

# CURRICULUM VITAE



Name, First Name: **SANCHEZ, Clément**

Married : 3 child

Nationality: French

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## UNIVERSITY DIPLOMAS :

- Engineer of l'Ecole Nationale Supérieure de Chimie de Paris (Major) 1978
- Doctorat ès Sciences (PhD in Physical Sciences) University of PARIS 6-Pierre et Marie Curie  
<https://www.college-de-france.fr/site/clement-sanchez/index.htm>1981

## CAREER IN NATIONAL EDUCATION

- Attaché de Recherche CNRS (1978-1982)
- Chargé de Recherche CNRS (1982-1988)
- Director of Research II CNRS (1988-1995)
- Professor at l'Ecole Polytechnique (1991-2003)
- Director of Research I CNRS (1995-2006)
- Director of Research Exceptional Class CNRS (2006-2011)
- Director of the laboratory « Chimie de la Matière Condensée» (1999-2013)
- Co-Director of the laboratory « Chimie de la Matière Condensée de Paris » UMR CNRS 7574 (2000-2004)
- Director of the laboratory « Chimie de la Matière Condensée de Paris » UMR CNRS 7574 (2005-2013)
- Professor at the Collège de France, Chaire de « Chimie des Matériaux Hybrides » (2011-2020)
- Emeritus Professor Sorbonne University (since 2020-)
- Professeur at USIAS University of Strasbourg Institut of Advanced Study (since 2020-)
- Invited Professor at University of Bordeaux (Since 2021-)

## NATIONAL SCIENTIFIC AND ADMINISTRATIVE RESPONSABILITIES

- Member of the 33th section (Materials) of 'Commission de Spécialistes', Univ-Paris-VI, (1996-2008)
- Member of the 19th section (Materials) of 'Comité National du CNRS' (2000-2008)
- Membre of the Rerearch Directory of the section 15 of 'Comité National du CNRS' (2005-2008)
- Member of the 'Directoire de la Recherche', expert for chemistry, University-Paris VI, (2000-2006)
- Member of the Directory of the Solid State Chemistry Division, Société Chimique de France, (2009-2013)
- President of the CNC (Comité National de la Chimie, French National Comitee of Chemistry) (2017---)
- Openlab Materials PSA-UPMC (2011---)

## NATIONAL AND INTERNATIONAL SCIENTIFIC RESPONSABILITIES

- Scientific expert for Materials Science of CNRS-Industry CRIN Cell (1991-1994)
- Scientific expert for materials chemistry at the Center of Atomic Energy Le Ripault (since 2001.....)

- Scientific expert for DGA in Materials Chemistry (2007- 2009)
- Member of the Scientific Advisory Comitee of "SOLEIL" , the new French synchrotron
- Head of the Nanochemistry Division C'Nano Ile de France (2006-2009)
- Member of the board «Maison de la Chimie » (2008---
- Member of the Scientific council of AC Nanosciences-Nanostructures (2002-2004)
- Member of the Scientific council of 'Action Matériaux-CNRS' (2004)
- Member of the Scientific council of 'ANR « Nanomatériaux » and Member of the directory (2005-2006)
- Scientific coordinator of the OFTA group on "*Hybrid Materials*" (1993-1996)
- **Book** " Matériaux Hybrides" Arago 17, Mai 1996, Ed Masson
- Scientific coordinator of the OFTA group on "*Biomimetism and Materials* " (1998- 2001)
- **Book** "Biomimétisme et Matériaux " Arago 25 , 2001, Ed Tech et Doc.
- Editor in Chief of the international Journal "*New Journal of Chemistry* "(2000-2004)
- Member of the Editorial Board of:
  - "*Chemical Communication*" (2000-2004)
  - "*Journal of Materials Chemistry*"(2005-2012)
- Member of the Advisory Editorial Board of:
  - "*New Journal of Chemistry*" (2005- 2009)
  - "*Chemistry of Materials* " (2004-2012)
  - "*Chemical Society Reviews* " (2011---
- French President of the (FBF) France-Berkeley Fund (2010---
- Member of the Administration Council of the Société Chimique de France (2012-2018)
- Member of the SAB, L'Oréal (2016----
- **Member of Scientific Evaluation Committee** (ITQ-Valencia 2021, CICECO Aveiro, 2014, 2018,
- **5 Max Planck Instituts as Rapporteur** in 2019 (FHI Berlin, Golm, 2 instituts in Mulheim, Mainz).

#### SCIENTIFIC ORGANIZATION or CO-ORGANIZATION OF NATIONAL SYMPOSIA

- "Matériaux Intelligents" (Société Francaise de Physique, Rennes, 1994).
- "Matériaux Hybrides" Société Chimique de France (Bordeaux, 1997).
- "Nanosciences" Société Chimique de France (Rennes, 2000).
- "Les Journées Sol-Gel du CEA" (Tours, 2004, 2006, 2007, 2014).
- "Matériaux Fonctionnels Avancés: Des Nanocéramiques aux Hybrides" (Matériaux 2006, Dijon)
- "N<sup>3</sup> Nanochimie, Nanomatériaux, Nanostructures » (Matériaux 2010, Nantes)
- SCF 2015- Energie (Lille, 2015)

#### SCIENTIFIC ORGANIZATION or CO-ORGANIZATION OF INTERNATIONAL SYMPOSIA (as Chairman or CoChairman)

- 7<sup>th</sup> International Workshop on Glasses and Ceramics from Gels (Paris, 1993)
- 1<sup>st</sup> European Workshop on Hybrid Organic-Inorganic Materials (Bierville, France, 1993):
- "Better Ceramics Through Chemistry VI", Materials Research Society (San-Francisco, 1994)
- "B. C. T. C. VII, Hybrid Materials", Materials Research Society, (San-Francisco 1996).
- "Insights into New Materials" World Congress of the *AICHE*, (1996).
- "Hybrid Materials", Materials Research Society, (San-Francisco, 1998).
- REU International meeting on "Advanced Materials", REU NSF-CNRS (Gainesville 1999).
- "Hybrid Organic-Inorganic Materials", Materials Research Society, (San-Francisco, 2000).
- REU International meeting on "Advanced Materials", REU NSF-CNRS (Paris, 2000).
- "Hybrid Organic-Inorganic Materials", Materials Research Society, (San-Francisco, 2002).
- 3 *EUROMAT* Symposia on "Biomimetic and Bioinspired approaches to Functional Inorganic and Hybrid Materials", (Lausanne, 2003).
- "Hybrid Materials", Materials Research Society, (Boston, 2004).
- "Functional Hybrid Materials: Nanoscale Objects to Nanostructured Inorganic and Hybrid Materials", European-Materials Research Society, (Strasbourg, 2005).
- "Hybrid Materials", Materials Research Society, (San Francisco, 2007).
- 1<sup>st</sup> International Conference on "Hybrid Materials", (Tours-France, 2009)
- International Conference on "Hybrid Materials II", (Strasbourg-France, 2011)
- " Electronic Organic-Inorganic Hybrid Nanomaterials: Synthesis and Device Physics", Materials Research Society, (San Francisco, 2011).
- International Conference on "Hybrid Materials IV", (Sitges-Spain, 2015)
- International Conference on "Hybrid Materials V", (Lisbonne-Portugal, 2017)
- **IUPAC -Centenary World Meeting 2019 (July Paris –France) as President**
- *International Conference on "Hybrid Materials VI", (Sitges-Spain, march 2019)*
- **In preparation** International Conference on "Hybrid Materials VII" (Genova, Italy, October 2022)

## EDITION of BOOKS and JOURNAL SPECIAL ISSUES

- Proceedings of the 1<sup>st</sup> European Workshop on Hybrid Organic-Inorganic Materials 1993.
- "Better Ceramics Through Chemistry VI", Materials Research Society Symposium Proceedings, vol 346,1994.
- Numéro special du New Journal of Chemistry, Hybrid Organic-Inorganic Materials, Oct 1994 (Guest Editor)
- "Better Ceramics Through Chemistry VII" Hybrid O-I Materials, Materials Research Society Symposium Proceedings, vol 435,1996
- Numéro spécial du Journal of Sol-gel Science and Technology, Organic-Inorganic Hybrid Materials. 1995.
- Hybrid O-I Materials, Materials Research Society Symposium Proceedings, vol 539, 1998.
- "Hybrid Organic-Inorganic Materials", Materials Research Society Symposium Proceedings, vol 528, 2000.
- "Hybrid Organic-Inorganic Materials", Materials Research Society Symposium Proceedings, vol 726 , 2002.
- "Functional Hybrid Organic-Inorganic Materials", Wiley VCH , vol XVII, 2003, ISBN 3-527-304843 2002.
- "Hybrid Organic-Inorganic Materials", Materials Research Society Symposium Proceedings, vol 847 , 2004.
- Themed Issue on "Functional Hybrid Materials", J. Mater. Chem., 215, vol 35-36, 2005.
- Special Issue of the Symposium "Functional Hybrid Materials: Nanoscale Objects to Nanostructured Inorganic and Hybrid Materials", in Progress in Solid State Chemistry (33), 2005.
- "Organic-Inorganic Hybrid Materials", Materials Research Society Symposium Proceedings, VI.1007, 2007.
- Special Issue on " *Recent progress made in Hybrid Materials Science* ", Chem. Soc. Rev., 2011.
- "Electronic Organic and Inorganic Hybrid Nanomaterials", MRS Symposium Proceedings, vol. 1359, 2011.
- "Hierarchically Structured Porous Materials", Wiley-VCH, Weinheim, ISBN-13: 978-3-527-32788-1, 2011.

## MEMBER OF SCIENTIFIC COMITEE in INTERNATIONAL MEETINGS

- 6<sup>th</sup> International Workshop on Glasses and Ceramics from Gels (Séville, Espagne, october 1991)
- Perspectives in Inorganic Chemistry, (Brixen Italy, 1995)
- Perspectives in Inorganic Chemistry, (Brixen Italy, 1996)
- Perspectives in Inorganic Chemistry, (Brixen Italy, 1997)
- SPIE International Symposium "Optical Devices for Fiber Communication", Boston, september 1999
- 13<sup>th</sup> International Zeolite Conference (Montpellier, France, July 8–13, 2001)
- Silica –2001, Mulhouse Sept 2001 France
- XIV International Symposium of OrganoSilicon Chemistry, Würzburg, july 2005
- International Mesostructured Materials Symposium, Cap Town, May 2004
- Symposium "Nanoporous Materials IV" june 2005 Niagara Falls, Canada.
- International Mesostructured Materials Symposium, Shangai, sept 2006.
- International Materials Symposium CIMTEC, Sicile, July 2006.
- Essonn' European School on Nanosciences and Nanotechnologies, Grenoble Sept 2005-2006-2007-2008
- Nanoporous V conference, Vancouver 2008.
- EUChem 2008 Conference, Turin, Italy.
- International Advisory Board of the International Sol-Gel conference, Hangzhou, China, 2011
- Advisory Board of the International Sol-Gel conference, Lyon 2022

## SCIENTIFIC DISTINCTIONS AND AWARDS

- Recipient (1978) of the Major Medal of the ENSCP
- Recipient (1983) of a NATO Fellowship
- Laureate (1988) of the IBM Price for « Materials Science »
- Laureate (1994) of the Price from the French Chemical Society (Solid State Chemistry Division)
- Recipient (1995) of the CNRS Silver Medal
- Laureate (2000) of the Yvan Pueches Price of the French Academy of sciences
- Laureate(2000) of the ADFAC –University of Paris VI Price for research valorisation
- Recipient (2007) of the Lavoisier Medal CEA Le Ripault
- Catalan-Sabatier Award of the Real Sociedad Espagnola de Quimica (2007)
- Laureate (2008) of the Gay-Lussac-Humboldt Award of the Alexander von Humboldt Foundation.
- Lecturer (2008) of the Otto-Warburg-Vorlesung, University of Bayreuth
- Guest Professor of the University of Jilin-China (2009-)
- Guest Professor of the University of Wuhan-China (2009-)
- Recipient (2009) of the P. Süe Award of the French Chemical Society
- Recipient (2010) of the Institut Français du Petrole Award of the French Academy of Sciences
- Nominated Foreign Academician of the Real Academia Nacional de Farmacia, Spain 2011.
- Nominated Academician of the European Academia of Sciences, 2010.
- Nominated Academician of the French Academie of Sciences, 2011.
- Nominated Academician of Academia Europaea, 2012.
- Nominated Fellow of the Material Research Society, 2012.
- Lecturer of the Nippon Sheet Glass-UCLA lecture, University of Los Angeles : 2014.

- Recipient of François Sommer Award « Man and Nature » 2014.
- Nominated Foreign Academician of the Royal Academia of Belgium, 2014.
- Recipient of Eni Award « Protection of the Environment » 2014.
- Nominated Fellow of the Royal Society of Chemistry, 2014.
- Recipient of the Career Award of the International Sol-Gel Society 2015.
- Guest Professor of the ETH Zurich (2016)
- Advanced Materials PSA Award 2016
- Chevalier dans l'ordre national de la légion d'honneur (2017)
- Highest Award (Grande Médaille) of the French Society for Materials & Metallurgy (SF2M) (2017)
- Nominated Academician of the World Academy of Ceramics (2017)
- Nominated Academician of the French Academy of Technologies (2018)
- International Chair Francqui Award (U. Louvain-U. Namur- U. Leuven) (2018)
- Prof C.N.R Rao Oration Lecture Award of University of Delhi (2018)
- CNR Rao Award Lecture of the Chemical Research Society of India (Raipur-2018)
- Nominated Fellow of the ISGS (International Sol-Gel Society), 2018.
- Nominated Honorary Fellow of the Chemical Research Society of India (CRSI) 2018
- Nominated Guest Professeur at University of Strasbourg Institut of Advanced Studies Chair of Chemistry of ultradivided matter USIAS (2020--)
- Blaise Pascal Medal of The European Academy of Sciences (2021)
- Guest Professor University of Bordeaux ( 021-2023)

## TECHNOLOGICAL TRANSFERT, INDUSTRIAL VALORISATION

- Basic research performed since 40 years on the field of hybrid materials yield to numerous applications (for example see the list of patents and the two general review articles J. Mater Chem., 2005 ; Chem. Soc. Rev., 2011.
- Leader of many public and industrial contracts and grants (*Rhodia, Saint-Gobain, IFPEN, Corning, Protex, Bouyges, Lafarge, l'Oréal, CEA, EADS, Sumitomo, Air liquide, Materis, Kerneos, Total, PSA, Solvay, SARP, Faurecia, ...*),
- High valorisation of the research on Hybrid Materials (co-inventor of 76 patents ).
- ADFAC-UPMC Award for Research valorisation for Hybrid Materials (2000)
- 1 commercial product with large distribution in cosmetics
- 1 licence on MOF
- Several Patented works that are at TRL 5 to 7

## RESEARCH INTERESTS and FIELDS of EXPERTISE

- \* **Designed construction of a large variety of hybrid organic-inorganic nanostructured materials**
- \* **Development of Sol-gel science & technology non only based on silica chemistry but also based on transition metal oxides, rare earth oxides, aluminium oxides , tin oxides chemistries.**
- \* **Bio-inspired approaches to hierarchically structured inorganic and hybrid organic-inorganic materials**
- \* **Soft chemistry based routes to nanostructured materials. Sustainable chemistry (chimie douce)**
- \* **Synthesis of exotic nanoparticles (metal phosphides, borides, carbides, multicationic oxides...)**
- \* **Templated synthesis of inorganic gels and mesoporous coatings and particles (self-assembly)**
- \* **Optical, electronic, ionic, catalytic and mechanical properties of nanomaterials**
- \* **Applications of hybrids in the domains of energy, environment, biomaterials and health.**

## SCIENTIFIC INDICATORS and SUMMARY of PRODUCTIONS

Publications in high impact journals: **532** Book Chapters: **17**

Publications in reviewed proceedings: **67** Patents: **72**

Book and Guest Editions: **16**

Invited Conferences **450** such as :

*Invited Conferences, Keynotes Lectures and Plenary lectures in International conferences: 212*

*Invited Conferences National Symposia: 45*

*Invited Conferences in National Universities or Industrial Research Centers: 101*

*Invited Conferences in International Universities or Industrial Research Centers: 92*

- **h factor = 112 Number of Citations > 63000 Average number of citations by article > 60**
- **(Google scholar) : <https://scholar.google.fr/citations?user=vM9snnEAAAJ&hl=fr>**
- **Belong to the list of the most cited scientists in Materials Science: <http://isihighlycited.com/> (last 20 years)**
- **list of "top 2% scientists in the world" published by Standford University 2021**  
(<https://data.mendeley.com/datasets/btchxktzyw/2>)
- **Cited in the world's most influential scientific minds 2014**

## Objectives and Strategy of my research

- To produce both fundamental and applied research at the frontier between nanosciences, biology, medicine, energy, and environment by pushing to their limits: nanochemistry developed with inorganic or hybrid matter, innovative processing techniques, modern spectroscopies and physical characterisation methods (both *ex situ* and *in situ*).
- To conceive and **to elaborate original inorganic and hybrid organic-inorganic nanostructured materials** allowing the development of innovative responses to social concerns. Study the mechanism of formation of nanomaterials from molecular inorganic and hybrid precursors to the final materials (dense and porous materials, in the form of films, fibers, powders, monoliths). We are not only developing soft and green chemical routes in green solvents, ionic liquids, molten salts but also new processing approaches at intermediate temperatures between “**Chimie douce**” and conventional solid state chemistry that allow to synthesize nanoparticles with new or broader chemical compositions.
- To understand the chemistry and processes of formation of inorganic and hybrid nanostructured materials to allow their tailored fabrication (composition, size, morphology, texture) along with a final control over their chemistry and associated behavior. Develop bio-inspired engineering permitting the access of new multifunctional architectures (hierarchical structures) with perfect control over the structure, texture, and the functionalization of the material at different length scales.

### Themes of Research

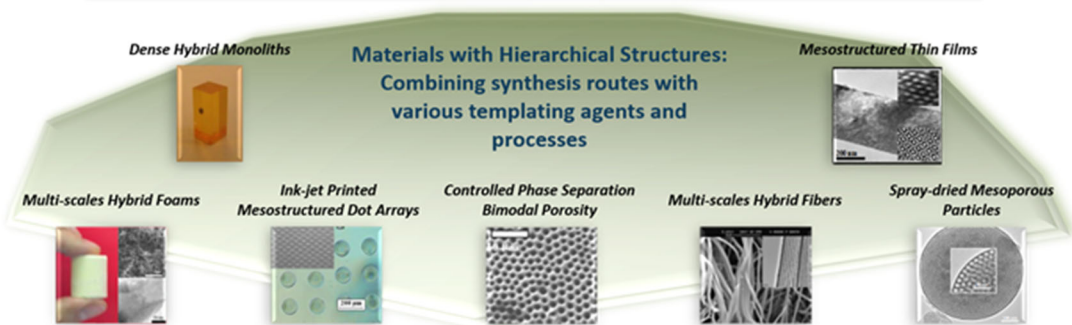
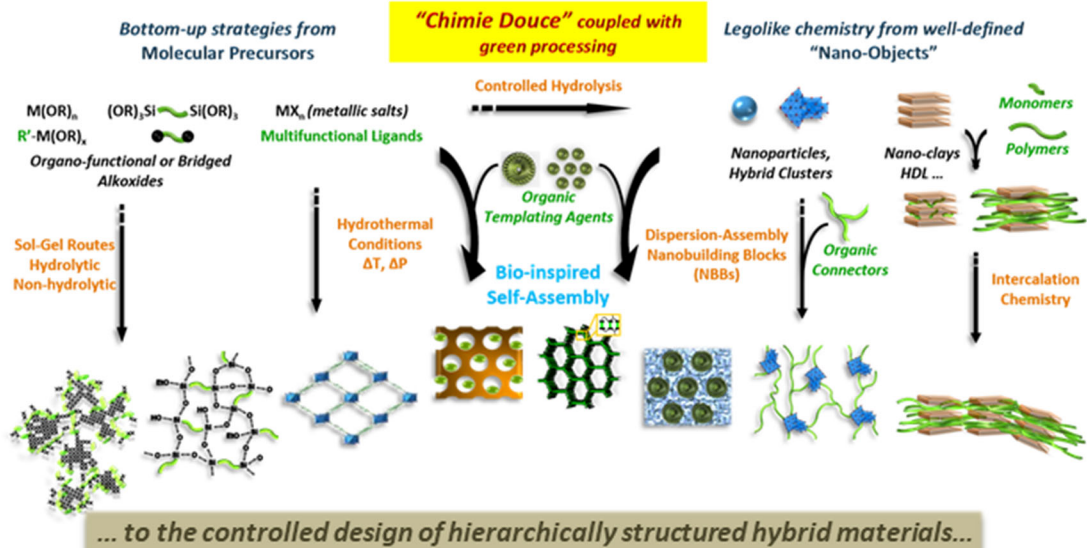
**\* Designed construction of a large variety of hybrid organic-inorganic nanostructured materials**

**\* Development of Sol-gel science & technology non only based on silica chemistry but also based on transition metal oxides, rare earth oxides, aluminium oxides , tin oxides chemistries.**

- Texturation and meso-organization of metallic oxides at organized organic interfaces.
  - Synthesis and characterization of hybrid functional nano-objects obtained by polymerization of heterofunctional molecular precursors and the study of their possible assembly.
  - Engineering new mineral structures or new inorganic nanoparticles (metal phosphides, carbides and borides, multicationic metal oxides, metal oxy-sulfides etc...) , and hybrid hierarchical structures with multiple functionalities.
  - Studying the processes of self-assembly and characterization of the organic mineral interface by spectroscopic techniques, diffraction and scattering (*in-situ* and *ex-situ* methods).
  - Synthesis of inorganic and hybrid textured materials under external stress.
  - Studying the properties (optical, electronic, mechanical, catalytic...) of novel nanomaterials.
  - Targeted application domains include: the study of some properties (optical, electronic, mechanical, catalytic...) of the novel nanostructured materials and their use as chemical and biological sensors, photoelectodes, photocatalysts, smart coatings, or as new materials for catalysis, fuel cells, microbatteries, bio-nanocomposites for tissue engineering or cosmetics, and new hybrid vectors for theragnostics.
- **The following cartoon illustrates the research field covered by C. SANCHEZ**

# Green Strategies to Bio-inspired Tailor-made Hybrid Materials

From the fundamental studies of mechanism of formation...



... targeting societal, environmental and industrial demands.

