Vincent Demers-Carpentier

CONTACT INFORMATION

Material Science and Engineering Department (847) 491-5874
Northwestern University vincent.demers-carpentier@northwestern.edu
Evanston, Il 60208

CITIZENSHIP Canada

RESEARCH INTERESTS

Catalysis for sustainable energy, Applications of nanoscale surface properties, Chiral surface reactivity, Functionalization of nanomaterials.

EDUCATION

Postdoctoral Fellowship, Northwestern University (USA). *In progress*

- Adviser: Professor Mark Hersam
- Area of Study: Nanomaterials

Ph.D. Chemistry, Université Laval (Canada). *August 2012*

- Thesis topic: *Direct Sub-Molecular Observation and Manipulation of Chirality Transfer Preorganization on a Catalyst Surface: Determining the Mechanism for Chirality Transfer.*
- Adviser: Professor Peter McBreen
- Area of Study: Surface Chemistry

M.S. Chemistry, Université Laval (Canada); *December 2008*

- Memoire Topic : *Study of Keto-Enol Tautomerization Driven Self-Assembly on Pt(111) using Surface Vibrational Spectroscopy and Scanning Tunnelling Microscopy.*
- Adviser: Professor Peter McBreen
- Area of Study: Surface Chemistry

B.S. Engineering Physics, Université Laval (Canada); *May 2007*

- Specialization in Materials Science

Undergraduate Researcher, Université Laval; 2005-2007

- Adviser: Professor Peter McBreen
- Part of a collaboration with the Nuckolls Group at Columbia University resulting in a joint publication in Angewandte Chemie.

SCHOLARSHIPS

Natural Sciences and Engineering Research Council of Canada (NSERC)

- Alexander Graham Bell Canada Graduate Scholarship (*2009*)
- Postdoctoral Fellowship Program (*2012*)

Fonds de recherche sur la nature et les technologies (FQRNT)

- Masters Graduate Scholarship (B1) (*2008*)

AWARDS

- Selected oral presentation ''Hot Topics in Surface Chemical Reactions'' Gordon Conference on Chemical Reactions at Surfaces (2011).
- Lauréat Étudiant-Chercheur Étoile, April 2012, Fonds de recherche sur la nature et les technologies (FQRNT).
- Lauréat Radio-Canada/Le Soleil, May 20th 2012.
- 2nd place Poster Competition, Seeing at the Nanoscale Conference 2013.

PUBLICATIONS

1- Demers-Carpentier, V.; Rasmussen, A.H.; Goubert, G.; Ferrighi, L.; dong, Y.; Lemay, J.-C.; Masini, F.; Zeng, Y.; Hammer, B.; McBreen, P.H. *Stereodirection of an α-Ketoester at Sub-Molecular Sites on Chirally Modified Pt(111): Heterogeneous Asymmetric Catalysis* J. Am. Chem. Soc. (Accepted with minor revisions)

2- Demers-Carpentier, V.; Goubert, G.; Masini, F.; Dong, Y.; Rasmussen, A.H.; Hammer, B.; McBreen, P.H. *Scanning Tunneling Microscopy Measurements of the Full Cycle of a Heterogeneous Asymmetric Hydrogenation Reaction on Chirally Modified Pt(111)* J. Phys. Chem. Lett. **2012**, 3, 92.

3- Demers-Carpentier, V.; Goubert, G.; Masini, F.; Lafleur-Lambert, R.; Dong, Y.; Lavoie, S.; Mahieu, G.; Rasmussen, A.; Ferrighi, L.; Gao, H.; Pan, Y.; Hammer, B.; McBreen, P. H. *Direct Sub-Molecular Observation of Chirality Transfer Preorganization on a Catalyst Surface* Science, **2011**, 334, 776.

4- Goubert, G.; Demers-Carpentier, V.; Masini, F.; Dong, Y.; Lemay, J.-C.; McBreen, P. H. *Weak Interactions in the Assembly of Strongly Chemisorbed Molecules* Chem. Commun. **2011**, 47, 9113.

5- Brunelle, J.; Demers-Carpentier, V.; Lafleur-Lambert, R.; Lavoie, S.; Mahieu, G.; Goubert, G.; McBreen, P.H. *Disrupting aryl-CH¨O Interactions of Pt(111): Disrupting Aryl-CH…O Interactions on Pt(111) Through the Coadsorption of Trifluoroacetic Acid and 2,2,2-Trifluoroacetophenone (TFAP): Inhibition of Competing Processes in Heterogeneous Asymmetric Catalysis* Top. Catal. **2011**, 54, 1334.

6- Demers-Carpentier, V.; McBreen, P.H. *Surface Vibrational Spectroscopy Study of Benzene and 2,2,2-Trifluoroacetophenone on Pt(111)* J. Phys. Chem. C **2011**, 115, 6513

7- Demers-Carpentier, V.; Laliberté, M.-A.; Pan, Y.; Mahieu, G.; Lavoie, S.; Goubert, G.; Hammer, B.; McBreen, PH.. *Tuning Aryl-CH···O Intermolecular Interactions on Pt(111)* J. Phys. Chem. C **2011**, 115, 1355

8- Demers-Carpentier, V.; Laliberté, M.-A.; Lavoie, S.; Mahieu, G.; McBreen, P.H. *Two-Dimentional Self-Assembly and Catalytic Function : Conversion of Chiral AcIcohols into Self-Assembled Enols on Pt(111)* J. Phys. Chem. C **2010**, 114, 7291

9- Lavoie, S.; Laliberté, M.-A.; Mahieu, G.; Demers-Carpentier, V.; McBreen, P.H. *Keto-Enol Driven assembly of Methyl Pyruvate on Pt(111)*. J. Am. Chem. Soc. **2007**, 129, 11668

10- Rim, K.T.; Siaj, M.; Xiao, S.; Myers, M.; D. Carpentier, V.; Liu, L.; Su, C.; Steigerwald, M.; Hybertsen, M.S.; McBreen, P.H.; Flynn, G.W.; Nuckolls, C. *Forming Aromatic Hemispheres on Transition-Metal Surfaces* Angew. Chemie. Int. Ed. **2007**, 46, 7891

CONFERENCE PRESENTATIONS

Oral Presentation at ACS Spring 2011 National Meeting & Exposition. San Diego (USA), March *2012*

Oral Presentation at ACS Fall 2011 National Meeting & Exposition. Denver (USA), *August 2011*

Oral Presentation at CSC 94th Conference and Exhibition. Montreal (Canada) June 2011

Oral Presentation at Gordon Conference Chemical *Reactions at Surfaces* in the ''Hot Topics'' session. Ventura (USA), February 2011

Oral Presentation at AVS 55th International Symposium. Boston (USA), *October 2008*

Poster Presentations
10th Int. Conference on Atomically Controlled Surfaces, Interfaces and Nanostructures, *September 2009*, Granada (Spain) and 6 others.

TECHNICAL SKILLS

Hands-on operation, design and maintenance of three different multi-technique UHV systems

Utilization and optimisation of the following surface science techniques:

- Scanning Tunnelling Microscopy (STM)
- High Resolution Electron Energy Loss Spectroscopy (HREELS)
- Reflection-Absorption Infrared Spectroscopy (RAIRS)
- Thermal Desorption Spectroscopy (TDS) and Auger Electron Spectroscopy (AES)
- X-Ray Photoelectron Spectriscipy (XPS)

TEACHING EXPERIENCE

- Lab Instructor and Grader for CHM-2004: Undergraduate Physical Chemistry Laboratory
- Supervision of summer interns (*summer 2007, 2008, 2009 and 2010*)

REFERENCES :

Peter McBreen (Thesis Advisor)

- peter.mcbreen@chm.ulaval.ca

Bjoerk Hammer (Head of Collaborating Group)

- hammer@phys.au.dk

Mark Hersam (Postdoc supervisor)

- m-hersam@northwestern.edu