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Charles Bessey Professor of Chemistry

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Research Interests

Nanoparticle and surface chemistry of transition metal oxides, particularly as it relates to materials applications and heterogeneous catalysis. Work is focused on the study of gas-solid interactions of transition metal compounds by electron spectroscopies, thermal desorption, SIMS and LEED techniques under ultrahigh vacuum conditions. Interpretation of experimental results is aided by *ab initio* HF and DFT computational studies.

Education

The University of Connecticut Storrs, CT 06268

B.S. in Chemistry with minors in Physics and Mathematics, June 1974, Summa Cum Laude, Thesis under the supervision of Dr. Wyman Vaughan, Thesis Topic: Synthesis of 5-exo-methyl-2-norbornene.

Princeton University, Princeton, New Jersey 08544

M.A. in Physical Chemistry, June 1976, Ph.D. in Physical Chemistry, August 1979, Thesis under the supervision of Dr. Steven Bernasek, Thesis Topic: Surface Characterization of the Cubic Sodium Tungsten Bronze (100) and Tungsten Trioxide (100) Single Crystals.

University of California, Berkeley, California 94720

Postdoctoral Fellow 1979-1981

Honors, Awards and Professional Recognition

Guest Editor, Journal of Molecular Catalysis A, 4/1/07-2/1/08

Invited Speaker, San Luis IV International Symposium on Surfaces, Interfaces, and Catalysis, April 2007, Cuernavaca, Mexico

Symposium Chair, ACS Arthur Adamson Award, American Chemical Society National Meeting Spring 2006

Charles Bessey Professor of Chemistry 4/1/05-present

Executive Committee for Surface Science Division, American Vacuum Society, 2004-2006

Symposium Chair, Graduate Student CRDF Symposium, Bekasovo, Russia, July 2004

NSF Special Creativity Award, 2000

UNL College of Engineering Multi-disciplinary Research Award, 1997

UNL Graduate Faculty Fellow, University of Nebraska-Lincoln, 1985

ASEE Summer Faculty Fellow at Solar Energy Research Institute, Golden, CO, 1981

NSF National Needs Postdoctoral Research Fellowship, Univ. California- Berkeley, 1979-80.

University Scholar, University of Connecticut, 1972-74

Phi Lambda Upsilon, 1974

Phi Beta Kappa, 1972

Professional Societies

American Chemical Society
American Vacuum Society

Employment

August 1994-Present	Professor of Chemistry University of Nebraska, Lincoln NE 68588
August 1987-July 1994	Associate Professor of Chemistry University of Nebraska, Lincoln
August 1981-July 1987	Assistant Professor of Chemistry University of Nebraska, Lincoln
Sept 1979-June 1981	Postdoctoral Research Associate Department of Chemistry, Univ. of CA-Berkeley, CA 94720
Sept 1980-November 1980	Instructor Dept of Chemistry, Mills College, Oakland, CA 94613
Sept 1974-August 1979	Teaching/Research Assistant Dept of Chemistry, Princeton Univ., Princeton, NJ 08544
May 1974-September 1974	Research Chemist University of Connecticut, Storrs, CT 06268
September 1973-June 1974	Teaching Assistant Department of Chemistry, Univ. of CT, Storrs, CT 06268

Grants funded while at UNL (\$3,157,010)

Note that for multi-investigator grants, only the portion due to the P.I. is included in the total.

NSF, Metal Oxide Solid Solutions: Macroscopic to Nano-Scale, 7/15/10-7/14/13, \$449,800.

DOE, GAANN Fellowships in Chemistry, 8/1/10-7/31/13, \$393,800.

Pacific Northwest National Laboratory (PNNL) supercomputer time, Density Functional Calculations of $\text{TiO}_2(110)$ Adsorbate Systems (remote log-in from UNL) 6/01/08-present, 25,000 hours on Chinook (Supercomputer).

NSF, MRSEC Seed, Electronic and Magnetic Properties of Novel $\text{Zn}_x\text{Ni}_{1-x}\text{O}$ Nanoparticles, 7/1/07-6/30/08, \$34,750.

Pacific Northwest National Laboratory (PNNL) supercomputer time, Density Functional Calculations of $\text{TiO}_2(110)$ -Carboxylate Adsorbates (remote log-in from UNL) 6/15/07-5/30/08, 25,000 hours on MPP2 (Supercomputer).

PNNL Sabbatical grant, Density Functional Calculations of $\text{TiO}_2(110)$ -Carboxylate Adsorbate Systems, 9/1/06-6/15/07, \$25,000.

NSF, Surface Chemistry of Rocksalt and Spinel 3d Transition Metal Oxides, 7/1/02-8/31/06, \$425,000.

NRI, Building Surface Analysis into a New University Infrastructure in Environmental Science, Co-P.I.s Patrick Shea, Paul Burrow, Steve Comfort and Tian Zhang, 6/1/02-5/31/06,

- \$630,000 (of this \$328,380 is apportioned to Dr. Langell's lab).
- NSF EPSCoR, High Temperature and Multifunctional Nanoscale Materials and Devices, P.I. Ned Ianno, co-PI. Brian Roberston and 15 other co-P.I.s, \$3.6 M, 9/1/04-8/31/7 (of this about \$15,000 is apportioned to Dr. Langell's Lab).
- NSF Special Creativity Award, Transition Metal Oxide-Adsorbate Interactions by HREELS, TDS and Photoelectron Spectroscopies, 2/1/01-8/31/02, \$300,000.
- NSF Supplemental Award for REU Minority Student, Summer 2000, \$5000
- NSF WWW-Based Graduate Post-Certification Teacher Training in Chemistry, P.I. D. Brooks, Co-P.I.s J. Markwell, R. Emry, \$160,000, 5/1/99-4/30/01 (\$20,000 for M.A. Langell)
- NSF POWRE Supplemental Award for the Epitaxial Growth of Transition Metal Oxides for HREELS, TDS and Photoelectron Spectroscopies, \$64,872, 7/25/98-1/31/99.
- AFOSR High Temperature/ High Speed Junction Devices and Contacts, Co-P.I.s, Peter Dowben, Ned Ianno and Brian Robertson, \$306,014, 5/15/98-5/14/01 (\$75,700 for M. Langell)
- NSF Upgrade of a Synchrotron Radiation Beamline for Surface Chemistry P.I. Peter Dowben, Co-P.I.s M.A. Langell, P. Sprunger, E. Morikawa and A. Moewes, \$75,335, 8/1/98-7/31/99 (\$15,067, 1/5th equipment share for M.A. Langell).
- NSF Development of Spin Polarized Electron Scattering Facilities, \$383,944, 6/1/98-5/31/00, P.I. B. Robertson, Co-P.I.s., P. Dowben, M.A. Langell, J. Brand and S. Adenwalla (\$18,537 for M. Langell).
- PRF Decomposition Pathways of Metallocenes on Surfaces, P.I. M.A. Langell, Co-P.I. P. Dowben, \$50,000, 1/1/97-8/31/99 (\$25,000 for M. Langell).
- NSF Transition Metal Oxide – Adsorbate Interactions Studied by HREELS, TDS and Photoelectron Spectroscopy, 12/1/96-11/30/01, \$332,000.
- AFOSR Photoassisted Chemical Vapor Deposition for Packaging and Fabrication of Wide Band Gap Semiconductors, P.I. M.A. Langell, co-P.I.s P. Dowben and N. Ianno, \$313,070, 9/1/94-8/31/97 (\$85,184 for M.A. Langell).
- NSF HREELS Investigations of Transition Metal Oxide Adsorbate Interactions 3/15/92-8/14/96, \$260,000.
- Brookhaven National Laboratory (NSLS) Valence Band Spectra of NiO(100) and CoO(100), \$7,000 (7/1/91-7/31/92).
- NSF(SGER) Application of HREELS to the Metal Oxides and Other Ionic Surfaces, \$50,000, 7/15/91-12/31/92.
- PRF, The 3d Transition Metal Monoxides, \$52,500, 1/1/87-8/31/90.
- NSF, Gas Adsorption Properties of the Cubic 3d Transition Metal Oxides, \$222,300, 2/1/83-1/31/84.
- Ford Motor Company, Model Coal Liquefaction Catalysis, \$5,000 (indefinite period).
- PRF, Thermal Desorption Spectrometry of the 3d Transition Metal Oxides, \$10,000 9/1/82-8/31/84.
- Research Corporation, Surface Properties of Transition Metal Oxides, \$19,500, 10/31/81-8/31/84.

Publications

1. M. A. Langell and S. L. Bernasek, "LEED/Auger Observations of Cubic Sodium Tungsten Bronze Single Crystals", *Surf. Sci.* **69** (1977) 727.
2. M. A. Langell and S. L. Bernasek, "Transition Metal Compound Surfaces", *Progr. Surf. Sci.*

- 5/6** (1979) 165.
3. M. A. Langell and S. L. Bernasek, "Transition Metal Compound Surfaces. 1. The Cubic Sodium Tungsten Bronze (Na_xWO_3) Surface", *J. Vac. Sci. Technol.* **17** (1980) 1288.
 4. M. A. Langell and S. L. Bernasek, "Transition Metal Compound Surfaces. 2. The Tungsten Trioxide Surface", *J. Vac. Sci. Technol.* **17** (1980) 1296.
 5. M. A. Langell and S. L. Bernasek, "High Energy Electron Loss Spectroscopy of WO_3 and $\text{Na}_x\text{W}_9\text{O}_{33}$ Single Crystal Surfaces", *Phys. Rev. B* **23** (1980) 1584.
 6. C. J. Schramm, M. A. Langell and S. L. Bernasek, "The Sodium Order-Disorder Transition on the Na_xWO_3 (100) Surface", *Surface Science* **110** (1981) 217.
 7. M. A. Langell and G. A. Somorjai, "Oxide Nucleation and Subsequent Growth on Iron (110) Single Crystals", *J. Vac. Sci. Technol.* **21** (1982) 858.
 8. W. R. Vaughan, B. A. Gross, S. E. Burkle, M. A. Langell, R. Caple and D. B. Oakes, "6, 2-Methyl Migration in the Norbornane System", *J. Am. Chem. Soc.* **48** (1983) 4792.
 9. R. P. Furstenau, G. McDougall and M. A. Langell, "Initial Stages of Hydrogen Reduction of NiO (110)", *Surf. Sci.*, **150** (1985) 55-79.
 10. R. P. Furstenau and M. A. Langell, "Absorption of Ethylene on NiO (100)", *Surf. Sci.*, **159** (1985) 108.
 11. J. J. Scholz and M. A. Langell, "Kinetic Analysis of Metal Oxide Reduction", *Surf. Sci.*, **164** (1985) 543.
 12. M. A. Langell and R. P. Furstenau, "Gas Absorption Properties of Stoichiometric and Reduced NiO (100)", *Appl. Surf. Sci.*, **26** (1986) 445.
 13. M. A. Langell and N. R. Cameron, "Thermally Induced Surface Reconstruction of MnO (100)", *Surf. Sci.*, **185** (1987) 105.
 14. M. A. Langell, "Preferential Sputtering in 3d Metal Monoxides", *Surf. Sci.*, **186** (1987) 323.
 15. M. A. Langell, "Incongruent Sputtering in Metal Oxides", *Nucl. Instrum. Meth. B*, **28** (1987) 502.
 16. M. A. Langell and L. S. Colbert, "Incongruent Sputtering in NiO (100) and CoO (100) with 3 keV Argon Ions", in *Fundamentals of Beam-Solid Interactions and Transient Processing*, Eds., M. J. Aziz, L. E. Rehn and B. Striteker, **100** (1988) 151.
 17. S. S. Jaswal, M. A. Engelhardt, M. A. Langell and D. J. Sellmyer, "Electronic Structure and Surface Reactivity of $\text{R}_2\text{Fe}_{14}\text{B}$ Compounds", *Proc. Intermag. and Magnetic Methods (Vancouver)*, (1988) 371.

18. S. S. Jaswal, M. A. Langell, Y. G. Ren, M. A. Engelhardt and D. J. Sellmyer "Electronic Structure and Surface Reactivity of $\text{Nd}_2\text{Fe}_{14}\text{B}$ and Related Compounds", *J. Appl. Phys.*, **64** (1988) 5577 (1988).
19. M. A. Langell, Y. G. Ren and D. J. Sellmyer, "Auger and XPS of $\text{R}_2\text{Fe}_{14}\text{B}$ High Energy Magnets", *J. Magn. Magn. Mater.*, **82** (1989) 213.
20. K. W. Wulser and M. A. Langell, "Methanol Adsorption on Single Crystal $\text{NiO}(100)$ HREELS Deconvolution", *Am. Chem. Soc. Abst.*, **198th Col.**, (1989) 79.
21. M. Mahon and M. A. Langell, "XPS/AES of Metal Carbonyls Ligated to Chemically Modified Titanium Dioxide Thin Films", *Chem. Mod. Oxide Surfaces*, **3**, Eds., D. Leyden and W. T. Collins (Gordon and Breach Science Publishers, New York, 1990) 205.
22. M. Mahon and M. A. Langell, "Desorption of Tethered Iron Carbonyl from Silylated Titanium Dioxide", *Langmuir*, **7** (1991) 486.
23. C. L. Berrie and M. A. Langell, "The Auger Parameter, Polarization Energies and Electronegativities: Application to a Series of Nonconducting Barium Salts", *Surface Inter. Anal.*, **17** (1991) 635.
24. K. W. Wulser, B. H. Hearty and M. A. Langell, "Valence Density of States of Hydrogen-Reduced $\text{NiO}(100)$ ", *National Synchrotron Light Source Annual Report*, 1991.
25. K. W. Wulser and M. A. Langell, "Methanol Adsorption on Single Crystal $\text{NiO}(100)$ Studied by HREELS Deconvolution", *J. Electron Spectrosc. Rel. Phenom.*, **59** (1992) 223.
26. K. W. Wulser and M. A. Langell, "Carboxylic Acid Adsorption on $\text{NiO}(100)$ Characterized by X-ray Photoelectron and High Resolution Electron Energy Loss Spectroscopies", *Catal. Letters*, **15** (1992) 39.
27. K. W. Wulser, B. H. Hearty and M. A. Langell, " $\text{NiO}(100)$ Valence Density of States During Hydrogen Reduction", *Phys. Rev. B*, **46** (1992) 9724.
28. K. W. Wulser and M. A. Langell, "Temporary Negative-Ion Resonances in the $\text{NiO}(100)$ High Resolution Electron Loss Spectrum", *Phys. Rev. B*, **48** (1993) 9006.
29. C. L. Berrie and M. A. Langell, "Polarization Energies in Extra-atomic Relaxation of Several Distorted Barium Halides", *Surf. Interface Anal.*, **21** (1994) 245.
30. K. W. Wulser and M. A. Langell, "Fuchs-Kleiwier Phonon Structure and Surface Integrity of $\text{NiO}(100)$ ", *Surface Sci.*, **314** (1994) 385.
31. M.A. Langell, C.L. Berrie, M.H. Nassir and K.W. Wulser, "Adsorption of Acetic Acid on Hydroxylated $\text{NiO}(111)$ Thin Films", *Surface Sci.* **320** (1994) 25.

32. M.H. Nassir and M.A. Langell, "CoO(100) Fuchs-Kliewer Phonon Spectrum by High Resolution Electron Energy Loss Spectroscopy", *Solid State Commun.* **92** (1994) 791.
33. M.A. Langell and M.H. Nassir, "Stabilization of NiO(111) Thin Films by Surface Hydroxyls", *J. Phys. Chem.*, **99** (1995) 4162.
34. G.A. Carson, M.H. Nassir and M.A. Langell, "Co₃O₄ Epitaxial Formation on CoO(100)", *Proc. Mater. Res. Soc.*, **335** (1995) 163-168.
35. G. Carson, M.H. Nassir and M. A. Langell, "Epitaxial Growth of Co₃O₄ on CoO(100)", *J. Vac. Sci. Technol.*, **A14** (1996) 1637.
36. M.A. Langell, C.W. Hutchings, G.A. Carson and M.H. Nassir, "High Resolution Electron Energy Loss Spectroscopy of MnO(100) and Oxidized MnO (100)", *J. Vac. Sci. Technol.*, **A14** (1996) 1656.
37. J.L. Armstrong, J.M. White and M.A. Langell, "Thermal Decomposition Reactions of Acetaldehyde and Acetone on Si(100)", *J. Vac. Soc. Technol.*, **A15** (1997) 1146.
38. D.L. Pugmire, C.M. Woodbridge and M.A. Langell, "Orientation of Nickelocene on Ag(100)", *Surface Sci.*, **411** (1998) L844.
39. G.A. Carson, M.H. Nassir, K.W. Wulser and M.A. Langell, "Fuchs-Kliewer Phonon Spectrum of Single Crystal NiO(100) and of Ni(100)/NiO(111) and Ni(100)/NiO(100) Thin Films", *Surface Sci. Spectra*, **5** (1998) 229.
40. G.A. Carson, M.H. Nassir and M.A. Langell, "CoO(100) and CoO(100)/ Co₃O₄ Fuchs-Kliewer Phonon Spectra", *Surface Sci. Spectra*, **5** (1998) 235.
41. M.A. Langell, G.A. Carson, M. Anderson, S. Smith and L. Peng, "CoO(100)/Co₃O₄ Valence Band Density of States", *Phys. Rev. B*, **59** (1999) 4791.
42. M.W. Nydegger, G. Couderc and M.A. Langell, "Surface Composition of Co_xNi_{1-x}O Solid Solutions by X-ray Photoelectron and Auger Spectroscopies", *Appl. Surface Sci.*, **147** (1999) 58.
43. M.A. Langell, G.A. Carson, S. Smith, L. Peng, M.H. Nassir, "The Valence Electronic Structure of Co₃O₄: Is It a Charge-Transfer Insulator?", *Proc. Mater. Res. Soc.*, **547** (1999) (Editors S.M. Kauzlarich, E.M. McCarron III, A.W. Sleight and H.C. zur Loye) 255.
44. C. M. Woodbridge, X. J. Gu, M. A. Langell, "Auger Parameter Studies of Selected Titanium Compounds", *Surf. Interface Anal.*, **27** (1999) 816.
45. D.L. Pugmire, C.M. Woodbridge, S. Root and M.A. Langell, "Nickelocene Adsorption on Single-Crystal Surfaces", *J. Vac. Sci. Technol.*, **17** (1999) 1581.
46. J. Choi, H. Dulli, Y. Feng, S.-H. Liou, P. Dowben and M.A. Langell, "The Influence of

- Surface Terminal Layer and Surface Defects on the Electronic Structure of CMR Perovskites: $\text{La}_{0.65}\text{A}_{0.35}\text{MnO}_3$ (A=Ca, Sr, Ba)", *Physica Status Solidi B*, **214** (1999) 45.
47. M.A. Langell, F. Gevrey and M.W. Nydegger, "Surface Composition of $\text{Mn}_x\text{Co}_{1-x}\text{O}$ Solid Solutions by X-ray Photoelectron and Auger Spectroscopies", *Appl. Surface Sci.*, **153** (2000) 114-127.
 48. C.M. Woodbridge, D.L. Pugmire, R.C. Johnson, N.M. Boag and M.A. Langell, "HREELS and XPS Studies of Ferrocene on Ag(100)" *J. Phys. Chem. B*, **104** (2000) 3085-3093.
 49. D.L. Pugmire, C.M Woodbridge and M.A. Langell, "Adsorption of Nickelocene on Si(111)", Book of Abstracts, 219th ACS National Meeting, San Francisco, CA, March 26-30, (2000) 2000.
 50. M.A. Langell, D.L. Pugmire, and W.H. McCarroll, "Surface Characterization of Single Crystal Co_3O_4 and $\text{CoO}(100)/\text{Co}_3\text{O}_4$ Thin-film Epitaxy", Book of Abstracts, 219th ACS National Meeting, San Francisco, CA, March 26-30 2000 (2000).
 51. M.A. Langell, C.M. Woodbridge, D.L. Pugmire and N.M. Boag, "Adsorption and Decomposition of Decamethylferrocene on Ag(100).", Book of Abstracts, 219th ACS National Meeting, San Francisco, CA, March 26-30, 2000 (2000)..
 52. J.-G. Kim, D.L. Pugmire, D. Battaglia and M.A. Langell, "Analysis of the NiCo_2O_4 Spinel Surface with Auger and X-ray Photoelectron Spectroscopy", *Appl. Surface Sci.* **165** (2000) 70.
 53. D.L. Pugmire, C.M. Woodbridge, N.M. Boag and M.A. Langell, "Adsorption and Decomposition of Nickelocene on Ag(100): A HREELS and TPD Study", *Surface. Sci.*, **472** (2001) 155-171.
 54. M.A. Langell, J.G. Kim, D.L. Pugmire and W. McCarroll, "The Nature of Oxygen at Rocksalt and Spinel Oxide Surfaces", *J. Vac. Sci. Technol.*, **19(4)** (2001) 1977-1982.
 55. S.C. Petitto and M.A. Langell, "Surface Composition and Structure of $\text{Co}_3\text{O}_4(110)$ and the Effect of Impurity Segregation", *J. Vac. Sci. Technol.*, **22(4)** (2004) 1690-1696..
 56. E.M. Malone, S.C.Pettito and M.A. Langell, "Fuchs-Kliewer Phonon Spectrum of $\text{Co}_3\text{O}_4(110)$ Single Crystal Surfaces by High Resolution Electron Energy Loss Spectroscopy", *Solid State Comm.*, **130(9)** (2004) 571-575.
 57. E. Papastavros, P.J. Shea, and M.A. Langell, "Oxygen, Carbon and Sulfur Segregation in Annealed and Unannealed Zerovalent Iron Substrates", *Langmuir*, **20(26)**, (2004) 11509-11516.
 58. E. M. Malone, S. C. Petitto, M. A. Langell, "Fuchs-Kliewer Phonon Spectrum of $\text{Co}_3\text{O}_4(110)$ by High Resolution Electron Energy Loss Spectroscopy", *Surf. Sci. Spectra.*, **11**, (2004) 43-51.

59. S.C. Petitto, E.M. Malone, and M.A. Langell, "The Periodically-Stepped NiO(100) Surface and the Adsorption of Bromobenzene", *J. Phys. Chem. B.*, **110(3)**, (2006) 1309-1318.
60. E. M. Malone, S. C. Petitto, G. S. Harbison, K. W. Wulser, M. A. Langell, "Deconvolution of the Co₃O₄(110) Fuchs-Kliwer Phonon Spectrum", *J. Vac. Sci. Technol.*, **23(4)**, (2005) 1061-1066.
61. S.C. Petitto and M.A. Langell, "Cu₂O(110) Formation on Co₃O₄(110) Induced by Copper Impurity Segregation", *Surf. Sci.*, **599(1-3)**, (2005), 27-41.
62. E.M. Marsh, S.C. Petitto and M.A. Langell, "Fuchs-Kliwer phonon spectrum of Co₃O₄(110) by high resolution electron energy loss spectroscopy", *Surf. Sci. Spectra* (2006), Volume Date 2004, 11 43-51.
63. S.C. Petitto, E.M. Malone, and M.A. Langell, "Adsorption of Bromobenzene on Periodically-Stepped NiO(100)", *Journal of Physical Chemistry B*, **110(3)**, 1309-1318 (2006).
64. S.C. Petitto, C.L. Berrie, and M.A. Langell, "Novel Mesoscale Defect Structure on NiO(100) Surfaces by Atomic Force Microscopy", *Surf. Sci. Lett.*, **600(17)**, 229-235 (2006) <http://digitalcommons.unl.edu/chemistrylangell/12/>
65. Evgueni B. Kadossov and Marjorie A. Langell, "Effect of surrounding Point Charges on the Density Functional Calculations of Ni_xO_x Clusters (x=4-12)", *J. Computational Chem.*, **8(7)**, 1240-1251 (2007), <http://www3.interscience.wiley.com/cgi-bin/fulltext/114121631/PDFSTART>.
66. Anthony W. Moses, Harry G. Garcia Flores, Jong-Gyu Kim and Marjorie A. Langell, "Surface Properties of LiCoO₂, LiNiO₂ and LiNi_{1-x}Co_xO₂", *Appl. Surf. Sci.*, **253(10)**, 4782-4791 (2007), <http://digitalcommons.unl.edu/chemistrylangell/11/>.
67. K.J. Gaskell, A. Starace and M.A. Langell, "Zn_xNi_{1-x}O Rocksalt Oxide Surfaces: Novel Environment for Zn²⁺ and Its Effect on the NiO Band Structure", *J. Phys. Chem. C*, **111(37)**, 13912-13921 (2007).
68. D.W. Brooks, J. Markwell, M.A. Langell, R. Emry, K.J. Crippen, H. Brooks, A. Abuloum and K.C. Cohen, "Web-Based Pedagogical Content Coursework for High School Chemistry Teachers", *J. Chem. Ed.*, **84(11)**, 1861-1865 (2007).
69. S.C. Petitto, E.M. Marsh, G.A. Carson and M.A. Langell, "Cobalt Oxide Surface Chemistry: the Interaction of CoO(100), Co₃O₄(110) and Co₃O₄(111) with Oxygen and Water", *J. Molecular Catal. A*, **281**, 49-58 (2008).
70. K.J. Gaskell, A. Starace and M.A. Langell., "Zn_xNi_{1-x}O Mixed-Metal Oxides by XPS and Auger", *Surf. Sci. Spectra*, **14**, 79-102 (2008, Vol.. Date 2007).

71. K.J. Gaskell, A. Starace and M.A. Langell., “Zn_xNi_{1-x}O Mixed-Metal Oxides by AES”, *Surf. Sci. Spectra*, **14**, 68-78 (2008, vol. date 2007).
72. M.A. Langell, E.B. Kadossov, H. Boparai and P.J. Shea, “Effect of Dithionite on the Surface Composition of Iron-Containing Aquifer Sediment,” *Surface and Interface Analysis*, **41(12/13)**, 941-950 (2009).
73. N. Hong, M Langell and S Adenwalla, “N-doping of Semiconducting Boron Carbide”, *Phys. Rev. B*, **107(2)**, 024513/1-7 (2010).
74. M.A. Peck, M. D. Allison, Y. Huh, R. Skomski, R. Zhang, P. Kharel, D. J. Sellmyer, and M. A. Langell, “Magnetic Properties of NiO and (Ni, Zn)O Nanoclusters”, *Journal of Applied Physics*, **109**, 07B518/1-4 (2011).
75. J.M. Lee and M.A. Langell, “Chemical State of Excess Lanthanum at the Surface of La₂NiMnO₆ Double Perovskite”, *Journal of Electron Spectroscopy and Related Phenomena*, to be submitted.
76. M.A. Peck and M.A. Langell, “Comparison of Nano-scaled and Bulk NiO Structural and Environmental Characteristics by XRD, XAFS and XPS”, *Chemistry of Materials*, submitted.
77. A.T. Fulmer and M.A. Langell, “Effect of Composition on Ni_xFe_{3-x}O₄ Ferrite Nanoparticles on Structure and Bonding”, in prep.
78. D. Wilson and M.A. Langell, “Effect of Annealing on the Surface Composition of Fe₃O₄ Nanoparticles”, in prep.
79. M.A. Peck and M.A. Langell, “Zn_xNi_{1-x}O Solid Solutions Studied by XAF and XPS”, to be submitted.
80. M.A. Peck and M.A. Langell, “Zinc Cations in a Unique Environment: XANES of Zn_xNi_{1-x}O Rocksalt Solid Solutions”, *Chemistry of Materials*, submitted.

Present Students and Collaborators

Postdoctoral Associate

Karen Gaskell '05-07
 Evgueni Kassadov '06-07
 Mohamed K. Nassir, '94-95
 Charles Hutchins, '95
 Jong Gyu Kim '99-01

Graduate Students

Tyler Balson, Ph.D candidate
Greg Christiansen, M.S. candidate
Matthea Peak, Ph.D. candidate
Daniel Wilson, Ph.D. candidate

Greg Carson, Ph.D. '97 (Asst. Professor, Mansfield University, PA)
Sarah Chapman Petitto, Ph.D '05 (Assistant Professor, St. Cloud State)
Gaetan Couderc Masters Equivalent '97 (Univ. Franche-Compte, Besançon, France)
Harry Garcia Flores, Ph.D. '10 (Postdoctoral Fellow, Los Alamos National Laboratory)
Ron Furstenau, Masters '84 (Professor, Air Force Academy)
Frederic Gevray, Masters Equivalent '98 (Univ. Franche-Compte, Besançon, France)
Timothy Hayes, Masters '88 (Los Alamos National Labs)
Mike Nydegger, Masters '99 (Asst. Professor, Butler Community College)
David L. Pugmire, Ph.D. '00 (Task Leader, Los Alamos National Lab., National Research Council Postdoctoral Fellow '00-'02 at NIST, AVS Graduate Research Award, '99, Folsom Award, '01)
Craig Timberlake, Masters '85 (Dow)
Cynthia Woodbridge, Ph.D. '02 (Asst. Professor, US Military Academy at West Point)
Dr. Kurt Wulser, Masters '88, Ph.D. '91 (UNL Center for Mass Spectrometry)

Undergraduate Students

Adam Fulmer, 10/2010-present, B.S. Candidate, UNL
Juan Carlos Tellez, B.S. candidate, Universidad de Salamanca, January 2010
Cindy Berrie, B.S. UNL '92 (Ph.D. Univ of CA-Berkeley, Associate Professor, U. Kansas)
Kristy Carey, B.S., Truman State, Summer 2008
Laronna Colbert, Summer '87 (Med. School, Loma Linda)
John Hazuka, B.S. UNL '84 (Ph.D. University of Colorado)
Xiu "Sherry" Jin, Summer '91, B.S. Pittsburg State, KS (Masters, U. Missouri-Rolla in Chemical Engineering)
Jasmine Lee, '04, B.S. UNL
Greg McDougall, B.S. '83 (Self-Employed in Chemical Analysis, Sioux City, SD)
Brian McIntyre, B.S. '90 (Ph.D., Univ. of CA-Berkeley; Intel)
Scott Smith, B.S. UNL '94
Lan Peng, summer '94 (Harris Labs, Lincoln, NE)
Cheryl Spika, B.S. UNL '97 (Dental School, UNL)
Jonathan J. Schroden, REU summer '97, B.S. St. John's U. (Ph.D. MIT)
R. Clint Johnson, REU summer '97, B.S. Physics, Colorado College
Paul Pesavento, REU summer '98, B.S. Bimedji State (Ph.D. candidate, U. Minnesota)
Seth Root, REU summer '98, B.S. UNL (M.S., UNL)
Matt Stockinger, REU '99 B.S. St. Johns U (Ph.D., U. British Columbia)
David Battaglia, REU '99 B.S. Concordia University (Ph.D. candidate U. Arkansas)
April Vaverka, REU summer '00, B.S. UNK (Ph.D. candidate, U.C. Davis)
Kyle Baughman, REU '00 B.S, Arizona State
Anna Castello, REU summer '00, B.S. Monterey Institute of Technology, Mexico
Anthony Moses B.S. '02 Chemical Engineering, UNL (Ph.D. , Univ. of CA-Santa Barbara)

Anne Starace, summer '03, UCARE '04-'05 (Ph.D., U. Indiana, now NREL)
Jennifer Faer, summer '03, B.S. Univ. New Haven, CT (Chemist, CT)
Jasmine Lee, UCARE '04-06 (B.S., UNL)
Adam Scheel, summer '04 (B.S., UNL)
Anh (Nancy) Ngyuen, '06-07, UCARE '06-07 (B.S., UNL)

Collaborators

David Brooks, Teachers College, UNL
Cindy L. Berrie, Department of Chemistry, University of Kansas
Mike Henderson, Pacific Northwest National Laboratory
Michel Dupuis, Pacific Northwest National Laboratory
Pat Shea, School of Natural Resources, UNL
David Sellmyer, Department of Physics and Astronomy, UNL

Departmental and University Service Highlights (last five years)

GAANN Fellows mentor, 8/1/10-present
EPScOR State Advisory Board, 8/1/06-present
Department of Chemistry University Professorship Committee 9/05-present
Tenure and Promotion Subcommittee Member, Jian Zhang, Fall 2010-present
Member, Graduate Studies ITA Institute Advisory Board 3/1/03-present
Graduate Admissions Chair for the Department of Chemistry, 8/15/07-8/14/10
Ex Officio Member of the Graduate Committee, Department of Chemistry, 8/15/07-8/14/10
University Marshal, 08/07-08/08
College of Arts & Sciences Executive Committee 8/1/07-5/31/08