

# ROBERT O. SAVINELLI

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## OBJECTIVE

To advance my role as a leader in the rapidly changing dynamic between business, energy, and the environment.

## PRESENT POSITION

I am currently a Ph.D. candidate in the Department of Chemistry and Biochemistry at the University of California in Santa Barbara. My work is supervised by Professor Susannah L. Scott.

## EDUCATION

Ph.D. Inorganic Chemistry	University of California, Santa Barbara	2010 (Anticipated)
B.A. Chemistry	The Colorado College	2000 (A.C.S. certified)

## PROFESSIONAL EXPERIENCE

**University of California**, *Research associate*, Advisor: Prof. Susannah L. Scott (Mar 2005 – present)

Ph.D. Research. **Structural and catalytic evaluation of molybdenum oxide and carbide catalysts.** I have prepared supported and unsupported catalysts for use in water-gas shift and methane dehydroaromatization. Surface carbon deposition was analyzed using X-ray photoelectron spectroscopy (XPS). Wavelet Transform EXAFS was used to elucidate the structure of Mo sites inside zeolites channels.

Synchrotron Experience. I have collected many *ex-situ* and *in-situ* X-ray absorption spectra at the Stanford Synchrotron Radiation Lightsource (2005 – 2009), and the Advanced Photon Source (2005).

Lab Responsibilities. Website design, automated micro-reactor operation and training, XPS training.

Inorganic Proposal Title. **Synthesis of glycerol carbonate from glycerol and carbon dioxide.**

**Dalian Institute of Chemical Physics**, *Visiting scholar*, Advisor: Prof. Bao Xinhe (Jun 2006 – Nov 2006)

State Key Laboratory of Catalysis. Research was conducted in northeastern China.

Topic. **Olefin metathesis under flowing conditions on supported Mo<sub>2</sub>C catalysts**

Chinese Technology Study Tour. I coordinated with the Technology Management Program at UCSB and DICP, to organize a 5 day study tour of Microsoft, The BP Clean Energy Centre / Tsinghua University, Capital Steel, The National Science Foundation, Kodak, General Electric, Accelergy, UOP, BP-SECCO, and BASF in Beijing and Shanghai. In total 22 students and 2 professors attended the tour in China. (2007)

Workshops and Conferences

**Materials Research Society Fall meeting**, Boston, MA (2009)

**21st North American Catalysis Society meeting**, San Francisco, CA (2009)

**Grand challenges in electron chemistry and catalysis at interfaces workshop**, UCSB, CA (2008)

**Gordon Research Conference on Catalysis**, Colby Sawyer College, NH (2008)

**National Science Foundation meeting of principal investigators**, Arlington, VA, (2007)

**Workshop on Electron Chemistry and Catalysis**, Dalian, China (2007)

**12<sup>th</sup> US China Joint Commission Meeting on Science and Technology**, Beijing, China (2006)

**13<sup>th</sup> Chinese Catalysis Society national meeting**, Lanzhou, China (2006)

**Techniques of Surface Science and Catalysis summer school**, UCSB, CA (2006)

**Workshop on Hydrogen Fuel cells for Utility and Transportation Applications**, LANL, NM (1996)

**Nusil Silicone Technology R &D**, *Synthetic chemist*, CA (Jun 2004 – Sep 2004)

I received ISO 9001 training in synthetic silicone chemistry and worked on a number of projects to make materials with specific elastomeric properties which could be scaled up for the production of specialty polymers used in the medical industry.

**Kaplan**, *MCAT and DAT instructor*, CA (Jan 2004 – Feb 2006)

I taught lessons in general chemistry, organic chemistry, math, verbal skills, and perceptual ability to college seniors preparing for entrance exams into medical and dental school.

**Santa Barbara Public School District**, *Substitute teacher*, Ca (Mar 2004 – Jun 2004)

Prior to joining Nusil, I worked as a substitute high school and middle school teacher.

**Avinoak**, *Solar technician*, CA (May 2003 – Feb 2004)

I installed solar heating and PV systems.

**Blue Star EMEX**, *Technical staff member*, CO (Jun 2001 – Dec 2002)

I was directly involved with the preparation and testing of cobalt based Fisher Tropsch catalysts and contributed to the design, fabrication, and operation of Blue Star's natural gas to diesel pilot plant. I prepared and screened prospective catalysts at high temperature, and pressure in bench reactors controlled using NI Lookout. I used GC, NDIR, GC-MS, TOC, and tested pour point, cloud point, and lubricity when analyzing reactant gases and liquid products.

**Northeastern University**, *Teaching assistant*, MA (Sep 2000 – Mar 2001)

## EXPERIMENTAL SKILLS

X-ray Photoelectron Spectroscopy, (**XPS**) - Kratos Axis Ultra X-ray Photoelectron Spectrometer

X-ray Powder Diffraction Spectroscopy, (**XRD**) – Scintag, Philips Norelco, and Bruker diffractometers

*In-situ* X-ray absorption Spectroscopy, (**XANES** and **EXAFS**) - SSRL and APS

*Operando* Fourier Transform Infrared Spectroscopy, (**FTIR**) - Shimadzu IR Prestige Spectrometer

Mass Spectrometry, (**MS**) – Hiden HPR-20, Balzers, and Hewlett Packard Spectrometers

Gas Chromatography, (**GC**) - Hewlett Packard 5890, Shimadzu 2010, Shimadzu GC-8, and Buck 910

Glovebox use, - Vac Atmospheres

Brunauer, Emmett, Teller Surface area analysis, (**BET**) -Micrometrics Tristar 3000

Tapered Element Oscillating Microbalance, (**TEOM 1500 PMA**) flow reactor - catalysis and mass change

Thermo Gravimetric Analysis, (**TGA**) - Mettler TGA/sDTA851e Thermo-Gravimetric Analyzer

## COMPUTER SKILLS

Proficient on Windows XP, DOS, Linux, Solaris, and Macintosh operating systems running: Adobe Photoshop CS2, Athena, Atoms, Casa XPS 2.2, ChemDraw 9, Chem3D 9, CorelDraw 12, Crystallmaker, Dreamweaver 04, Endnote 8, Feff 8, HP ChemStation, Hama, Igor 6, Kaleidagraph 4, MS Office, Shimadzu IR Solution, SolidWorks 2000, WinXAS 3.1, Visio 2000, and X'Pert High Score 2.

## BOARDS, COMMITTEES, AND DEPARTMENTAL INVOLVEMENT

Graduate Recruitment. *Oral presentation* Partnership For International Research And Education Electron Chemistry And Catalysis At Interfaces. (2008)

Graduate student representative. Chemistry department, student compensation committee, successfully passed a 20 % increase in graduate student salaries. (2008)

Founding director and vice president. Energy Forum, UCSB, a student organization that hosted lectures on energy related topics. I also created their website: <http://www.energyforumucsb.com>. (2008)

Poster session organizer. Graduate student recruitment. (2006)

## PUBLICATIONS

Savinelli, R. O.; Scott, S. L. "Wavelet Transform EXAFS Analysis of Mono- and Dimolybdate Model Compounds and a Mo/HZSM-5 Dehydroaromatization Catalyst." *Phys. Chem. Chem. Phys.*, **2010**, DOI:10.1039/B926474D

Savinelli, R. O.; Li J.; Seshadri, R.; Scott, S. L. "Molybdenum Carbide and Oxycarbide Hydrogen Production Catalysts: Preparation, Characterization, and Evaluation." *NACS 21<sup>st</sup> NAM Proceedings: Abstracts*, **2009**.

Savinelli, R. O.; Li, J.; Seshadri, R.; Scott, S. L. "The effects of synthesis temperature, H<sub>2</sub> treatment, air exposure, and extended storage on the surface composition of Mo<sub>2</sub>C powders." **2009** Manuscript in progress.

Savinelli, R. O.; Scott, S. L. "Analysis of high resolution C 1s X-ray Photoelectron spectra of Mo<sub>2</sub>C powders." **2009** Manuscript written.

Page, K.; Li, J.; Savinelli, R. O.; Szumila, H. N.; Zhang, J. P.; Stalick, J. K.; Proffene, T.; Scott, S.L.; Seshadri, R. "Reciprocal space and real-space neutron investigation of nanostructured Mo<sub>2</sub>C and WC." *Solid State Sci.* **2008**, 10, 1499-1510.

Borsa A. G.; Harford, S. T.; Zhang J. Z.; Savinelli, R. O. "Detailed 3D Computer Model of a Pilot Plant Multi-tubular Fisher-Tropsch Reactor: Experimental and Model Results" *AICHE Proceedings*, **2003**, New Orleans spring meeting.

## PRESENTATIONS

Savinelli, R. O.; Scott, S. L. "Analysis of high resolution C 1s X-ray photoelectron spectra of Mo<sub>2</sub>C powders." *Poster Presentation*. MRS, Fall Meeting , Boston, Ma November 30 - December 4, **2009**.

Savinelli, R. O.; Li J.; Seshadri, R.; Scott, S. L. "Molybdenum Carbide and Oxycarbide Hydrogen Production Catalysts: Preparation, Characterization, and Evaluation." *Poster Presentation*. North American Catalysis Society, 21st National Annual Meeting , San Francisco, CA June 7-12, **2009**.

Savinelli, R. O.; Li J.; Seshadri, R.; Scott, S. L. "Molybdenum Carbide: Synthesis, Characterization, and Catalytic Performance: TPre-MS, TGA, XPS, XRD, BET, SEM, and TEM." *Poster Presentation*. Gordon Research Conferences on Catalysis, Colby Sawyer College, NH June 22-27, **2008**.

Savinelli, R. O.; Li, J.; Sun, J.M.; Zhang, J.P.; Bao X.H.; Seshadri, R.; Scott S. L. “Study of Transition Metal Carbides for Use in Heterogeneous Water-gas Shift and Olefin Metathesis Reactions.” *Oral and Poster Presentation*. Partnership for International Research and Education Principle Investigator update, National Science Foundation, Arlington, VA, October **2007**.

Savinelli, R.; Li, J.; Sun J.M.; Zhang, J.P.; Bao X.H.; Seshadri, R.; Scott S. L. “Extended Research Visit to Dalian Institute of Chemical Physics. Cyclopentylidene initiating sites for propylene metathesis over  $\text{Mo}_2\text{C}/\text{Al}_2\text{O}_3$ .” *Oral Presentation*. PIRE ECCI International Advisory Board Annual Meeting, Dalian Institute of Chemical Physics. Dalian, China June 29, **2007**.

Savinelli, R. O.; Li J.; Seshadri, R.; Scott, S. L. “XAS and XPS Characterization of Metal Carbide Catalysts.” *Oral Presentation*. US- China Partnership Workshop on Heterogeneous Catalysis and Surface Science. Dalian Institute of Chemical Physics. Dalian, China June 29, **2007**.

Savinelli, R. O. “Partnership for International Research and Education, A Student’s Perspective on Research in Dalian.” *Oral Presentation*. 12<sup>th</sup> US China Joint Commission meeting on Science and Technology, on behalf of the National Science Foundation, Beijing, China, October **2006**.

Savinelli, R.; Peoples, B.; Deguns, E.; Demmelmaier, C., Hisamoto, M.; Fleischman, S.; Moses, A.; Singh, U.; Leifeste, H.; Yung, C.; Chattopadhyay, S.; Scott, S. “Understanding the Relationship between Surface Structure and Catalytic Properties of Heterogeneous Catalysts” *Poster Presentation*. UCSB chemistry graduate recruitment **2006**.

## ACADEMIC HONORS AND AWARDS

National Science Foundation – PIRE fellowship recipient (2009)

North American Catalysis Society – Kokes award recipient (2009)

National Science Foundation – PIRE award to study catalysis in China (2006)

Northeastern University – GAANN fellowship (2000)

Colorado College – Dean’s list (1998)

Howard Hughes Medical Institute – scholarship recipient (1997)

National Forensic League – superior distinction in oratory and debate (1997)

New Mexico Chapter of Mechanical Engineers – award and scholarship (1997)

New Mexico Department of Education – outstanding scholastic achievement award (1997)

United States Army – certificate for an outstanding engineering project (1997)

United States Navy – first place award for distinguished achievement (1997)

American Vacuum Society – second place Northern New Mexico regional science fair - (1997)

The Legislature of the State of New Mexico – excellence in leadership certificate (1995)

Hugh O’Brian Youth Foundation – award for outstanding leadership potential (1995)

## INTERESTS AND ACTIVITIES

I enjoy running, skiing, squash, digital photography, languages, and website design. I’m interested in nano-materials, 3D data storage, sustainable energy and food policies, public domain IP, solar energy, glycerol chemistry, US-Sino diplomacy, technology content on the Internet, heterogeneous catalysts, the environment, energy extraction and use policy.