STACEY J. SMITH

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PROFESSIONAL APPOINTMENTS

2013-Present *Assistant Research Professor, Department of Chemistry, Brigham Young University, X-ray Diffraction facility manager*

EDUCATION

2012- 2013 *Postdoctoral research, Crystallography, Massachusetts Institute of Technology*

2007- 2012 *Ph.D., Physical Chemistry, Brigham Young University*

2003-2007 *B.S., Chemistry, Summa cum Laude, Brigham Young University*

RESEARCH EXPERIENCE

2013-Present *Assistant Professor of Chemistry, X-ray Diffraction Facility Manager*

2012- 2013 *Postdoctoral studies, MIT, Cambridge, MA*

Single crystal X-ray crystallographic analysis of organic and inorganic small molecule compounds. XRR studies of semiconductor thin films.

2007- 2012 *Graduate studies, Brigham Young University, Provo, UT*

X-ray-PDF, EXAFS, NMR, BET, TEM analysis of La-doped Al_2O_3 nanoparticle catalyst supports to determine nanoparticle morphology, agglomerate porosity, Al_2O_3 phase and La dopant location vs. synthetic temperature. Gained insight into the stabilization mechanism of the La dopant.

X-ray-PDF, Rietveld, NMR, TEM analysis of Al_2O_3 nanoparticle catalyst supports to determine particle size/morphology and phase progression as a function of synthetic temperature. Symmetry-mode analyses of the Al_2O_3 phase diagram & select phase transitions.

Powder XRD, TG/DTA-MS, FTIR analysis of the reaction mechanism for a novel synthetic method for making metal oxide nanoparticles. Wrote initial draft of BYU's MRI-R^2 NSF proposal for a new powder x-ray diffractometer accepted in 2009.

June 2009 *National School of Neutron and X-ray Scattering (NXS 2009)*

2-week training on synchrotron x-ray and neutron scattering techniques at Oakridge and Argonne National Laboratories sponsored by DOE.

2004-2007 *Undergraduate Research Assistant, Brigham Young University, Provo, UT*

Adiabatic/semi-adiabatic calorimetric study of akaganeite (β-FeOOH). Fit C_P data to polynomial/Debye/Schottky functions from 0.5–350 K. Calculated thermodynamic values vs. temperature and stability of β-FeOOH vs.other Fe-oxide phases.

Adiabatic/semi-adiabatic calorimetric and modeling studies of adsorbed water and related low-T Schottky anomaly on nano/bulkTiO_2. Collected/fit C_P data from 0.5–350 K. to polynomial/Schottky functions. Calculated thermodynamic values vs temperature.

Semi-adiabatic calorimetric studies of hexagonal ice. Collected/fit C_P data to polynomial functions down to 0.5 K. Calculated thermodynamic values vs. temperature.

Summer 2003 *Research Assistant, Arkansas State University, Jonesboro, AR*

Neurological study of the effects of nicotine on the brain. Surgically inserted electrodes into and statistically analyzed electrical pulses from rodent brains pre/post nicotine addiction.

TEACHING EXPERIENCE

Fall 2014 *Instructor, Senior Seminar, Chem 495/594R (110 students)*

Course requirements: Students must attend 10 seminars (minimum) given by guest lecturers in the Chemistry Department. For one of the seminars, students must read 2-3 papers by the speaker in advance and summarize them, take notes during the seminar, and turn their work in to be graded immediately following the seminar.

Winter 2014 *Instructor, General Chemistry, Chem 105, Sections 1-17,20 (439 students)*

Course content: Atomic and molecular structure, bonding, periodic properties of the elements, reaction energetics, electrochemistry, acids and bases, inorganic and organic chemistry.

Winter 2014 *Instructor, Advanced Inorganic Laboratory, Chem 518 (10 students)*

Involvement: Training students on X-ray diffraction (XRD) theory and experimentation. Assisting the students with two laboratory experiments – one involving powder XRD and one involving single-crystal (SC) XRD.

Fall 2013 *Instructor, Senior Seminar, Chem 495/594R (110 students)*

2007-2013 *Numerous substitute lectures, Freshman chemistry, Chem 111 and Chem 112*

Winter 2008 *Teaching Assistant, Physical Chemistry, Chem 461*
Graded tests, held office hours

Winter 2008 *Teaching Assistant, Advanced Analytical Chemistry Laboratory, Chem 523*
Supervised FTIR/Raman/ICP laboratory activities, prepared unknowns, graded reports

Fall 2007 *Teaching Assistant, Advanced Analytical Chemistry, Chem 521*
Wrote homework keys, graded homework/tests, held office hours

Fall 2007 *Teaching Assistant, Analytical Chemistry Laboratory, Chem 227*
Supervised all laboratory activities (sole TA in section), graded tests, held office hours

Winter 2007 *Teaching Assistant, Freshman Honors Chemistry, Chem 111*
Wrote homework/exam keys, graded tests, held office hours

Winter 2007 *Teaching Assistant, Freshman Chemistry, Chem 106*
Taught a weekly 1-hour recitation section, wrote quizzes/homework keys/exam keys, graded homework, held office hours.

AWARDS & RECOGNITIONS

Academic Recognitions

2011 I&EC Graduate Student Award Symposium 3rd place paper/presentation, ACS National Conference, Denver, CO

2011 BYU Outstanding Chemistry/Biochemistry Graduate Student

2010	Etter Student Lecturer Award, Neutron Scattering SIG, ACA Conference, Chicago, IL
2010	BYU Spring Research Conference session winner
2009	Neutron & X-ray Scattering School student presentation award
2008	BYU Spring Research Conference session winner
2007	Summa Cum Laude, BYU, B.S. degree in chemistry
2006-2007	BYU outstanding undergraduate senior in chemistry
2005-2006	BYU physical chemistry undergraduate student of the year
2003-2004	BYU freshman chemistry undergraduate student of the year

Scholarships/Grants

2011	USNCCr Travel Fellowship (NSF funding) for the XXII IUCr Congress in Madrid, Spain
2011	IUCr student bursary
2011	Supplement from the I&EC Division for the ACS Conference in Denver, CO
2011	Fall BYU graduate student Research Presentation Award (RPA) for conference travel
2010	ACA Conference travel grant
2010	Spring BYU graduate student RPA for conference travel
2010	Fall BYU graduate student RPA for conference travel
2009	DOE sponsorship for the National School of Neutron and X-ray Scattering
2009-2010	BYU Roland K. Robins Graduate Research Fellowship for outstanding scholarship and promise in research
2008-2009	BYU Mentored Research Grant
2007-2008	BYU Nicholes/Maw Award for outstanding first-year graduate students
2006	BYU Department of Chemistry Summer Undergraduate Research Grant
2005	BYU Academic Scholarship, spring term
2003-2007	National Merit Scholarship
2003	SAMMY scholarship (Scholar Athlete Milk Mustache of the Year), sponsored by 'Got Milk?' and USA Today

PUBLICATIONS

Smith, S. J.; Huang, B.; Liu, S.; Liu, Q.; Olsen, R. E.; Boerio-Goates, J.; Woodfield, B. F. Metal oxide nanoparticle synthesis via a robust "solvent-deficient" method. *Nanoscale*, **2014**, Accepted for publication.

Wang, H.; Madaan, N.; Bagley, J.; Diwan, A.; Liu, Y.; Smith, S. J.; Lunt, B. M.; Davis, R. C.; Linford, M. R. Spectroscopic ellipsometric modeling of a Bi-Te-Se write layer of an optical data storage device as guided by atomic force microscopy, scanning electron microscopy, and X-ray diffraction. *Thin Solid Films* **2014**, accepted for publication.

Axtell, J. C.; Schrock, R. R.; Muller, P.; Smith, S. J.; Hoveyda, A. H. Synthesis of Tungsten Imido Alkylidene Complexes that Contain an Electron-Withdrawing Imido Ligand. *Organometallics* **2014**, accepted for publication.

Schliesser, J. M.; Smith, S. J.; Li, G.; Li, L.; Walker, T. F.; Parry, T.; Boerio-Goates, J.; Woodfield, B. F. Heat capacity and thermodynamic functions of nano-TiO_2 anatase in relation to bulk-TiO_2 anatase. *J. Chem. Thermodyn.* **2014**, accepted for publication.

Huang, B.; Schliesser, J.; Olsen, R. E.; Smith, S. J.; Woodfield, B. F. Synthesis and Thermodynamics of Porous Metal Oxide Nanomaterials. *Current Inorganic Chemistry*, **2014**, *4*, 40-53.

Li, X.; Michaelis, V. K.; Ong, T. C.; Smith, S. J.; McKay, I.; Mueller, P.; Griffin, R. G.; Wang, E. N.; One-pot solvothermal synthesis of a well-ordered layered sodium aluminoalcoholate complex: a useful precursor for the preparation of porous Al_2O_3 particles. *Cryst. Eng. Comm.* **2014**, *16*(14), 2950-2958.

Li, X.; Michaelis, V. K.; Ong, T. C.; Smith, S. J.; Griffin, R. G.; Wang, E. N.; Designed Single-Step Synthesis, Structure, and Derivative Textural Properties of Well-Ordered Layered Penta-coordinate Silicon Alcoholate Complexes. *Chem. - Eur. J.* **2014**, *20*(21), 6315-6323.

Standley, E. A.; S. J. Smith, S. J.; Müller, P.; Jamison, T. F. A Broadly Applicable Strategy for Entry into Homogeneous Nickel(0) Catalysts from Air-Stable Ni(II) Complexes. *Organometallics* **2014**, *33*(8), 2012–2018.

Yuan, J.; Schrock, R. R.; Gerber, L. C. H.; Müller, P.; Smith, S. Synthesis and ROMP Chemistry of Decafluoroterphenoxide Molybdenum Imido Alkylidene and Ethylene Complexes. *Organometallics* **2013**, *32*(*10*), 2983–2992.

Jeong, H.; Kozera, D. J.; Schrock, R. R.; Smith, S. J.; Zhang, J.; Ren, N.; Hillmyer, M. A., Z-Selective Ring-Opening Metathesis Polymerization of 3-Substituted Cyclooctenes by Monoaryloxide Pyrrolide Imido Alkylidene (MAP) Catalysts of Molybdenum and Tungsten. *Organometallics* **2013,** *32* (17), 4843-4850.

Peryshkov, D. V.; Forrest, W. P.; Schrock, R. R.; Smith, S. J.; Muller, P., B(C6F5)3 Activation of Oxo Tungsten Complexes That Are Relevant to Olefin Metathesis. *Organometallics* **2013,** *32* (19), 5256-5259.

Townsend, E. M.; Kilyanek, S. M.; Schrock, R. R.; Muller, P.; Smith, S. J.; Hoveyda, A. H., High Oxidation State Molybdenum Imido Heteroatom-Substituted Alkylidene Complexes. *Organometallics* **2013,** *32* (16), 4612-4617.

Müller, P.; Fronczek, F. R.; Smith, S. J.; Mako, T.; Levine, M. Two polymorphs of 1,8-dichloroanthracene. *Acta Cryst. C*, **2013**, *C69(2)*, 199-203.

Smith, S. J.; Amin, S.; Woodfield, B. F.; Boerio-Goates, J.; Campbell, B. J. Phase progression of Al_2O_3 nanoparticles synthesized in a solvent deficient environment. *Inorg. Chem.*, **2013**, *52*(*8*), 4411-4423.

Huang, B.; Bartholomew, C. H.; Smith, S. J.; Woodfield, B. F. Facile solvent-deficient synthesis of mesoporous γ-alumina with controlled pore structures. *Micro. Meso. Mat.*, **2013**, *165*, 70-78.

Boerio-Goates, J.; Smith, S. J.; Liu, S.; Lang, B. E.; Li, G.; Woodfield, B. F.; Navrotsky, A. Characterization of surface defect sites on bulk and nanophase anatase and rutile TiO_2 by low-temperature specific heat. *J. Phys. Chem. C.*, **2013**, *117(9)*, 4544-4550.

Snow, C.; Lilova, K. I.; Radha, A. V.; Shi, Q.; Smith, S. J.; Navrotsky, A.; Boerio-Goates, J.; Woodfield, B. F. Heat capacity and thermodynamics of a synthetic two-line ferrihydrite, $FeOOH{\cdot}0.027H_2O$. *J. Chem. Thermodyn.,* **2013**, *58,* 307-314.

Smith, S. J.; Page, K.; Kim, H.; Woodfield, B. F.; Boerio-Goates, J.; Campbell, B. J. Novel synthesis and structural analysis of ferrihydrite. *Inorg. Chem.*,**2012**, *51(11),* 6421-6424.

Woodfield, B. F.; Liu, S.; Boerio-Goates, J.; Liu, Q.; Preparation of uniform nanoparticles of ultra-high purity metal oxides, mixed metal oxides, metals, and metal alloys.US Patent Application: 2007-US4279, 2007098111, 20070216, 2007. Smith, S. J. added as a co-inventor fall 2011.

Spencer, E. C.; Ross, N. L.; Parker, S. F.; Woodfield, B. F.; Boerio-Goates, J.; Smith, S. J.; Olsen, R. E.; Kolesnikov, A. I.; Navrotsky, A.; Ma, C. Determination of the Magnetic Contribution to the Heat Capacity of Cobalt Oxide Nanoparticles and the Thermodynamic Properties of the Hydration Layers. *J. Phys. Condens. Matter*, **2011**, *23(20)*, 205303.

Snow, C.; Smith, S. J.; Lang, B. E.; Shi, Q.; Boerio-Goates, J.; Woodfield, B. F.; Navrotsky, A. Heat capacity studies of the iron oxyhydroxides akaganeite (β-FeOOH) and lepidocrocite (γ-FeOOH). *J. Chem. Thermodyn.*, **2010**, *43(2)*, 190-199.

Smith, S. J.; Stevens, R.; Liu, S.; Li, G.; Navrotsky, A.; Boerio-Goates, J.; Woodfield, B. F. Heat capacities and thermodynamic functions of TiO_2 anatase and rutile: analysis of phase stability. *Am. Mineral.*, **2009**, *94*, 236-243.

Smith, S. J.; Lang, B. E.; Liu, S.; Boerio-Goates, J.; Woodfield, B. F. Heat capacities and thermodynamic functions of hexagonal ice from T = 0.5 K to T = 38 K. *J. Chem. Thermodyn.*, **2007**, *39*, 712-716.

PUBLICATIONS IN PROGRESS

Walker, W. K.; Stokes, R. J.; Smith, S. J.; Michaelis, D. J. Allylic Aminations with Hindered Secondary Amine Nucleophiles Catalyzed by Heterobimetallic Ti–Pd Complexes. *Journal of the American Chemical Society*, **2014**, Submitted for publication.

Chesnel, K.; Trevino, M.; Cai, Y.; Hancock, J. M.; Smith, S. J.; Harrison, R. G. Particle size effects on the magnetic behaviour of 5 to 11 nm Fe3O4 nanoparticles coated with oleic acid. *Journal of Physics, via the conference on Fine Particles Magnetism* **2013**, under revision.

Petrucci, O. D.; Farrer, J. K.; Smith, S.; Watt, R. K. Catalytic Decontamination of Mercury from Water by Ferritin Photochemistry and Renewable Carboxylic Acids. In preparation.

Smith, S. J; Huang, B.; Bartholomew, C. H.; Campbell, B. J. Boerio-Goates, J.; Woodfield, B. F. Analysis of dopant location in La-doped γ- Al_2O_3 nanoparticles synthesized using a novel 1-pot process. In preparation.

PRESENTATIONS

Smith, S. J., Ruf, M. X-ray Crystallography: It doesn't always have to be a single crystal. International Webinar Presentation, Bruker AXS, October 7, **2014**.

Smith, S. J.; Mueller, P., Comparing single crystal and powder XRD instruments for routine quantitative powder analyses. In *American Crystallographic Association (ACA) Annual Meeting*, Honolulu, Hawaii, July 24, **2013**.

Smith, S. J.; Huang, B.; Bartholomew, C. H.; Woodfield, B. F.; Boerio-Goates, J.; Campbell, B. J. The role of a La dopant in inhibiting the gamma to alpha Al_2O_3 phase transition. *2012 Annual Meeting of the American Crystallographic Association (ACA)*, Boston, MA, July 28 - August 1, **2012**.

Smith, S. J.; Huang, B.; Cook, K.; Olsen, R. E.; Bartholomew, C. H.; Woodfield, B. F.; Boerio-Goates, J.; Campbell, B. J. Revised mechanism of La stabilization for La-doped alumina catalyst supports. *242nd American Chemical Society (ACS) National Meeting*, Denver, CO, August 28-September 1, **2011**.

Smith, S. J.; Campbell, B. J. Symmetry-mode analysis of the alumina phase diagram. *International Union of Crystallography (IUCr) XXII Congress and General Assembly*, Madrid, Spain, August 22-30, **2011**. Poster presentation.

Smith, S. J.; Huang, B.; Cook, K.; Olsen, R. E.; Bartholomew, C. H.; Woodfield, B. F.; Boerio-Goates, J.; Campbell, B. J. Revised mechanism of La stabilization for La-doped Al2O3 catalyst supports. *BYU Spring Research Conference*, Provo, UT, March 19, **2011**.

Smith, S. J.; Olsen, R. E.; Cook, K.; Huang, B.; Bartholomew, C. H.; Woodfield, B. F.; Boerio-Goates, J.; Campbell, B. J. Novel synthesis of metal oxide-nanoparticle catalysts and catalyst supports and their structural characterization via combined PDF/EXAFS analysis. *Pacifichem 2010*, Honolulu, HI, December 15-20, **2010**. Poster presentation.

Smith, S. J.; Olsen, R. E.; Cook, K.; Huang, B.; Bartholomew, C. H.; Woodfield, B. F.; Boerio-Goates, J.; Campbell, B. J. Revised mechanism of La stabilization for La-doped alumina catalyst supports. *2010 American Institute of Chemical Engineers (AIChE) Annual Meeting*, Salt Lake City, UT, November 7-12, **2010**.

Smith, S. J.; Campbell, B. J.; Huang, B.; Bartholomew, C. H.; Woodfield, B. F.; Boerio-Goates, J.; Page, K.; Kim, H.; Chapman, K. Phase progression of alumina nanoparticle catalyst supports as a function of synthetic temperature. *2010 Annual Meeting of the American Crystallographic Association (ACA)*, Chicago, IL, July 24-29, **2010**.

Smith, S. J.; Campbell, B. J.; Bartholomew, C. H.; Woodfield, B. F.; Boerio-Goates, J.; Astle, L. Structural characterization of alumina nanoparticle supports using TEM, XAFS, Rietveld, and PDF techniques. *239th American Chemical Society (ACS) National Meeting*, San Francisco, CA, March 21-25, **2010**.

Smith S. J.; Campbell, B. J.; Bartholomew, C. H.; Woodfield, B. F.; Boerio-Goates, J. Structural characterization of alumina nanoparticle catalyst supports. *BYU Spring Research Conference*, Provo, UT, March 20, **2010**.

Smith, S. J.; Olsen, R. E.; Liu, Q.; Liu, S.; Woodfield, B. F.; Boerio-Goates, J. Mechanism behind a novel green, two-step, general method for synthesizing metal and metal oxide nanoparticles.

North American Solid State Chemistry Conference (NASSC), Columbus, OH, March 17-20, **2009**. Poster presentation.

Smith, S. J.; Liu, Q.; Boerio-Goates, J.; Woodfield, B. F. The Mechanism behind a Novel Two-Step Solid-State Method for Synthesizing Metal Oxide Nanoparticles. *Joint 63rd Northwest and 21st Rocky Mountain Regional Meeting of the American Chemical Society (ACS)*, Park City, UT, June 15–18, **2008**.

Smith, S. J.; Liu, Q.; Boerio-Goates, J.; Woodfield, B. F. How does it work? The mechanism behind a novel two-step solid-state synthesis method for making metal oxide nanoparticles. *BYU Spring Research Conference*, Provo, UT, March 15, **2008**.

Smith, S. J.; Boerio-Goates, J.; Woodfield, B. F. Using models of TiO_2 to study unusual surface phenomena. *1st Annual Utah Conference for Undergraduate Research (UCUR)*, Salt Lake City, UT, **2007**. Poster presentation.

PATENTS

Woodfield, B. F.; Smith, S.; Selck, D.; Bartholomew, C. H.; Ma, X.; Xu, F.; Olsen, R. E.; Astle, L. Single reaction synthesis of texturized catalysts. US20130267411A1, Submitted in **2013**.

PROPOSALS ACCEPTED

NSF Major Research Instrumentation Proposal (MRI-R2), "Acquisition of a powder X-ray diffractometer for chemistry research," $200,000. PI's: Woodfield, B. F.; Boerio-Goates, J.; Harrison, R. G.; Campbell, B. J. (Smith, S. J. wrote the initial draft.) Proposal was written and accepted in 2009. Funds were received in 2010 and used to purchase the PANalytical powder X-ray diffractometer currently used by the BYU chemistry department.

Proposals for beamtime at the Advanced Photon Source (APS) synchrotron X-ray facility at Argonne National Laboratory:

(1) Determining the local structure and phase evolution of Al_2O_3 catalyst supports using PDF/Rietveld analysis (GUP20741), Submitted to beamline 11-IDB, PI = Stacey Smith. Awarded beamtime 03/2010.
(2) Determining the location and local structure of dopants within catalysts/catalyst supports using XAFS (GUP20737), Submitted to beamline 12-BM, PI = Stacey Smith. Awarded beamtime 03/2010.
(3) PDF analysis of Fischer-Tropsch catalyst reduction and reaction processes (GUP22776), Submitted to beamline 11-IDB, PI's = Stacey Smith and Kari Cook. Awarded beamtime 10/2010.

AFFILIATIONS

American Chemical Society (ACS), 2009-present

American Crystallographic Association (ACA), 2010-present

International Union of Crystallographers (IUCr), 2011-present

American Institute of Chemical Engineers (AIChE), 2010-2012

American Physics Society (APS), 2010-2012

SCIENTIFIC COMMUNITY SERVICE/INVOLVEMENT

Elected secretary of the Service Crystallography Special Interest Group in the American Crystallographic Association, or ACA (2014-2016).

Elected Chair-elect (2014-2015) to become Chair (2015-2016) of the General Interest Group in the American Crystallographic Association, or ACA. I will be organizing two conference sessions and multiple poster sessions for the 2015 ACA Annual Conference.

STEM Out – Co-organizer of "STEM Out," a free day of science fun and hands-on activities held at BYU on November 9, 2013 (Sponsored by NASA) geared toward introducing middle school aged girls to science and providing them with a positive experience. The activity was so popular (registration filled within 2 days of its announcement, and we allowed over 220 girls to attend though we originally planned for 150), and the feedback was so positive that we intend to find the funding necessary to make the activity an annual event.

Utah Debate presentation – gave 2 invited presentations, "The Chemistry of Plastics," on November 21, 2013 for several hundred elementary, middle, and high school students participating in the Utah Debate program. The topic of the debate was plastic waste; I educated the students on the chemistry, uses, and properties of plastics.

Provo Mentoring Magic Show – on November 1, 2013 I gave a presentation to and chemistry magic show for under-privileged middle school (6^{th} grade) students in the Provo Mentoring Program to raise interest in science and in pursuing higher education.

Volunteer Judge for the Central Utah Science & Engineering Fair: 2008, 2009, 2011, 2012, 2014

Graduate student recruiting committee, BYU Dept. of Chemistry & Biochemistry, 2013-2014.

Undergraduate student advisement committee, BYU Dept. of Chemistry & Biochemistry, 2013-2015.

BYU Graduate Student Society Council Member, 2009-2011