

ALEXANDER SACHSE

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PROFESSIONAL AND RESEARCH EXPERIENCE

2015 – 2015: Post doctoral researcher at the Molecular Nanotechnology Lab, Alicante, Spain
Project: *Development of hierarchical porous zeolites by surfactant templating and application in catalysis*

2013 – 2015: Post doctoral researcher at the Institute of Chemistry at the Federal University of Rio Grande do Sul, Brazil

Project: *Development of strategies for the achievement of ordered mesoporous zeolites and their application as heterogeneous catalysts*

- Funds awarded through a Young Talent Award from the Science without Borders Program.

2011 – 2013: Post doctoral researcher at the Advanced Materials for Catalysis and Health Group of the Institute Charles Gerhardt of Montpellier, France

Project: *The employment of natural templates for the synthesis of mesoporous oxides and mixed oxides and their employment as heterogeneous catalysts*

- Founded through the French national ANR project.

2008 – 2011: PhD Student in the Advanced Materials for Catalysis and Health Group of the Institute Charles Gerhardt of Montpellier, France

Project: *Synthesis of silica and zeolite monoliths with hierarchical porosity as microreactors for in-flow catalysis*

- Founded through a Marie Curie Fellowship. Project in the framework of the European NanoHost project. Defended as European PhD.
- Visiting PhD student (from March to June 2010) at the Consiglio Nazionale delle Ricerche in the Institute of Science and Technology, Milan, Italy.

EDUCATION

2007: Diploma in chemistry (equivalent to Msc degree) from the Ludwig Maximilians Universität München, Germany

2004: Vordiplom in chemistry (equivalent to Bsc degree) from the University of Konstanz, Germany

2001: European Baccalaureate from the European School of Munich, Germany

KEY RESEARCH TECHNIQUES

- Materials synthesis: silica, alumina, titania, mixed oxides, MOFs (Metal Organic Frameworks), zeolites, materials with hierarchical porosity,...
- Synthesis strategies: sol-gel process, pseudomorphic transformation, spinodal decomposition
- Functionalization of inorganic solids: grafting, coating, co-condensation, *in situ* synthesis of nanoparticles
- Materials shaping: monoliths, fine powders, nanoparticles, films, fibers
- Shaping techniques: spray-drying, electro-spinning, spin-drying, casting
- Homogeneous and heterogeneous catalysis: batch and flow systems, diffusion limitations, deactivation of catalysts, photocatalysis, catalyst development
- Characterization techniques: Electron microscopy (SEM, TEM, EDX); Physical chemical analysis (XRD, XPS, NMR, GC, GC-MS, IR, UV/VIS, DLS, Zeta-potential); Material analysis (nitrogen sorption analysis, TGA, TPD/TPR, elemental)

COMPLEMENTARY SKILLS

- Training and supervision of new PhD, Master and undergraduate students in materials design, heterogeneous catalysis, characterization techniques and scientific paper writing
- Responsible for the organization and chairing of group meetings at the ICGM-MACS and Institute of Chemistry (UFRGS)
- I have been a trainee in the patent attorneys office Kraus&Weisert in Munich (Germany) for 14 months, gathering valuable experience and knowledge in Intellectual Property
- I am fluent in six European languages (German, Italian, English, French, Spanish, Portuguese)
- I am confident with work planning, project budgeting, project development, long and short term goal setting, administration
- Computational knowledge: MS Office, SciFinder, Origin, KaleidaGraph, ChemDraw, EndNote, Internet.

AWARDS

- PhD prize 2012 awarded from the Balard Foundation, Montpellier, France.

SUCCESSFUL FUNDRAISING

- Young Talent Award from the Science without Borders program. A program that aims to fund research projects of young scientists with “highlighted scientific and technology production”. Funds also a scholarship for one permanent undergraduate student. Budget: 324.960 BRL (≈ 102.000 Euros).

SCIENTIFIC PUBLICATIONS

15- Mesoporous Y zeolite through ionic liquid based surfactant templating

A. Sachse, C. Wuttke, U. Diaz, M. O. de Souza

Microporous Mesoporous Mater., 2015, 217, 81-86.

doi:10.1016/j.micromeso.2015.05.049

14- Alumina with tailored porosity from colloidal bio-templating of Al clusters

A. Sachse, C. Gérardin, K. L. Kostov, E. Belamie, B. Alonso

Chem. Eur. J., 2015, 21, 3206-3210.

DOI: 10.1002/chem.201405444

13- Improved Silica-Titania Catalysts by Chitin Biotemplating

A. Sachse, V. Hulea, K. L. Kostov, E. Belamie, B. Alonso

Catal. Sci. Technol., 2015, 5, 415-427.

DOI: 10.1039/C4CY00978A

12- Ordered Mesoporous ZSM-5 Employing an Imidazolium based Ionic Liquid

A. Sachse, C. Wuttke, E. Lissner, M. O. de Souza

Chem. Eur. J., 2014, 20, 14996-14999.

DOI: 10.1002/chem.201404568

11- Selective continuous flow extractive denitrogenation of oil containing S- and N-heteroaromatics using metal-containing ionic liquids supported on monolithic silica with hierarchical porosity

P. Forte, **A. Sachse**, M. Maes, A. Galarneau, D. De Vos

RSC Adv., 2014, 4, 1045-1054.

DOI: 10.1039/C3RA43585G

10- Selective hydrogenation over Pd nanoparticles supported on a pore-flow-through silica monolith microreactor with hierarchical porosity

A. Sachse, N. Linares, P. Barbaro, Fajula, A. Galarneau

Dalton Trans., 2013, 42 (5), 1378 – 1384. (Invitation: special edition for the career of David Cole-Hamilton)
DOI: 10.1039/c2dt31690k.

9- Efficient mesoporous silica–titania catalysts from colloidal self-assembly
A. Sachse, V. Hulea, K. L. Kostov, N. Marcotte, M. Y. Boltoeva, E. Belamie, B. Alonso
Chem. Commun., 2012, 48, 10648-10650.
DOI: 10.1039/C2CC35127G

8- Macroporous LTA-monoliths for in-flow removal of radioactive strontium from aqueous effluents: application to the case of Fukushima
A. Sachse, A. Merceille, Y. Barré, A. Grandjean, F. Fajula, A. Galarneau
Microporous Mesoporous Materials, 2012, 164, 251-258. (**Invitation:** special issue entitled "Porous Materials for Future Energy Supply and a Clean Environment, Dedicated to editor Prof. Jens Weitkamp for his 70th Birthday)
<http://dx.doi.org/10.1016/j.micromeso.2012.07.019>

7- In situ synthesis of Cu-BTC (HKUST-1) in macro-/mesoporous silica monoliths for use in continuous flow catalysis
A. Sachse, R. Ameloot, B. Coq, F. Fajula, B. Coasne, D. De Vos, A. Galarneau
Chem. Commun., 2012, 48, 4749-4751.
DOI:10.1039/C2CC17190B.

6- Challenges and Strategies in the Synthesis of Mesoporous Alumina Powders and Hierarchical Alumina Monoliths
S. Hartmann, **A. Sachse**, A. Galarneau
Materials, 2012, 5, 336-349. (**Feature Papers Invitation:** Special Issue on Advances in Porous Inorganic Materials.)
doi:10.3390/ma5020336

5- Alumina-grafted macro-/mesoporous silica monoliths as continuous flow microreactors for the Diels–Alder reaction
A. Sachse, V. Hulea, A. Finiels, B. Coq, F. Fajula, A. Galarneau
J. Catal., 2012, 287, 62-67.
DOI : 10.1016/j.jcat.2011.12.003

4- Monolithic flow microreactors improve fine chemicals synthesis
A. Sachse, A. Galarneau, B. Coq, F. Fajula
New J. Chem., 2011, 35(2), 259-264.
DOI:10.1039/C0NJ00965B.

3- Functional Silica Monoliths with Hierarchical Uniform Porosity as Continuous Flow Catalytic Reactors
A. Sachse, A. Galarneau, F. Fajula, F. Di Renzo, P. Creux, B. Coq
Micropor. Mesopor. Mater., 2011, 140, 58-68.
doi.10.1016/j.micromeso.2010.10.044

2- Synthesis of Zeolite Monoliths for Flow Continuous Processes. The Case of Sodalite as a Basic Catalyst
A. Sachse, A. Galarneau, F. Di Renzo, F. Fajula, B. Coq
Chem. Mater., 2010, 22, 4123-4125.
Doi : 10.1021/cm1014064

1- Functionalized Inorganic Monolithic Microreactors for High Productivity in Fine Chemical Catalytic Synthesis

A. El Kadib, R. Chimenton, **A. Sachse**, F. Fajula, A. Galarneau, B. Coq
Angew. Chem. Int. Ed., 2009, 48, 4969-4972.
Doi : 10.1002/anie.200805580

SUBMITTED PUBLICATIONS

Very Simple Strategy for the Preparation of Highly Porous γ -Alumina

A. Sachse, C. Gérardin, G. Delahay, E. Belamie, B. Alonso
in preparation.

PROCEEDINGS

Monolithes siliciques avec porosité hiérarchique en catalyse sous flux

Alexander Sachse, Anne Galarneau, François Fajula, Francesco Di Renzo, Bernard Coq
Proceedings Matériaux 2010, Nantes (18-22 octobre 2010).

ORAL PRESENTATIONS AT NATIONAL AND INTERNATIONAL CONFERENCES

15- Bio-Inspired Chitin-Silica and -Titania Nanocomposites by Self-Assembly from Colloidal Co-Suspensions

E. Belamie, **A. Sachse**, N. Marcotte, K. Kostov, V. Hulea, B. Alonso
2013 MRS Fall Meeting & Exhibit, 1-6 December 2013, Boston, United States.

14- Highly efficient silica titania catalysts obtained by a new biotemplating route

A. Sachse, E. Belamie, V. Hulea, B. Alonso
17^o Congr. Brasileiro de Catalise - VII Congr. de Catalise do Mercosul, 15-19 September 2013, Gramado, Brazil.

13- Bio-inspired chitin-oxide nanocomposites through self-assembly [Keynote]

E. Belamie, **A. Sachse**, N. Marcotte, K. Kostov, V. Hulea, B. Alonso
Euromat 2013, 8-13 September, Sevilla, Spain.

12- New mesoporous silica-titania catalysts by biotemplating - towards green catalyst preparation

A. Sachse, E. Belamie, N. Marcotte, V. Hulea, K. Kostov, B. Alonso
17th International Zeolite Conference (17th IZC), 7-12 July 2013, Moscow, Russia.

11- Monoliths with hierarchical porosity to enhance efficiency and productivity of catalysts and as a solution for radioactive wastewater treatment in flow

Anne Galarneau, **Alexander Sachse** and François Fajula
International Mesoporous Materials Symposium, IMMS 2013, 20-24 Mai 2013, Awaji Island, Japan.

10- Monoliths with hierarchical porosity for high diffusion in catalytic processes and radioactive wastewater treatment in flow

Anne Galarneau, **Alexander Sachse** and François Fajula
Third International Conference on Multifunctional, Hybrid and Nanomaterials (Hybrid Materials 2013), 3-7 March 2013, Sorrento, Italy.

9- Monoliths with homogeneous hierarchical porosity: the best design for high diffusion and high mass transfer

Anne Galarneau, **Alexander Sachse** and François Fajula
2^{ème} Journées annuelles de l'AFA (Association Française de l'Adsorption), 13-15 February 2013, Paris, France.

8- Nanocomposites chitine/oxyde bioinspirés par auto-assemblage

E. Belamie, **A. Sachse**, N. Marcotte, K. Kostov, V. Hulea, B. Alonso

GFP 2012 - 41ème colloque national, 19-22 November 2012, Grenoble, France.

7- Flow-through silica monoliths with multimodal hierarchical porosity for catalytic and separation liquid-phase processes intensification [Plenary Lecture]

F. Fajula, A. Galarneau, V. Hulea, **A. Sachse**

Symposium in honour of Ramôa Ribeiro Catalysis: From the Active Site to the Process, 8-9 October 2012, Lisbonne, Portugal.

6- Bio-inspired chitin-oxide nanocomposites through self-assembly

B. Alonso, **A. Sachse**, N. Marcotte, K. Kostov, V. Hulea, E. Belamie

Nature Inspires Chemistry Engineers, 3-5 October 2012, Nice, France.

5- Catalyse basique sous flux avec des microréacteurs monolithiques à base de zéolithes

Alexander Sachse, Anne Galarneau, Bernard Coq, Francesco Di Renzo, François Fajula

GFZ-GECAT 2011, 23-26 Mai 2011, Arêches (Savoie), France.

4- Design of Zeolite Monoliths with Controlled Macroporous Networks and their Impact in Catalysis and Separation Processes

A. Sachse, A. Galarneau, B. Coq, F. Fajula, F. Di Renzo

Second International Conference on Multifunctional, Hybrid and Nanomaterials, 6-10 March 2011, Strasbourg, France.

3- Monolithes de silice à porosité hiérarchique et ordonnée pour la catalyse

Alexander Sachse, Anne Galarneau, François Fajula, Francesco Di Renzo, Bernard Coq

Matériaux 2010, 18-22 October 2010, Nantes, France.

2- Pseudomorphic transformation of Silica Monoliths as Powerful Materials in Catalysis

A. Sachse, A. Galarneau, B. Coq, F. Fajula

9th Congress on Catalysis Applied to Fine Chemicals (CAFC9), 13-16 September 2010, Zaragoza, Spain.

1- Silica monoliths with uniform macropores and structured mesoporous (MCM-41) or microporous (silicalite) skeletons

Anne Galarneau, Alexander Sachse, François Fajula, Francesco Di Renzo, Bernard Coq

IZC-IMMS 2010, 4-9 July 2010, Sorrento, Italy.

ORAL PRESENTATIONS WITHIN A POSTER WORKSHOP AT INTERNATIONAL CONFERENCES

1- Development of hierarchical micro/mesoporous ZSM-5 using ionic liquids

Alexander Sachse, Michèle Oberson de Souza

6th FEZA conference, 8-11 September 2014, Leipzig, Germany.

POSTER PRESENTATIONS AT NATIONAL AND INTERNATIONAL CONFERENCES

11- Design of Hierarchical Porous Zeolites by Recrystallization in the Presence of Ionic Liquids

Alexander Sachse, Caroline Wuttke, Michèle Oberson de Souza

Fourth International Conference on Multifunctional, Hybrid and Nanomaterials, 9-13 March 2015, Sitges, Spain.

10- Ionic Liquids for the Design of Hierarchical Porous ZSM-5

Alexander Sachse, Caroline Wuttke, Michèle Oberson de Souza

Fourth International Conference on Multifunctional, Hybrid and Nanomaterials, 9-13 March 2015, Sitges, Spain.

9- A new class of silica-titania catalysts by chitin biotemplating

Alexander Sachse, Nathalie Marcotte, Krassimir Kostov, Vasile Hulea, Emmanuel Belamie, Bruno Alonso

XVII International Sol-Gel Conference, 25-30 August 2013 Madrid, Spain.

8- A New Class of Silica-Titania Catalysts by Chitin Biotemplating

A. Sachse, E. Belamie, N. Marcotte, K. Kostov, V. Hulea, B. Alonso

Third International Conference on Multifunctional, Hybrid and Nanomaterials (Hybrid Materials 2013), 3-7 March 2013, Sorrento, Italy.

7- Les monolithes de silice à porosité hiérarchique: une solution pour le développement des procédés en flux

A. Sachse, A. Galarneau

Journées de l'école doctorale Sciences Chimiques, 3-4 July, 2012, Montpellier, France.

6- Mise en forme des zéolithes (SOD, LTA, FAU) par synthèse pseudomorphique

J. Vittenet, M. Manko, **A. Sachse**, W. Makowski, S. Brosillon, J. Mendret, A. Galarneau

28^{ème} réunion du GFZ, 21-23 Mach 2012, Mittelwihr, France.

5- Pseudomorphic transformation of Silica Monoliths with Hierarchical Porosity and Application in Flow Catalysis

Alexander Sachse, Anne Galarneau, Francesco Di Renzo, Bernard Coq, François Fajula

Euromat 2011, 12-15 September 2011, Montpellier, France.

4- MonoSil, a Superior Catalyst for Various Industrial Applications

Alexander Sachse

Marie Curie Conference 2010, 1-2 July 2010, Turin, Italy.

3- Les monolithes à porosité hiérarchique en catalyse

Alexander Sachse, Anne Galarneau, Bernard Coq, François Fajula

GFZ 2010, 31 March – 2 April 2010, Giens, France.

2- Improvement of fine chemical productivity thanks to functionalized silica monoliths in flow-through reactions

Alexander Sachse, Abdelkrim El Kadib, Anne Galarneau, Bernard Coq, François Fajula

ISHHC XIV, International Symposium on Relations between Homogeneous and Heterogeneous Catalysis, 13-18 September 2009, Stockholm, Sweden.

1- Improvement of fine chemical productivity thanks to functionalized silica monoliths in flow-through reactions

Alexander Sachse, Abdelkrim El Kadib, Anne Galarneau, Bernard Coq, François Fajula

IDECAT Conference on Catalysis, 19-24 Mai 2009, Porquerolles, France.

ORGANIZATION OF CONFERENCES

- 17^o Congr. Brasileiro de Catalise - VII Congr. de Catalise do Mercosul, 15-19 September 2013, Gramado, Brazil.
- NanoHost workshop “Design of Hierarchically Ordered Materials for Catalysis” – 4-6 October 2010 Montpellier, France.
- Chairman at the Hybrid Materials conference, 3-7 March 2013, Sorrento, Italy.

LECTURES AND SEMINARS

- Invited speaker at the “2° Ciclo de Palestras sobre Peneiras Moleculares”: Design of hierarchical porous materials for catalytic applications. Monoliths as flow-through microreactors and mesoporous zeolites.
UFRN, 12-13 November 2014, Natal, Brazil.
- Strategies for the Implementation of Catalysis in Flow [Seminar]
Institute of Chemistry of UFRGS, 11 Mai 2012, Porto Alegre, Brazil.
- Monoliths for Flow-Through Catalysis
NanoHost meeting, 6-9 June 2011, St. Andrews, Great Britain.
- Monolithes à porosité hiérarchique pour la catalyse sous flux
Journée Scientifique de l'ICGM, 24 March 2011, Teyran, France.
- Hierarchical porous Materials as Heterogeneous Catalysts
NanoHost workshop, 4-6 September 2010, Montpellier, France.
- Functionalized Monoliths with Hierarchical Porosity for the Fine Chemical Production
NanoHost meeting, 13-14 Sept. 2009, Stockholm, Sweden.

TRAINING & DEVELOPMENT

- Workshop “Chemical Engineering”, CNRS Lyon (5 days)
- Workshop “Characterization of Porous Solids”, CNRS Marseille (3 days)
- NanoHost workshop “Design of Hierarchically Ordered Materials for Catalysis”, ICGM (2 days)
- Training on “Communication and Management”, University of Montpellier (21 hours)
- Training on “Time Management”, University of Montpellier (20 hours)
- Learning to use a ultramicrotome (UFRGS, 20 h)
- SEM training (University of Montpellier, 20 h)

TEACHING/LECTURING

- Lecture of Heterogeneous Catalysis for undergraduate chemistry students. Including preparation and correction of exams. UFRGS (2014).
- Practical lectures of Physical Chemistry for undergraduate chemistry students. Including supervision of experiments, preparation and correction of exams. UFRGS (2014).
- Lecture of General Chemistry for medicine students. Including practical and theoretical lessons, preparation and correction of exams. LMU (2008).

TRAINING & SUPERVISION OF PHD STUDENTS

September 2010 – September 2011: Maria Manko, visiting PhD student from the Krakow University (Poland) under the direction of Prof. Dr. Wacław Makowski and Dr. Anne Galarneau. The research project concerned the “study of hierarchical porous materials by thermodesorption of various molecules”.

March – June 2011: Yvonne Hoenneman, visiting PhD student from the Università degli Studi di Milano (Italy) under the direction of Dr. Vladimiro Dal Santo. The research project concerned the “synthesis of silica monoliths with hierarchical porosity and their functionalization with sulfonic acid groups for selective catalytic reactions of sugars”.

October – December 2010: Ruben Duque, visiting PhD student from the University of St. Andrews (United Kingdom) under the direction of Prof. Dr. David Cole-Hamilton. The research project concerned the “adsorption of ionic liquids and catalysts on silica monoliths with hierarchical porosity”.

September 2011: Paolo Forte, visiting PhD student from the Katholieke Universiteit Leuven (Belgium) under the direction of Prof. Dr. Dirk de Vos. The research project concerned the

“adsorption of ionic liquids and copper based catalysts on hierarchical porous silica monoliths for the extraction of sulfur species”.

SUPERVISION OF MASTER STUDENTS

August – December 2013: Alexandre Müller, Master student under the direction of Prof. Dr. Michèle Oberson de Souza. The research project concerned the “employment of MCM-41 containing ionic liquids in the chemical fixation of CO₂ into cyclic carbonates”.

February – June 2012: Bilel Said, Master of Science student under the direction of Dr. Anne Galarneau. The research project concerned the “dehydration of fructose to HMF (5-hydroxymethylfurfural, via biofuel dimethylfuran (DMF)) catalysis in continuous flow with functionalized silica monoliths with hierarchical porosity”.

SUPERVISION OF UNDERGRADUATE STUDENTS

September 2014 – present: Lina Strack, IC Student
Synthesis of functional porous materials.

September 2013 – present: Caroline Wuttke, IC Student
Pseudomorphic transformation of conventional H-ZSM-5 into hierarchical H-ZSM-5.

September 2013 – present: Carine Klauke, IC Student
Synthesis and properties of rubber functionalized with zeolites.