Anthony J. Wagner, PhD

Analytical Staff Scientist
Materials Science and Engineering Center
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OBJECTIVE STATEMENT

My research objective is to work hands-on in a laboratory, conducting interesting and innovative experiments with the goal of advancing scientific understanding. I look forward to learning and working with new types of instrumentation and employing my knowledge to help the next generation of scientists achieve their research goals.

RESEARCH INTERESTS

The formation, deposition, and modification of thin films for enhanced surface properties.
The surface interactions of energetic species.
The utilization of analytical techniques for the characterization of unique physical properties.

EDUCATION

1998-2003 Ph.D., Chemistry
Department of Chemistry, Johns Hopkins University, Baltimore, MD
Thesis: Degradation of Fluorine-containing Organic Thin Films and Organohalides Mediated by Ionizing Radiation: Nitrogen-based Surface Modification of Polymers and Metallization of Nitrogen-containing Polymers

1998-2000 M.A., Chemistry
Department of Chemistry, Johns Hopkins University, Baltimore, MD

1994-1998 B.S. in Chemistry and Mathematics
Clarke College (renamed Clarke University), Dubuque, IA

RESEARCH HISTORY

07/2018 – present Associate Scientist (working title: Analytical Scientist) in the Materials Science & Engineering Center
Director: Douglas Dunham, Ph.D.
University of Wisconsin – Eau Claire, Eau Claire, WI

07/2011–06/2018 Assistant Scientist (working title: Analytical Scientist) in the Materials Science & Engineering Center
Director: Douglas Dunham, Ph.D.
University of Wisconsin – Eau Claire, Eau Claire, WI

08/2006-07/2011 Research Scientist in Global Air Care – RD&E
Manager: William Archer, PhD SC
Johnson & Son, Inc, Racine, WI

04/2005-08/2006 Post-doctoral Fellowship in the Analytical Department – RD&E
Advisor: Michael McGlade
SC Johnson & Son, Inc, Racine, WI

12/2003-03/2005 Post-doctoral Fellowship in an Applied Spectroscopy Research Group
Advisor: John McClelland, PhD
Ames Laboratory (DOE), Ames, IA

09/1998-05/2003 Graduate Student in a Surface Analysis Research Group
Research Advisor: D. Howard Fairbrother, PhD
The Johns Hopkins University, Baltimore, MD

05/1999-05/2003 Facilities Operator of the Surface Analysis Lab in Materials Science
The Johns Hopkins University, Baltimore, MD

06/2001-09/2001 Graduate Student in NSF funded European Research Exchange
Research Advisor: Francois Reniers, PhD
Free University of Brussels, Brussels, Belgium

RESEARCH PROJECT EXPERIENCE

Analytical Staff Scientist at UWEC Materials Science and Engineering Center

- Manage lab instrumentation. Provide training to students and faculty for use in research and curriculum. Coordinate access, maintain and repair instrumentation.
- Work with local industry members to address product issues utilizing the suite of instrumentation available in the Center.
- Support community outreach activities by the center. Engage with local industry and K-12 students to further the STEM field of interest in the area.
- Support curricular and research utilization of the instrumentation in the Center. Provide mentorship on best application of instrumental techniques.

Research Scientist at SC Johnson & Son:

- Developed a novel analytical system coupling a dual column GC with a sensory analysis port to generate a predictive model using chemometrics
- Managed the analytical support for new product formulas containing Odor Elimination properties within the Air Care group
- Developed and employed new analytical methods to determine the product efficacy in Odor Elimination for use in new product advertising claims
- Provided analytical support to both challenge competitors advertising claims and defend advertising challenges brought by our competitors against the Oust and Glade product lines.
- Collaboratively explored new technologies for potential integration into future products. *(see patent application)* Once a viable technology was identified, I worked with the product development team to implement the technology into a new product.

Post-Doctoral position at SC Johnson & Son:

- Determined the partitioning of malodor molecules into solutions containing new active components using GC-MS
- Developed new methods for measuring odor reduction from soft surfaces using a custom designed 12-gallon chamber system
- Determined the efficacy of new formulas on reducing malodor molecules in a dynamic flow headspace using ATD GC-MS

Post-Doctoral position at Ames Labs:

- Explored multiple techniques including MS, HPLC-MS, and HPLC-FTIR to develop a searchable database of pen inks
- Analyzed FTIR spectra using Chemometric to predict mechanical properties of polymers
- Developed an infrared depth profiling method (FTIR-ATR and FTIR-PAS) for multilayer thin films utilizing a micro-lapping approach

Doctoral Candidate position:

- Utilized self-assembled monolayers (SAMs) as models of polymer surfaces/interfaces
- Metallized fluorine and nitrogen-containing SAMs and polymers
- Investigated the effect of x-ray irradiation on fluorine-containing thin films

- Evaluated methods of polymer surface modification, including nitrogen ions, oxygen radicals and a nitrogen plasma system (Free University of Brussels, Belgium)
- Investigated the effects of electron and x-ray degradation of halocarbon/ice films
- Used XPS and AES for thin film analysis and impurity determination

Experience with the following Instrumental Technique:
- X-ray Photoelectron Spectroscopy (XPS)
- Auger Electron Spectroscopy (AES)
- Scanning Electron Microscopy (SEM)
- Transmission Electron Microscopy (TEM)
- Energy Dispersive X-ray Spectroscopy (EDS)
- X-ray Fluorescence (XRF)
- X-ray Diffraction (XRD)
- High Performance Liquid Chromatography (HPLC)
- Gas Chromatography (GC) with Automated Thermal Desorption (ATD)
- Mass Spectrometry (MS)
- Solid Phase Micro-Extraction (SPME)
- Atomic Force Microscopy (AFM)
- Infrared Spectroscopy (FTIR) using ATR, photoacoustic (PAS), and reflectance (RAIRS)
- Laser Confocal Microscopy
- Nanoindentation
- Instron Mechanical Testing – Tensile, Compression, Peel
- Contact Angle Measurements
- Thermogravimetric Analysis (TGA)
- UV-Vis Spectroscopy
- Gel Permeation Chromatography (GPC)
- DC Sputter Deposition and RF Plasma Modification Chamber

ASSOCIATION MEMBERSHIP

2018 – Current	Microscopy Society of America
2018 – Current	Microanalysis Society
2012 – Current	Materials Research Society
2000 – 2016	American Chemical Society
2000 – 2014	American Vacuum Society

CONTINUING EDUCATION

2015	"Element 2/XR 3-day Operator Training" by Thermo Scientific
2014	"Advanced XRD training for SAXS, Leptos, Topas" by Bruker Scientific
2014	"Advanced WD-XRF Operators Training – Tiger S8" by Bruker Scientific
2011	"TEM Operators Training" by JEOL
2010	"SC Johnson & Son Aerosol Technology Training" company internal training
2010	"Pirouette Chemometrics Course" short course offered by Infometrix
2010	"Dispersions in Liquid: Suspensions, Emulsions, and Foams" ACS short course by Ian Morrison
2008	"Fundamentals of Gas Chromatography" short course by the Chicago Chromatography Discussion Group
2007	"Particle Transport, Deposition, and Removal" by Goodarz Ahmadi
2007	"Basics of Corrosion" an ASM International short course by Tom Glasgow
2006	"Special Topics in Organic Chemistry" short course by Kent McRenolds, PhD
2004	"Practical HPLC Troubleshooting" short course at the Minnesota Chromatography Forum

RECENT CONFERENCES ATTENDED FOR PROFESSIONAL DEVELOPMENT / CENTER OUTREACH

2017 Regional Materials and Manufacturing Network (RM^2N) Fall Symposium
UW-Platteville, Platteville WI October 16th

2017 WSTS 2017 – Wisconsin Science and Technology Symposium
UW-Platteville, Platteville WI July 24th - 25th

2016 Materials Research Society (MRS) Fall Meeting
Boston, MA November 27th – December 2nd

2016 Regional Materials and Manufacturing Network (RM^2N) Fall Symposium
UW-Stout, Menomonee WI October 17th

2016 Regional Materials and Manufacturing Network (RM^2N) Fall Symposium
UW-Milwaukee, Milwaukee WI May 2nd

2015 Manufacturing Advantage Conference
UW-Stout, Menomonee WI November 4th - 5th

2015 Regional Materials and Manufacturing Network (RM^2N) Fall Symposium
UW-Eau Claire, Eau Claire WI September 21st

2015 UW Advanced Materials Industrial Consortium Annual Meeting
UW- Madison, Madison, WI September 11th

2015 Materials Research Society (MRS) Spring Meeting
San Francisco, CA April 6th – 10th

SELECTED PRESENTATIONS

2016 Regional Materials and Manufacturing Network Fall Symposium, UW - Stout,
Oral: Working with Industry: The Many Faces of Success

2002 American Vacuum Society 49th International Symposium, Denver, CO
Oral: Reactivity of Polymers Containing Nitrogen and Oxygen Functional Groups with Vapor Phase Metal Atoms

2001 American Vacuum Society 48th International Symposium, San Francisco, CA
Poster: Surface Reactions of Polyethylene with Nitrogen Plasmas/Ion Beams

2000 American Chemical Society PacifiChem 2000, Honolulu, HI
Poster: Kinetic Properties of X-ray Modified Fluorine Containing Thin Films

2000 American Chemical Society 200th National Meeting, Washington, D.C.
Oral: Kinetics of X-ray Induced Modification to Semi-fluorinated Self-assembled Monolayers

CONFERENCE PROCEEDINGS

R.W. Jones, J.J. Sweterlitsch, **A.J. Wagner**, J.F. McClelland, D.K. Hsu, D.L. Polis, M.F. Sovinski; "FT-IR Photoacoustic Spectroscopy Applied to the Curing and Aging of Composites", *Review of Progress in Quantitative Nondestructive Evaluation* 2004, 24.

G.F. Dirras, G. Coles, **A.J. Wagner**, S.R. Carlo, C. Newman, K.J. Hemker, W.N. Sharpe Jr.; "On the role of the underlying microstructure on the mechanical properties of microelectromechanical systems (MEMS) materials" *Materials Research Society Symposium Proceedings* 2001, 657(Materials Science of Microelectromechanical Systems (MEMS) Devices III), EE5.22/1-EE5.22/6.

PATENT APPLICATIONS

C.S. Weiss, **A.J. Wagner**, W.M. Rees; "Reduction of Airborne Malodors using Hydrogen Peroxide and a catalyst-coated media", International Publication # WO/2009/064453.

PUBLICATIONS

A.J. Wagner, G.M. Wolfe, D.H. Fairbrother; "Atomic Oxygen reactions with semi-fluorinated and n-alkanethiolate self-assembled monolayers" *Journal of Chemical Physics* 2004, 120 (8), 3799- 3810.

J. Torres, **A.J. Wagner**, C.C. Perry, G.M. Wolfe, D.H. Fairbrother; "Self Assembled Monolayers: Chemical and Physical Modification Under Vacuum Conditions" *Dekker Encyclopedia of Nanoscience and Nanotechnology* 2004, Vol. 5, 3315-3329.

A.J. Wagner, G.M. Wolfe, D.H. Fairbrother; "Reactivity of vapor-deposited metal atoms with nitrogen-containing polymers and organic surfaces studied by in situ XPS" *Applied Surface Science* 2003, 219 (3-4), 317-328.

A.J. Wagner, D.H. Fairbrother, F. Reniers; "A comparison of PE surfaces modified by plasma generated neutral nitrogen species and nitrogen ions" *Plasmas and Polymers* 2003, 8 (2), 119-134.

K.J. Blobaum, **A.J. Wagner**, J.M. Plitzko, D. Van Heerden, D.H. Fairbrother, T.P. Weihs; "Investigating the reaction path and growth kinetics in CuOx/Al multilayer foils" *Journal of Applied Physics* 2003, 94 (5), 2923-2929.

C.C. Perry , G.M. Wolfe, **A.J. Wagner**, J. Torres, N.S. Faradzhev, T.E. Madey, D.H. Fairbrother; "Chemical reactions in CF_2Cl_2/water (ice) films induced by X-ray radiation" *Journal of Physical Chemistry B* 2003, 107 (46), 12740-12751.

J. Torres, C.C. Perry, **A.J. Wagner**, D.H. Fairbrother; **"**Interaction of chlorine radicals with polyethylene and hydrocarbon thin films under vacuum conditions - a comparison with atomic oxygen reactivity" *Surface Science* 2003, 543 (1-3), 75-86.

K.J. Blobaum, D. Van Heerden, **A.J. Wagner**, D.H. Fairbrother, T.P. Weihs; "Sputter-deposition and characterization of paramelaconite" *Journal of Materials Research* 2003, 18 (7), 1535-1542.

C.C. Perry, S.R. Carlo, J. Torres, **A.J. Wagner**, D.H. Fairbrother; "Chemical interaction of Fe, Ni and Au with poly(vinyl chloride) and poly(tetrafluoroethylene) during thermal evaporation and the effect of post-metallization X-ray irradiation studied by in situ X-ray photoelectron spectroscopy" *Polyimides and Other High Temperature Polymers* 2003, 2, 345-358.

C.X. Ji, G. Oskam, Y. Ding, J.D. Erlebacher, **A.J. Wagner**, P.C. Searson; "Deposition of $Au_xAg_{1-x}Au_yAg_{1-y}$ multilayers and multisegment nanowires" *Journal of the Electrochemical Society* 2003, 150 (8) C523-C528.

A.J. Wagner, C.D. Vecitis, G.M. Wolfe, C.C. Perry, D.H. Fairbrother; "Effect of chemical composition on the neutral reaction products produced during electron beam irradiation of carbon tetrachloride/water (ice) films" *Physical Chemistry Chemical Physics* 2002, 4 (15), 3806-3813.

A.J. Wagner, C.D. Vecitis, D.H. Fairbrother; "Electron-stimulated chemical reactions in carbon tetrachloride/water (ice) films" *Journal of Physical Chemistry B* 2002, 106 (17), 4432-4440.

A.J. Wagner, S.R. Carlo, C. Vecitis, D.H. Fairbrother; "Effect of X-ray irradiation on the chemical and physical properties of a semifluorinated self-assembled monolayer" *Langmuir* 2002, 18 (5), 1542-1549.

C.C. Perry, **A.J. Wagner**, D.H. Fairbrother; "Electron stimulated C-F bond breaking kinetics in fluorine-containing organic thin films" *Chemical Physics* 2002, 280 (1-2), 111-118.

S.R. Carlo, C.C. Perry, J. Torres, **A.J. Wagner**, C.D. Vecitis, D.H. Fairbrother; "Surface reactions of vapor phase titanium atoms with halogen and nitrogen containing polymers studied using in situ X-ray photoelectron spectroscopy and atomic force microscopy" *Applied Surface Science* 2002, 195 (1-4), 93-106

C.C. Perry, S.R. Carlo, **A.J. Wagner**, C. Vecitis, J. Torres, K. Kolegraff, D.H. Fairbrother; "Self-Assembled Monolayers as Models for Polymeric Interfaces" *Thin Films: Preparation, Characterization, Applications;* Eds M. Soriaga, J. Stickney, L.A. Bottomley, Y-G. Kim; Kluwer Academic/Plenum Publishers: August 2002.

A.J. Wagner, C.D. Vecitis, D.H. Fairbrother; "$CF_3(CF_2)_7(CH_2)_2SH$ self-assembled on Au and subsequent degradation under the influence of ionizing radiation as measured by XPS" *Surface Science Spectra* 2001, 8 (1), 32-38.

A.J. Wagner, K.P. Han, A.L. Vaught, D.H. Fairbrother; "X-ray induced modification of semifluorinated organic thin film" *Journal of Physical Chemistry B* 2000, 104 (14), 3291-3297.

S.R. Carlo, **AJ. Wagner**, D.H. Fairbrother; "Iron metallization of fluorinated organic films: A combined X-ray photoelectron spectroscopy and atomic force microscopy study" *Journal of Physical Chemistry B* 2000, 104 (28), 6633-6641.