

PERSONAL INFORMATION

Family name, First name: MARON Laurent

Researcher unique identifier(s) (such as ORCID, Research ID, etc. ...):

Date of birth: 14/12/1973

URL for web site:



• TEACHING ACTIVITIES

- 2008 – Full Professor – Physical Chemistry and Organometallic/Inorganic Chemistry/ Université Paul Sabatier/ Department of Chemistry/ Toulouse, France
- 2001 – 2008 Assistant Professor – Physical Chemistry and Organometallic/Inorganic Chemistry/ Université Paul Sabatier/ Department of Chemistry/ Toulouse, France
- 1996 – 1999 Teaching Assistant – Physical Chemistry/Université Paul Sabatier/ Department of Chemistry/ Toulouse, France

• ORGANISATION OF SCIENTIFIC MEETINGS

- 2000 7^{ème} RCTF, 150 attendees, Gruissan, France (member of the organizing committee)
- 2003 VHM 2003, 120 attendees, La Colle sur Loup, France
- 2005 EUCOCC5, 165 attendees, La Londe les Maures, France (Trésorier adjoint)
- 2006 VHM 2006, 118 attendees, Aubrac, France (Trésorier)
- 2006 10^{ème} Journée de la Matière Condensée, 500 attendees, Toulouse (member of the organizing committee)
- 2009 VHM 2009, 123 attendees, Canet en Rousillon, France (President)

• INSTITUTIONAL RESPONSIBILITIES

- 2012 – 2016 Member of the management committee of the Chemistry department Université Paul Sabatier/ Department of Chemistry/ Toulouse, France
- 2012 – 2020 Member of the Comité National des Universités / National / France
- 2011 – 2014 Member of a Management Committee COST action cm1006
- 2006 – 2012 Responsible of the 3rd year of Chemistry (120 students) Université Paul Sabatier/ Department of Chemistry/ Toulouse, France

• COMMISSIONS OF TRUST

- 2010 – International Advisory Board of Dalton Transactions
- 2012 Review panel member, Université Paris VI / MONARIS / France
- 2012 Review panel member, Université Paris VI / LCT / France
- 2016 Review panel member, Université Nancy / France
- 2017 Review panel member, Université Marseille / France
- 2014 – 2017 Review Panel of The Agence Nationale de La Recherche (research grants) – Vice-President
- 2018 Review panel member, Université Paris VI / LCT / France
- 2019 Review panel member, Marne-la-vallée

• SUMMARY OF PROFESSIONAL ACHIEVEMENTS

After a PhD in theoretical chemistry in Toulouse and a PhD in theoretical physics in Stockholm, I made a post-doctoral research project for the Michelin company on the theoretical treatment of the catalysis of lanthanide complexes. After, I got appointed as an assistant professor in physical chemistry in Toulouse where I started my independent research career on the theoretical chemistry of f element complexes. I got then promoted as a junior member in 2006 and full professor in 2008. I got then involved in the redox chemistry of f element for the activation of small molecules, like CO₂, through an ERC grant 'Frontier in Chemistry' in 2010, field where I'm to date the only one to be able to perform such calculations. Although the f-element community is rather small, I'm internationally recognized as all the experimental experts collaborate with me and now even main group experts are asking for my expertise when low-valent metal are involved (Science paper under review). Recently, I started a research project on transactinides and especially Berkelium for which I recently published a research paper in Science and a paper in Nature Chemistry. Meanwhile, I got awarded as an Experienced researcher

Humboldt Fellow (2010), a Chinese Academy of Science award (2015) and got visiting professorship in Calgary (2016) and Fudan University (2017), a Humboldt fellowship in 2018. I also received the RSC-SCF award in 2018. Finally, I got a Chinese Academy of Science award (2019) and was nominated as a senior member of the Institut Universitaire de France in 2019.

• MEMBERSHIPS OF SCIENTIFIC SOCIETIES

2010–2020 Member, American Chemical Society
2023– Fellow of the Royal Chemical Society

• SUMMARY OF CURRENT SCIENTIFIC ACTIVITY

My research is based on rationalizing, using theoretical approaches, the electronic structure and reactivity of metal complexes, mainly s, d and f metals. This research is carried out in very close collaboration with experimental groups either from academic or industrial side. In the industrial side, we have a long going collaboration with the Total company and the experimental group of Jean-François Carpentier (Rennes) on the metallocenes catalysed polymerization of olefins. From the academic side, we have a special interest on low-valent metals such as uranium at the +III oxidation state or lanthanide(II) and magnesium(I). This had an enormous impact in this field, particularly with regard to understanding the mechanisms of stoichiometric and catalytic reactions involving the activation of small molecules, such as CO₂, CO, N₂, by s, d or f-block metal complexes. This work in this area has changed the way the academic and industrial communities view actinide metals, and their reactivity. Through this research, and the numerous collaborations I have established with world leading experimentalists whose research encompasses the lanthanide and actinide metals, it has become clear that complexes of these metals can effect synthetic transformations previously only thought possible with transition metals, especially those of the platinum group. This has been recently extended to the coordination chemistry of transactinide complexes, mainly plutonium and berkelium, for which we have demonstrated some peculiar coordination properties, that were published in Science and Nature Chemistry.

• MAJOR COLLABORATIONS

C. Jones	low-valent magnesium reactivity with CO ₂ (Monash U., Australia)
M. Anker	divalent lanthanide for catalysis (U. Wellington, New Zealand)
R. A. Andersen	f-element chemistry (UC Berkeley, US)
J. Arnold	d and f-complexes structure and reactivity (UC Berkeley, US)
J. Walensky	actinide complexes for reactivity (U Missouri, US)
J. Robinson	lanthanide-based polymerization of cyclic esters (Brown University, US)
W. J. Evans	divalent lanthanide reactivity (UC Irvine, US)
C. C. Cummins	titanium reactivity (MIT, US)
W. E. Piers	Cobalt, Iron and cationic scandium reactivity (U Calgary, Canada)
P. L. Arnold	high-valent uranium reactivity (U. Edimburgh, Scotland and UC Berkeley, US),
J. Okuda	alkaline-earth reactivity (U. Aachen, Germany)
F. G. N. Cloke	CO ₂ reactivity with uranium complexes (U. Sussex, England)
S. Liddle	low-valent uranium reactivity (U. Manchester, England)
K. Meyer	small molecule activation (U. Erlangen, Germany)
P. Roesky	borohydride reactivity (U. Karlsruhe, Germany)
J-F. Carpentier, S. Guillaume, Y. Sarazin, E. Kirilov	polymerization (U. Rennes, France)
D. Bourissou	ambiphilic ligand complexes (U. Toulouse, France)
F. Bonnet, M. Visseaux	olefin polymerization (U. Lille, France)
G. Nocton	Lanthanide-based reactivity (Ecole Polytechnique, France)
M. Mazzanti	low-valent uranium reactivity with CO ₂ (EPFL, Switzerland)
Ch. Copéret	silica surface reactivity (ETH Zurich, Switzerland)
Y. Chen	scandium complexes reactivity (SCUT Guangzhou, China)
C. Zhu	actinide structure and reactivity (U. Nanjing, China)

X. Zhou, L. Zhang rare earths complexes and clusters reactivity (Fudan U. Shanghai, China)
 D. Cui, J. Cheng polymerization and actinide complexes (U. Changchun, China)
 S. Wang Rare earth complexes for catalysis (U. Wuhu, China)
 X. Xu Catalysis with low valent metal (U. Suzhou, China)
 Y-H Chen Rare-earth catalysts for organic transformation (U. Wuhan, China)
 Z. Hou f-element reactivity and clusters (RIKEN Tokyo, Japan)
 M. Hill s group reactivity (U. of Bath, England)
 A. Vanugopal Main group catalysis (IITER, India)

• **564 Publications / h-index: 73**

List of major Publications (last 10 years)

2 Science , 7 Nature Chemistry, 7 Nature Communication, 1 Acc. Chem. Res., 1 Chem, 1 PNAS, 37 JACS, 38 Angewandte Chemie, 23 Chemical Science, 1 Chemical Society Review, 1 JACS Au

Wilson, A. S. S.; Hill, M. S.; Mahon, M. F.; Dinoi, C.; Maron, L., Organocalcium-mediated nucleophilic alkylation of benzene. *Science* **2017**, 358 (6367), 1168-1171.

Silver, M. A.; Cary, S. K.; Johnson, J. A.; Baumbach, R. E.; Arico, A. A.; Luckey, M.; Urban, M.; Wang, J. C.; Polinski, M. J.; Chemey, A.; Liu, G.; Chen, K. W.; Van Cleve, S. M.; Marsh, M. L.; Eaton, T. M.; de Burgt, L. J. V.; Gray, A. L.; Hobart, D. E.; Hanson, K.; Maron, L.; Gendron, F.; Autschbach, J.; Speldrich, M.; Kogerler, P.; Yang, P.; Braley, J.; Albrecht-Schmitt, T. E., Characterization of berkelium(III) dipicolinate and borate compounds in solution and the solid state. *Science* **2016**, 353 (6302), 888-+.

P. L. Arnold, A.-F. Pécharman, E. Hollis, A. Yahia, L. Maron, S. J. Parsons et J. B. Love *Nature Chemistry* **2** (2010) 1056

Arnold, P. L.; Mansell, S. M.; Maron, L.; McKay, *Nature Chemistry* **2012**, 4 (8), 668-674.

Cary, S. K.; Galley, S. S.; Marsh, M. L.; Hobart, D. L.; Baumbach, R. E.; Cross, J. N.; Stritzinger, J. T.; Polinski, M. J.; Maron, L.; Albrecht-Schmitt, T. E., Incipient class II mixed valency in a plutonium solid-state compound. *Nature Chemistry* **2017**, 9 (9), 856-861

Halter, D. P.; Heinemann, F. W.; Maron, L.; Meyer, K., The role of uranium-arene bonding in H₂O reduction catalysis. *Nature Chemistry* **2018**, 10 (3), 259-267.

Feng, G. F.; Zhang, M. X.; Shao, D.; Wang, X. Y.; Wang, S. A.; Maron, L.; Zhu, C. Q., Transition-metal-bridged bimetallic clusters with multiple uranium-metal bonds. *Nature Chemistry* **2019**, 11 (3), 248-253.

Arnold, P. L.; Ochiai, T.; Lam, F. Y. T.; Kelly, R. P.; Seymour, M. L.; Maron, L., Metallacyclic actinide catalysts for dinitrogen conversion to ammonia and secondary amines. *Nature Chemistry*. **2020**, 12, 654-659

Reiners, M.; Baabe, D.; Munster, K.; Zaretske, M. K.; Freytag, M.; Jones, P. G.; Coppel, Y.; Bontemps, S.; del Rosal, I.; Maron, L.; Walter, M. D., NH₃ formation from N₂ and H₂ mediated by molecular tri-iron complexes. *Nature Chemistry* **2020**, 12 (8).

Gardner, B. M.; Kefalidis, C. E.; Lu, E.; Patel, D.; McInnes, E. J. L.; Tuna, F.; Wooles, A. J.; Maron, L.; Liddle, S. T., Evidence for single metal two electron oxidative addition and reductive elimination at uranium. *Nature Communications* **2017**, 8.

Du, J. Z.; Alvarez-Lamsfus, C.; Wildman, E. P.; Wooles, A. J.; Maron, L.; Liddle, S. T., Thorium-nitrogen multiple bonds provide evidence for pushing-from-below for early actinides. *Nature Communications* **2019**, 10.

Chatelain, L.; Louyriac, E.; Douair, I.; Lu, E. L.; Tuna, F.; Wooles, A. J.; Gardner, B. M.; Maron, L.; Liddle, S. T., Terminal uranium(V)-nitride hydrogenations involving direct addition or Frustrated Lewis Pair mechanisms. *Nature Communications* **2020**, 11 (1).

Feng, B.; Xiang, L.; McCabe, K. N.; Maron, L.; Leng, X. B.; Chen, Y. F., Synthesis and versatile reactivity of scandium phosphinophosphenidene complexes. *Nature Communications* **2020**, 11 (1).

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and solvent-induced disproportionation of uranium(IV). *Nature Communications* **2021**, *12* (1).
 Richardson, G. M.; Douair, I.; Cameron, S. A.; Bracegirdle, J.; Keyzers, R. A.; Hill, M. S.; Maron, L.; Anker, M. D., Hydroarylation of olefins catalysed by a dimeric ytterbium(II) alkyl. *Nature Communications* **2021**, *12* (1).
 Xin, X. Q.; Douair, I.; Rajeshkumar, T.; Zhao, Y.; Wang, S.; Maron, L.; Zhu, C. Q. Photochemical Synthesis of Transition Metal-Stabilized Uranium(VI) Nitride Complexes. *Nature Communications* **2022**, *13* (1). DOI: 10.1038/s41467-022-31582-z.

Feng, G. F.; Zhang, M. X.; Wang, P. L.; Wang, S.; Maron, L.; Zhu, C. Q., Identification of a uranium-rhodium triple bond in a heterometallic cluster. *Proceedings of the National Academy of Sciences of the United States of America* **2019**, *116* (36), 17654-17658.

M. Roger, N. Barros, T. Arliguie, P. Thuéry, L. Maron et M. Ephritikhine *J. Am. Chem. Soc.* **27** (2006) 8790
 J. Vignolle, H. Gronitzka, L. Maron, W. W. Schoeller, D. Bourissou et G. Bertrand *J. Am. Chem. Soc.* **129** (2007) 978
 E. L. Werkema, L. Maron, O. Eisenstein et R. A. Andersen *J. Am. Chem. Soc.* **129** (2007) 2529
 M. Ohashi, M. Konkol, I. Del Rosal, R. Poteau, L. Maron et J. Okuda *J. Am. Chem. Soc.* **130** (2008) 6920
 Marie Sircoglou, Sébastien Bontemps, Ghenwa Bouhadir, Nathalie Saffon, Karinne Miqueu, Weixing Gu, Maxime Mercy, Chun-Hsing Chen, Bruce M. Foxman, Laurent Maron, Oleg V. Ozerov, and Didier Bourissou *J. Am. Chem. Soc.* **130**(2008) 16729
 P. Oulié, N. Nebra, N. Saffon, L. Maron, B. Martin-Vaca et D. Bourissou *J. Am. Chem. Soc.* **131** (2009) 3493
 C. H. Booth, M. D. Walter, D. Kazhdan, Y.-J. Hu, W. W. Lukens, E. D. Bauer, L. Maron, O. Eisenstein et R. A. Andersen *J. Am. Chem. Soc.* **131** (2009) 6480
 C. H. Booth, D. Kazhdan, E. Werkema, M. D. Walter, W. W. Lukens, E. D. Bauer, Y.-J. Hu, L. Maron, O. Eisenstein, M. Head-Gordon et R. A. Andersen *J. Am. Chem. Soc.* **132** (2010) 17537
 Y. Sarazin, B. Liu, T. Roisnel, L. Maron and J.-F. Carpentier *J. Am. Chem. Soc.* **133** (2011) 9069
 A. Venugopal, W. Fegler, T. P. Spaniol, L. Maron and J. Okuda *J. Am. Chem. Soc.* **133** (2011) 17574
 B. Kosog, C. E. Kefauver et al. *J. Am. Chem. Soc.* **134** (2012) 17574

Bond into Magnesium(I) Dimers: Generation of Highly Active 1,2-Dimagnesioethane Compounds. *Journal of the American Chemical Society* **2017**, 139 (50), 18190-18193.

Mao, W. Q.; Xiang, L.; Lamsfus, C. A.; Maron, L.; Leng, X. B.; Chen, Y. F., Highly Reactive Scandium Phosphinoalkylidene Complex: C-H and H-H Bonds Activation. *Journal of the American Chemical Society* **2017**, 139 (3), 1081-1084.

Mao, W. Q.; Xiang, L.; Maron, L.; Leng, X. B.; Chen, Y. F., Nonchelated Phosphoniomethylidene Complexes of Scandium and Lutetium. *Journal of the American Chemical Society* **2017**, 139 (49), 17759-17762.

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Silver, M. A.; Cary, S. K.; Garza, A. J.; Baumbach, R. E.; Arico, A. A.; Galmin, G. A.; Chen, K. W.; Johnson, J. A.; Wang, J. C.; Clark, R. J.; Chemey, A.; Eaton, T. M.; Marsh, M. L.; Seidler, K.; Galley, S. S.; van de Burgt, L.; Gray, A. L.; Hobart, D. E.; Hanson, K.; Van Cleve, S. M.; Gendron, F.; Autschbach, J.; Scuseria, G. E.; Maron, L.; Speldrich, M.; Kogerler, P.; Celis-Barros, C.; Paez-Hernandez, D.; Arratia-Perez, R.; Ruf, M.; Albrecht-Schmitt, T. E., Electronic Structure and Properties of Berkelium Iodates. *Journal of the American Chemical Society* **2017**, 139 (38), 13361-13375

Mukherjee, D.; Hollerhage, T.; Leich, V.; Spaniol, T. P.; Englert, U.; Maron, L.; Okuda, J., The Nature of the Heavy Alkaline Earth Metal-Hydrogen Bond: Synthesis, Structure, and Reactivity of a Cationic Strontium Hydride Cluster. *Journal of the American Chemical Society* **2018**, 140 (9), 3403-3411.

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Boreen, M. A.; Lohrey, T. D.; Rao, G.; Britt, R. D.; Maron, L.; Arnold, J., A Uranium Tri-Rhenium Triple Inverse Sandwich Compound. *Journal of the American Chemical Society* **2019**, 141 (13), 5144-5148.

Liu, X. J.; Xiang, L.; Louyriac, E.; Maron, L.; Leng, X. B.; Chen, Y. F., Divalent Ytterbium Complex-Catalyzed Homo- and Cross-Coupling of Primary Arylsilanes. *Journal of the American Chemical Society* **2019**, 141 (1), 138-142.

Lohrey, T. D.; Maron, L.; Bergman, R. G.; Arnold, J., Heterotetrametallic Re-Zn-Zn-Re Complex Generated by an Anionic Rhenium(I) beta-Diketiminato. *Journal of the American Chemical Society* **2019**, 141 (2), 800-804.

Yuvaraj, K.; Douair, I.; Paparo, A.; Maron, L.; Jones, C., Reductive Trimerization of CO to the Deltate Dianion Using Activated Magnesium(I) Compounds. *Journal of the American Chemical Society* **2019**, 141 (22), 8764-8768.

Rice, N. T.; McCabe, K.; Bacsá, J.; Maron, L.; La Pierre, H. S., Two-Electron Oxidative Atom Transfer at a Homoleptic, Tetravalent Uranium Complex. *Journal of the American Chemical Society* **2020**, 142 (16), 7368-7373.

Tsoureas, N.; Maron, L.; Kilpatrick, A. F. R.; Layfield, R. A.; Cloke, F. G. N., Ethene Activation and Catalytic Hydrogenation by a Low-Valent Uranium Pentalene Complex. *Journal of the American Chemical Society* **2020**, 142 (11), 4584-4593.

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P. B Hitchcock, M. F. Lappert, L. Maron et A. V. Protchenko *Angew. Chem., Intl. Ed.* 47 (2008) 1488

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M. Sircoglou, G. Bouhadir, M. Mercy, N. Saffon, Y. Coppel, L. Maron et D. Bourissou *Angew. Chem., Intl. Ed.* 48 (2009) 3454

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A. Languérand, S. S. Barnes, G. Bélanger-Chabot, L. Maron, Ph. Berrouard, P. Audet et F. G. Fontaine *Angew. Chem., Intl. Ed.* 48 (2009) 6695

P. Gualco, T.-Z. Lin, M. Sircoglou, M. Mercy, S. Ladeira, G. Bouhadir, L. M. Perez, A. Amgoune, L. Maron, F. P. Gabbai et D. Bourissou *Angew. Chem., Intl. Ed.* 48 (2009) 9892

J. Guilhaumé, Ch. Raynaud, O. Eisenstein, L. Perrin, L. Maron et T. D. Tilley *Angew. Chem., Intl. Ed.* 49 (2010) 1816

S. Porcel, G. Bouhadir, N. Saffon, L. Maron et D. Bourissou *Angew. Chem Intl. Ed.* 49 (2010) 6186

Ph. Jochmann, Th. S. Dols, Th. P. Spaniol, L. Perrin, L. Maron et J. Okuda *Angew. Chem. Intl Ed.* 49 (2010) 7795

A. S. P. Frey, F. G. N. Cloke, M. P. Coles, L. Maron and T. Davin *Angew. Chem. Intl Ed.* 50 (2011) 6881

Mougel, V.; Camp, C.; Pecaut, J.; Coperet, C.; Maron, L.; Kefalidis, C. E.; Mazzanti, M., *Angewandte Chemie-International Edition* **2012**, 51 (49), 12280-12284.

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Fegler, W.; Venugopal, A.; Spaniol, T. P.; Maron, L.; Okuda, J., *Angewandte Chemie-International Edition* **2013**, 52 (31), 7976-7980.

Rit, A.; Spaniol, T. P.; Maron, L.; Okuda, J., *Angewandte Chemie-International Edition* **2013**, 52 (17), 4664-4667.

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Boutland, A. J.; Dange, D.; Stasch, A.; Maron, L.; Jones, C., Two-Coordinate Magnesium(I) Dimers Stabilized by Super Bulky Amido Ligands. *Angewandte Chemie-International Edition* **2016**, 55 (32), 9239-9243.

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Leich, V.; Spaniol, T. P.; Maron, L.; Okuda, J., Molecular Calcium Hydride: Dicalcium Trihydride Cation Stabilized by a Neutral NNNN-Type Macrocyclic Ligand. *Angewandte Chemie-International Edition* **2016**, 55 (15), 4794-4797.

Apostolidis, C.; Walter, O.; Vogt, J.; Liebing, P.; Maron, L.; Edelmann, F. T., A Structurally Characterized Organometallic Plutonium(IV) Complex. *Angewandte Chemie-International Edition* **2017**, 56 (18), 5066-5070

Kelly, R. P.; Maron, L.; Scopelliti, R.; Mazzanti, M., Reduction of a Cerium(III) Siloxide Complex To Afford a Quadruple-Decker Arene-Bridged Cerium(II) Sandwich. *Angewandte Chemie-International Edition* **2017**, 56 (49), 15663-15666.

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Liu, B.; Qiao, K. N.; Fang, J.; Wang, T. T.; Wang, Z. C.; Liu, D. T.; Xie, Z. G.; Maron, L.; Cui, D. M., Mechanism and Effect of Polar Styrenes on Scandium-Catalyzed Copolymerization with Ethylene. *Angewandte Chemie-International Edition* **2018**, 57 (45), 14896-14901.

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