

Vincent Guillerm

Address: King Abdullah University of Science and Technology, Thuwal, Saudi Arabia

E-mail: guillerm.vincent@yahoo.com

Mobile: +966 569180308

Doctor of Philosophy in Chemistry and Materials

27 publications; h-index: 17 (google scholar)

PROFESSIONAL EXPERIENCES

2011 – Present **Post-Doctoral Fellow**

Functional Materials Design, Discovery & Development research group

King Abdullah University of Science and Technology (KAUST), Saudi Arabia

- Design Metal-Organic Frameworks (MOFs) and Covalent Organic Frameworks (COFs) materials, conduct their synthesis, characterization and study their gas storage/separation properties.
- Train, guide and supervise Master/PhD students, newly arrived Post-Docs; review Master thesis and Powerpoint/Prezi presentations.
- Assist PhD students/Post-docs in manuscript preparation: suggest general outlines and improvements
- Collaborate with academic research group (M.S. Lah, Korea) and coordinate review publication project
- Collaborate with industry (Saudi Aramco), prepare reports and present results for scientific committee
- Monitor and maintain the lab chemicals and consumables stock (placing orders for the group)
- Develop processes and communication in the lab/group: initiate/improve the use of internal files and databases (structure list, online equipment schedule, chemical ordering process, Sharepoint, etc.)
- Undertake the [group website](#) improvement project (updates publications, news, highlights, etc.) and coordinate with IT department
- Initiate and lead scientific visualization projects: Develop videos; design journal front covers, figures for publication, artworks; prepare Powerpoints for PI and research scientists, etc.
- Share visualization skills, scientific knowledge: give training, lectures, tutoring sessions; review drafts, etc.

Referee: **Prof. Mohamed Eddaoudi**. *e-mail:* mohamed.eddaoudi@kaust.edu.sa; *mobile:* +966 544700025

2007 – 2011 **Ph.D. project:** "*Synthesis, functionalization and adsorption properties of new hybrid porous solids*"

Porous Solids Group, Université de Versailles - Institut Lavoisier, France

- Synthesized, functionalized and characterized novel flexible MOFs (M^{III}) and tetravalent MOFs (Ti, Zr, Hf)
- Collaborated with academics: collected, refined and interpreted data from *in-situ* X-ray powder diffraction coupled with gas sorption (Synchrotron experiments, ESRF - France)
- Collaborated with industry (Total, IFP), prepared reports and presented results to scientific committee
- Operated the high pressure gravimetric gas sorption equipment (Hiden IGA), including data collection for collaborators (for example: Prof. Stock, Germany)
- Oversaw Master student projects
- Initiated and developed the use of internal shared files (online equipment schedule, shared folders, etc.)

Referee: **Dr. Christian Serre**. *e-mail:* serre@chimie.uvsq.fr; *telephone:* +33 139254305

2007 **Master project:** "*Rare earth hexanuclear compounds as precursors for new materials*"
Institut National des Sciences Appliquées (INSA), Rennes, France

- Synthesis and characterization of rare earth based inorganic materials and MOFs

Referee: **Prof. Olivier Guillou**. *e-mail:* olivier.guillou@insa.fr; *telephone:* +33 223238438

SKILLS AND EXPERTISES

Fields of Expertise: Inorganic chemistry, porous materials (MOFs, COFs, etc.), crystalline materials, topology and materials design, sorption properties (gas storage, separation, etc.)

Administration, Scientific Visualization: Student guidance and supervision; Preparation and review of manuscript, powerpoint, reports, etc. Videos creation, POV-Ray imaging, etc.

Peer Review: Reviewer for J. Mater. Chem. A (Regular); J. Am. Chem. Soc. (Occasional)

Analysis - Characterization:

- X-ray diffraction (powder and single crystal) phase analysis, cell indexing, refinement and structure solution
- Structure topology: topology analysis (TOPOS), structure simulation (forcite)
- Gas sorption properties: collect analyse and interpret gas sorption isotherm (Belsorp, Micromeretics, Quantachrome)
- Other: supercritical CO₂ activation, thermogravimetric analysis, infrared spectroscopy, etc.

Trainings:

- *in-situ* infrared spectroscopy training placement (2009, University of Caen, Dr. Vimont, France)
- H₂S sorption training placement (2010, University of Mons, Prof. De Weireld, Belgium)
- TOPOS school (topology of periodic nets) workshop by Prof. Michael O'Keeffe (2014)

Language skills: English (fluent), French (native language), Spanish (conversational)

Computer skills:

- Specific software : Expo and FullProf Suite (structure solution and refinement from powder diffraction), Diamond, Materials Studio (including forcite tool), TOPOS, NonOrthoSA (surface area simulation), APEX, Avizo (scientific visualization)
- Responsible of the FMD³ group website (updates, news, highlights, publications, etc.); knowledge in HTML language
- General: SAP, Sharepoint, Origin, Microsoft Office Suite, Photoshop, Illustrator, Lightroom, etc.

EDUCATIONAL BACKGROUND

- 2007-2011** **Ph.D. in Chemistry & Materials - Metal-Organic Frameworks Chemistry**
Université de Versailles – Institut Lavoisier, France
- 2005-2007** **Master of Science in Chemistry, specializing in Solid State Chemistry and Materials**
Université de Rennes 1, France
Indian Institute of Science (IISc) – Materials Research Centre, Bangalore, India (internship, 2006)
- 2002-2005** **Bachelor of Science in the Physics and Chemistry of Materials**
Université de Valenciennes, France
Université de Rennes 1, France

ADDITIONAL EXPERIENCES

Elected by the Dean of the Physical Science and Engineering division to be part of the “post-doc task force” committee (2014)

Gave Practical Chemistry courses: Faculté de Médecine, Université de Paris V, Paris, France (2009-2010)

Offered Chemistry, Physics & Mathematics private tuitions: Acadomia tuition center, Rennes, France (2006-2007)

Travels and Photography: Asia (India, Burma, Malaysia...), Middle East (Saudi Arabia, UAE, Oman...), etc.
Invited for travel photography exhibitions (France); awarded with prizes (Saudi national day art competition 2013)

PATENTS

Design, synthesis and characterization of Metal-Organic Frameworks

US Provisional Number: 62/002,950, Priority Date May 26th 2014

Direct and post-synthetic approach for aldehydes/polyamine based porous materials with enhanced carbon dioxide capture/separation

US Provisional Number: 61/906,700, Priority Date Nov 20th 2013

ACCEPTED PUBLICATIONS

27. V. Guillerm, D. Kim, J.F. Eubank, R. Luebke, X. Liu, K. Adil, M.S. Lah and M. Eddaoudi

A supermolecular building approach for the design and construction of Metal-Organic Frameworks

Chemical Society Reviews, **2014**, DOI: 10.1039/c4cs00135d

26. V. Guillerm, Ł.J. Weseliński, Y. Belmabkhout, A.J. Cairns, V. D'Elia, Ł. Wojtas, K. Adil and M. Eddaoudi

Discovery and introduction of a (3,18)-connected net as an ideal blueprint for the design of Metal-Organic Frameworks

Nature Chemistry, **2014**, DOI: 10.1038/NCHEM.1982

25. O. Shekhah, Y. Belmabkhout, C. Zhijie, V. Guillerm, A.J. Cairns, K. Adil and M. Eddaoudi

Made-to-order metal-organic frameworks for trace carbon dioxide removal and air capture

Nature Communications, **2014**, 5, 4228

24. V. Guillerm, Ł.J. Weseliński, M. Alkordi, M.I. H. Mohideen, Y. Belmabkhout, A.J. Cairns, and M. Eddaoudi

Porous organic polymers with anchored aldehydes: A new platform for post-synthetic amine functionalization en route for enhanced CO₂ adsorption properties

Chemical Communications, **2014**, 50, 1937 – 1040; **Highlighted as ChemComm front cover**

23. S. Vaesen, V. Guillerm, Q. Yang, A. Wiersum, B. Marszalek, B. Gil, A. Vimont, M. Daturi, T. Devic, P.L. Llewellyn, C.

Serre, G. Maurin and G. De Weireld

A robust amino-functionalized titanium (IV) based MOF improved separation of acid gases

Chemical Communications, **2013**, 49, 10082 – 10084

22. F. Salles, H. Jobic, T. Devic, V. Guillerm, C. Serre, M. Koza, G. Férey and G. Maurin

Diffusion of binary CO₂/CH₄ mixtures in the MIL-47(V) and MIL-53(Cr) MOF type solids: a combination of neutron scattering measurements and molecular dynamics simulations

Journal of Physical Chemistry C, **2013**, 117, 11275 – 11284

21. Q. Yang, V. Guillerm, F. Ragon, A.D. Wirsum, P.L. Llewellyn, C. Zhong, T. Devic, C. Serre and G. Maurin

CH₄ storage and CO₂ capture in highly porous zirconium oxide based metal-organic frameworks

Chemical Communications, **2012**, 48, 9831 – 9833

20. V. Guillerm, F. Ragon, M. Dan-Hardi, T. Devic, M. Vishnuvarthan, B. Campo, A. Vimont, G. Clet, Q. Yang, G. Maurin, G. Férey, A. Vittadini, S. Gross and C. Serre

A series of isorecticular, highly stable, porous zirconium oxide based metal-organic frameworks

Angewandte Chemie International Edition, **2012**, 51(37), 9267 – 9271

Angewandte Chemie, **2012**, 124(37), 9401 – 9405; **Selected as hot paper and inside cover**

19. A. Ghoufi, A. Subercaze, Q. Ma, P.G. Yot, I. Puente-Orench, T. Devic, V. Guillerm, C. Zhong, C. Serre, G. Férey and G. Maurin

Comparative guest, thermal, and mechanical breathing of the porous Metal Organic Framework MIL-53(Cr): A computational exploration supported by experiments

Journal of Physical Chemistry C, **2012**, 116, 13289 – 13295

18. S. Devautour-Vinot, G. Maurin, C. Serre, P. Horcajada, D. Paula da Cunha, V. Guillerm, E. de Souza Costa, F. Taulelle and C. Martineau

Structure and dynamics of the functionalized MOF type UiO-66(Zr): NMR and dielectric relaxation spectroscopies coupled with DFT calculations

Chemistry of Materials, **2012**, 24, 2168 – 2177

17. D.I. Kolokolov, A.G. Stepanov, V. Guillerm, C. Serre, B. Frick and H. Jobic

Probing the dynamics of the porous Zr terephthalate UiO-66 framework using ²H NMR and neutron scattering

Journal of Physical Chemistry C, **2012**, 116, 12131 – 12136

16. G.D. Pirngruber, L. Hamon, S. Bourrelly, P.L. Llewellyn, E. Lenoir, V. Guillerm, C. Serre and T. Devic

A method for screening the potential MOFs as CO₂ adsorbents in Pressure Swing Adsorption processes

Chemistry and Sustainability, Energy and Materials, **2012**, 5, 762 – 776

15. L. Hamon, N. Heymans, P.L. Llewellyn, V. Guillerm, A. Ghoufi, S. Vaesen, G. Maurin, C. Serre, G. De Weireld and G.D. Pirngruber
Separation of CO₂-CH₄ mixtures in the mesoporous MIL-100(Cr) MOF: Experimental and modeling approaches
Dalton Transactions, **2012**, 41, 4052 – 4059
14. A. D. Wiersum, E. Soubeyrand-Lenoir, Q. Yang, B. Moulin, V. Guillerm, M. Ben Yahia, S. Bourrelly, A. Vimont, S.R. Miller, C. Vagner, M. Daturi, G. Clet, C. Serre, G. Maurin and P. L. Llewellyn
An evaluation of UiO-66 for gas-based applications
Chemistry, An Asian Journal, **2011**, 6, 3270 – 3280
13. Q. Yang, A.D. Wiersum, P.L. Llewellyn, V. Guillerm, C. Serre and G. Maurin
Functionnalizing porous zirconium terephthalate UiO-66(Zr) for natural gas upgrading: a computational exploration
Chemical Communications, **2011**, 47, 9603 – 9605
12. Q. Yang, H. Jobic, F. Salles, D. Kolokolov, V. Guillerm, C. Serre and G. Maurin
Probing the dynamics of CO₂ and CH₄ within the porous zirconium terephthalate UiO-66(Zr): A synergic combination of neutron scattering measurements and molecular simulations
Chemistry, A European Journal, **2011**, 17, 8882 – 8889
11. Q. Yang, A.D. Wiersum, H. Jobic, V. Guillerm, C. Serre, P.L. Llewellyn and G. Maurin
Understanding the thermodynamic and kinetic behavior of the CO₂/CH₄ gas mixture within the porous zirconium terephthalate UiO-66(Zr) : A joint experimental and modelling approach
Journal of Physical Chemistry C, **2011**, 115, 13768 – 13774
10. F. Salles, S. Bourrelly, H. Jobic, T. Devic, V. Guillerm, P.L. Llewellyn, C. Serre, G. Férey and G. Maurin
Molecular insight into the adsorption and diffusion of water in the versatile hydrophylic/hydrophobic flexible MIL-53(Cr) MOF
Journal of Physical Chemistry C, **2011**, 115, 10764 – 10776
9. T. Anghfeld, J. Moellmer, V. Guillerm, R. Staudt, C. Serre and N. Stock
High-throughput and time-resolved EDXRD study of the formation of CAU-1-(OH)₂ – Microwave and Conventional Heating
Chemistry, A European Journal, **2011**, 17, 6462 – 6468
8. C. Zlotea, D. Phanon, M. Mazaj, D. Heurtaux, V. Guillerm, C. Serre, P. Horcajada, T. Devic, E. Magnier, F. Cuevas, G. Férey, P.L. Llewellyn, and Michel Latroche
Effect on hydrogen sorption properties of NH₂ and CF₃ functionalization of MOFs
Dalton Transactions, **2011**, 40, 4879 – 4881
7. P.S. Bárcia, D. Guimarães, P.A.P. Mendes, J.A.C. Silva, V. Guillerm, H. Chevreau, C. Serre and A.E. Rodrigues
Reverse shape selectivity in the adsorption of hexane and xylene isomers in MOF UiO-66
Microporous & Mesoporous Materials, **2011**, 139, 67 – 73
6. S. Bernt, V. Guillerm, C. Serre and N. Stock
Direct covalent post-synthetic chemical modification of Cr-MIL-101 using nitrating acid
Chemical Communication, **2011**, 47, 2838 - 2840
5. V. Guillerm, S. Gross, C. Serre, T. Devic, M. Bauer and G. Férey
A zirconium methacrylate oxocluster as precursor for the low-temperature synthesis of porous zirconium(IV) dicarboxylates
Chemical Communications, **2010**, 46, 767 – 769
4. D.I. Kolokolov, H. Jobic, A.G. Stepanov, V. Guillerm, T. Devic, C. Serre and G. Férey
Dynamics of benzene rings in MIL-53(Cr) and MIL-47(V) frameworks studied by ²H NMR
Angewandte Chemie International Edition, **2010**, 49(28), 4791 – 4794
Angewandte Chemie, **2010**, 122(28), 4901 – 4904
3. D.I. Kolokolov, H. Jobic, A.G. Stepanov, M. Plazanet, M. Zbiri, J. Ollivier, V. Guillerm, T. Devic, C. Serre and G. Férey
Comparison of the dynamics of MIL-53(Cr) and MIL-47(V) frameworks using neutron scattering and DFT methods
The European Physical Journal – Special Topics, **2010**, 189, 263 - 271
2. L. Hamon, P.L. Llewellyn, T. Devic, A. Ghoufi, G. Clet, V. Guillerm, G.D. Pirngruber, G. Maurin, C. Serre, G. Driver, W. Van Beek, E. Jolimaître, A. Vimont, M. Daturi and G. Férey
Co-adsorption and separation of CO₂-CH₄ mixtures in the highly flexible MIL-53(Cr) MOF
Journal of the American Chemical Society, **2009**, 131(47), 17490 – 17499
1. G. Calvez, O. Guillou, C. Daguebonne, P.-E. Car, V. Guillerm, Y. Gerault, F. Le Dret, N. Mahé
Octahedral hexanuclear complexes involving light lanthanide ions
Inorganica Chimica Acta, **2008**, 361, 2349 – 2356