D. Kaesz, in *Metal Clusters in Catalysis* (Gates, Gucci, Knötzinger).
- 1990** G. Lavigne *The Chemistry of Metal Cluster complexes* (R. D. Adams, D. Shriver, H. D. Kaesz).
- 1993** G. Lavigne et al. in: *The Journal of Cluster Science*, **1993** *4*, 49.
- 1998** G. Lavigne, B. de Bonneval, *Catalysis by di- and poly-metallic complexes*, (R. D. Adams, F. A. Cotton)
- 1999** G. Lavigne, *Eur. J. Inorg. Chem.* **1999**, 917 (Microreview)

Biographical sketch

I earned my degrees in chemistry at the *University Paul Sabatier*. Immediately after my first 3rd cycle thesis, I was appointed as CNRS research associate in 1973. Then, I graduated from the *University Pierre & Marie Curie*, where I received the “Doctorat d’Etat es Sciences” in 1979 under the guidance of Professor [Yves Jeannin](#) and Dr. Suzanne Jeannin. The objective of my thesis work was to gain insight into the mechanism of the protection of metal surfaces by industrial organic corrosion inhibitors like mercapto-ethanoic acid or mercapto-benzothiazole. I initiated an innovative approach consisting in a grafting of these inhibitors on transition metal clusters in such a way to obtain realistic “molecular” models of the effective surface complex. This first research project provided the original background of my expertise in the field of Transition Metal Clusters. In 1979, I joined the newly created group of Jean-Jacques Bonnet, at the LCC, to initiate a new project on the applications of metal clusters as pre-catalysts. Later, during my post-doctoral studies at UCLA with [Herbert D. Kaesz](#), I made the fascinating discovery that catalytic amounts of “highly dissociated” salts of halides or pseudo-halides are prone to enhance the substitutional lability of Ru₃(CO)₁₂ ([Lavigne, Kaesz, JACS, 1984](#)), an important finding in relevance to the known implication of Ru/halide systems as catalysts for the syngas conversion to ethyleneglycol, the “big deal” reaction of the eighties. Beyond the scope of cluster chemistry, this pioneering work became the starting point of my subsequent extensive mechanistic and reactivity studies on *nucleophilic activation of coordinated carbon monoxide*, which were then developed by a number of groups over the world, and proved to have important implications in a variety of ruthenium-catalyzed organic reactions. In 1988, I was promoted CNRS senior researcher (Directeur de recherches) at the *Laboratoire de Chimie de Coordination*. My research activities during the nineties have been summarized in a [Microreview](#) and have been also highlighted in *Angewandte Chemie*, see: A. F. Hill, [Angew. Chem., Int. Ed. Engl. 2000, 39, 130-133](#). Since 2003, I am head of the group “[Molecular design of Transition metal catalysts](#)”, in association with Noël Lugan, senior CNRS researcher. Our present research projects ([see website](#)) are focusing on the conceptual and experimental design of a variety of novel pre-catalysts including principally (i) Ru(II) complexes for metathesis and transfer hydrogenation and (ii) Ru(0) complexes for C-H/olefin coupling. Thanks to the recruitment in 2006 of a new co-worker, Vincent César, the palette of catalytic reactions we are dealing with has now been expanded. In particular, we are presently developing a hitherto unknown family of anionic N-heterocyclic carbenes paving the way to zwitterionic catalysts (research project now funded by the ANR). Very recently, in July 2008, Heinz Gornitza, Professor, and Catherine Hemmert, CNRS researcher, have both joined the team. Their expertise in the chemistry of carbenes is reinforcing the potential of our group in this strongly competitive research area. An outline of our research is available on our webpage of [research interests](#), and a [research summary](#) can be also downloaded. Amongst diverse professional activities listed above, I was recently Chair of the *coordination chemistry division* of the *French Chemical Society* (“[Société Chimique de France](#)”) and I am presently member of the European board of the Division of Inorganic Chemistry of [EuChemS](#).

Scientific production

78 publications, including 5 reviews and book chapters,* 72 invited lectures and 53 communications.

Statistics (ISI, web of Sciences*): Average citation per article = 28.74; h-index = 28

(* Note: The present statistical analysis is based on 62 articles only, since book chapters and reviews in books are not taken into account by this ISI database.

Invited lecture tours abroad (*out of 72 lectures*)

- 1991: Switzerland** Guest professor University of Neuchâtel (Prof. Georg Süss-Fink) –
- 1991: Germany** Visiting Professor, five German Universities (Tour organized by Prof. Dr. Helmut Werner)
- 1994: USA** Visiting Professor, nine North American Universities and EXXON Co
- 1995: USA** Invited speaker, Gordon Conference, Inorganic Chemistry, Wolfeboro.
- 1996: Japan** Visiting Professor, nine Universities (Tsukuba, Tokyo, Osaka, Kyoto...) (Lecture tour organized by Prof. Masato Tanaka, and Prof. [Akio Yamamoto](#)).
- 1998: USA** Invited speaker, Award Symposium in Honor of H. D. Kaesz (ACS meeting).
- 1999 : Italy** Lecture tour, Firenze (M. Peruzzini), Pisa (G. Fachinetti) –
- 2000: Germany** Visiting Professor, five Universities and Max-Planck Institute (Lecture tour organized by Prof. Dr. Herbert Roesky)
- 2001: Japan** Invited speaker, *Japan Science and Technology Corporation* (CREST Symposium) + new lecture tour in Japan (RIKEN, University of Kyoto) –
- 2003: Chile** Invited speaker, (PICS Symposium, Valparaiso).
- 2004: Poland** Keynote speaker, YoungChem2004 and Invited talk, IOC Warsaw
- 2005: Chile** Invited speaker, X-Encuentro Química Inorgánica., Santiago de Chile
- 2005: Russia** Invited speaker, Kazan Youth School of Organic Chemistry. Lecture tour, Nesmeyanov Institute, Moscow, and YUCOS research center, Moscow
- 2008: Taiwan** Lecture tour March 2008 (Three Universities in Taipei)
- 2009: Chile** Visiting Scientist, March 16-27, University of Santiago de Chile.

Collaborations (from past to recent ones):

[Yves. Jeannin](#), Jean-Jacques Bonnet, [Igor Tkatchenko](#), René Mathieu, [Herbert D. Kaesz](#), [Fred Basolo](#), [Jean-Yves Saillard](#), [Philippe Kalck](#), [Javier Cabeza](#), [Remi Chauvin](#), [Elena Lalinde](#), [Nikolai Ustynyuk](#), [Ernie Gore](#) (Johnson Matthey), [Karol Grela](#).

Funding: [ANR](#) project *Advanced Fine-Tuning of N-Heterocyclic Carbenes : from charge-doped prototypes to Janus-type carbenes* (2009-2011).