Marjorie A. Nicholson

1. **Name and academic rank**

   Marjorie A. Nicholson, Instructor & Laboratory Manager (2019-Present), Postdoctoral Research Associate (2006-Present)

2. **Education –**

   Bachelor Chemical Engineering Texas A&M University 1980

   Master Chemistry Texas A&M University 1991

   Ph. D. Chemistry University of South Carolina 2001

   Military Education

   Missile Launch Officers Training School, Vandenberg Air Force Base, 1979
   Airborne Training School, Fort Benning, Georgia, 1979
   Air Force ROTC, Texas A&M University, 1976-1980

3. **Academic experience**

   Research Associate, Chemical Engineering, University of South Carolina, 2006-Present
   Chair, Department of Science and Mathematics, Covenant Christian School, Columbia, South Carolina, 2003-2006
   Research Associate, Chemical Engineering, University of South Carolina, 2002-2003
   Research Associate, Chemistry, University of South Carolina, 2001
   Graduate Research Associate, Chemistry, University of South Carolina, 1993-2001
   Graduate Research Assistant, Chemistry, Texas A&M University, 1987-1992
   Post-baccalaureate Student, Chemical Engineering, Texas A&M University, 1983-1986
   Research Assistant, Chemistry Department, Texas A&M University, 1982
   Engineering Technician I, Chemical Engineering, Texas A&M University, 1980-1981

4. **Industrial experience –**

   Consulting with various companies (Ingevity, NuPro, Huawei, PCI, Coldstream, etc.) 2006 - 2025

   Chlorine Plant #6 Laboratory Manager, Dow Chemical Company, 1981-1982

5. **Certifications or professional registrations**

   Lifetime Teaching Certification – Texas Public Schools Teaching Certificate, Texas A&M University, 1985 Science & Math Composite

6. **Scientific and professional societies of which a member**

   The Electrochemical Society

   Phi Lambda Upsilon

7. Honors and awards

Intellectual Property Award, "Electropolymerization of Polypyrrole to Fabricate Nanowires," University of South Carolina, 2000
Arthur E. Martell Travel Award, Texas A&M University, 1990
Commander of the Texas A&M University Women's Drill Team, 1979
National Merit Scholarship Semifinalist, 1976

8. Service activities

Unit Operations laboratory tours and hands-on demonstrations, USC College of Engineering and Computing Open House, April 2022, 2023, 2024, 2025.

Departmental Faculty discussion group on recruitment and retention of undergraduates 2022

Departmental Undergraduate Subcomittee on core values 04/12/21

Meeting with Graduate students during Departmental Recruitment events 2008-2025

Chemistry demonstration, high school recruitment events, N. Trenholm Baptist Church, 2019

9. Publications:

1. SA Adegunju, PBCA Amalraj, CE Holland, MA Nicholson, AD Ebner, JA Ritter "Assessment of the new kinetically limited linear driving force model for predicting diffusion limited adsorption breakthrough curves" *Adsorption* 30 (1), 57-77 **2024**
2. Shakouri, A., Firouzjaie, H. A., Nicholson, M. A., Regalbuto, J. R., US Patent Entitled: "Electrostatic-Based Methods and Systems for Control of Rheological Behavior" Application No.: 17/703,193, Filed: 24 March 2022., the United States Patent & Trademark Office granted United States Utility Patent No. **US-12,065,555-B2**, **August 20**, **2024**
3. Assessment of the New Kinetically Limited LDF Model for Diffusion-Limited Separations by PSA, SA Adegunju, PBCA Amalraj, CE Holland, MA Nicholson, AD Ebner, .JA Ritter, *Industrial & Engineering Chemistry Research* 63 (1), 579-593 **2023**
4. Nguyen, H.G.T., Sims, C.M., Toman, B., Ritter, J. A., Ebner, A. D., Horn, J.,· vanZee, R. D., Thommes, M.,· Ahmad, R.,· Denayer, J. F. M.,· Baron, G. V.,· Napolitano, E.,· Bielewski, M.,· Mangano, E.,· Brandani, S.,· Broom, D. P.,· Benham, M. J.,· Dailly, A.,· Dreisbach, F.,· Edubilli, F.,· Gumma, S., Möllmer, J.,· Lange, M.,· Tian, M.,· Mays, T.J.,· Shigeoka, T.,· Yamakita, S.,· Hakuman, M.,· Nakada, Y.,· Nakai, K.,· Hwang, J.,· Pini, R.,· Jiang, H.,· Nicholson, M. A., Farrando-Pérez, J.,· Cuadrado-Collados, C.,· Silvestre-Albero, J.,· Tampaxis, C.,· Steriotis, T.,· Řimnáčová, D.,· Švábová, M.,· Vorokhta, M.,· Wang, H.,· Bovens, E.,· Heymans, N.,· DeWeireld, G. "A reference high-pressure CH_4 adsorption isotherm for zeolite Y: results of an interlaboratory study," *Adsorption* **26,** 1253–1266 **2020**.
5. Yuliana K. Lugo-José, Sina Behtash, Marjorie Nicholson, John Monnier, Andreas Heyden, Christopher T Williams "Unraveling the Mechanism of propanoic acid

hydrodeoxygenation on palladium using deuterium kinetic isotope effects" *Journal of Molecular Catalysis A Chemical* 406(1) **2015.**

6. Long Cai, Yiling Dai, Marjorie Nicholson, Ralph E. White, Kamakshi Jagannathan, Garima Bhatia, "Life modeling of a lithium ion cell with a spinel-based cathode," Journal of Power Sources, **221**, 191-200 (2013).

7. Ebner, A. D., M. L. Gray, N. G. Chisholm, Q. T. Black, D. D. Mumford, M. A. Nicholson, and J. A. Ritter, "Suitability of a Solid Amine Sorbent for CO_2 Capture by Pressure Swing Adsorption." Industrial & Engineering Chemistry Research, **50**, 9, 5634-5641 (2011).

8. Veeraraghavan, B; Slavkov, D; Prabhu, S; Nicholson, M.A., Haran, B. Popov, B, Heimann, B "Synthesis and characterization of a novel non-chrome electrolytic surface treatment process to protect zinc coatings" Surface & Coatings Technology, 167 (2003)

9. Nicholson, M.A.; Aust, J. F.; Booksh, K. S.; Bell, W. C.; Myrick, M. L. "Kinetic and Spectroscopic Profiles of Pyridine Complexes at a Silver Electrode Using Surface-Enhanced Raman Scattering (SERS) and Evolving Factor Analysis," Vibrational Spectroscopy 24 (2000) 157.

10. Noll, J.D.; Nicholson, M.A.; Van Patten, P.G.; Chung, C.-W., Myrick, M. L. "Template Electropolymerization of Polypyrrole Nanostructures on Highly Ordered Pyrolytic Graphite (HOPG) Step and Pit Defects" J. Electrochem. Soc. 45(1998) 3320.

11. Nicholson, M.A.; Noll, J.D.; Myrick, M.L. "Modeling of Growth Morphology of Underpotential Electropolymerization of Pyrrole on Graphite." J. Electrochem Soc. 145 (1998) 179.

12. Noll, J.D.; Van Patten, P.G.; Nicholson, M.A.; Booksh, K.; Myrick, M.L. "Flow Injection System for the Scanning Tunneling Microscope." Rev. Sci. Instrum. 66 (1995) 4150.

13. Nicholson, M.A.; Martin, C.R. "Effect of Polymer Morphology on Performance of a Lithium-Polypyrrole Battery," Texas A&M University Press, May 1991.

14. White, R.E.; Nicholson, M.A.; Kleine, L.G.; Van Zee, J.; Darby, R. "Extension of Darby's Model of a Hydrophobic Gas-Fed Porous Electrode," J. Electrochem. Soc. 131 (1984), 268.

15. Kleine, L. G.; Nicholson, M.A.; White, R.E."On Darby Homogeneous Model For A Gas-Fed Porous-Electrode," J. Electrochem. Soc. 129 (1982) C335.

10. Proceedings papers, Book Chapters, Theses

CO2 Capture from Flue Gas By PSA: Bench Scale Demonstration of a Novel Structured Adsorbent

Conference Paper

November 2015AIChE 2015 Annual Meeting

James A Ritter, Atikur Rahman, Marjorie Nicholson Armin Ebner

Novel Structured Adsorbent and Flowsheet for CO2 Capture from Flue Gas By PSA

Conference Paper

November 2014AIChE 2014 Annual Meeting

James A Ritter, Nima Mohammadi, Marjorie Nicholson, Armin Ebner

On the Variability and Reproducibility of Equilibrium Adsorption Isotherm Measurements From Different Laboratories

Conference Paper

November 201313 AIChE Annual Meeting

Lütfi Erden, Armin Ebner, Marjorie Nicholson, JA Ritter, M. Douglas LeVan

CO2 Capture From Flue Gas by PSA Utilizing a Structured Adsorbent

Conference Paper

November 2013AIChE 2013 Annual Meeting

Nima Mohammadi, Anahita Abdollahi, Marjorie Nicholson, Armin Ebner, James A Ritter

High Temperature, Pressure Swing Adsorption Process for the Production of Ammonia

Conference Paper, November 20102010 AIChE Annual Meeting

Shubhra Bhadra, Armin Ebner, Marjorie Nicholson, James A Ritter

Production of Ammonia with Pressure Swing Adsorption Utilized In Key Separation Steps

Conference Paper,

November 2008 AIChE Annual Meeting

James A Ritter, Armin Ebner, Shubhra Bhadra, Marjorie Nicholson, Felix Jegede

Donald T. Sawyer, Paul K. S. Tsang, Seungwon Jeon, Marjorie Nicholson, "Nucleophilic and Reductive Remediation Strategies for Hazardous Halogenated Hydrocarbons (PCBs, HCB, PCP, TCE, CCl4, DCBP, EDB, DDT, AND DDE)," Book Chapter January 1992.

Marjorie Nicholson, "Effect of polymer electrode morphology on performance of a lithium/polypyrrole battery," May 1991 TAMU Master Thesis.

Marjorie Nicholson, Integration of electrochemical methods with surface enhanced Raman spectroscopy, scanning tunneling microscopy, and atomic force microscopy," University of South Carolina PhD Thesis 2001.

11. Presentations:

"The Template Synthesis of Conducting Polymer Nanowires on Highly Ordered Pyrolytic Graphite (HOPG) Defects and the Modeling of Their Growth Morphology," Abstract 554, 194th Meeting of the Electrochemical Society, Boston, Massachusetts, November 1998.

"The Template Synthesis of Polypyrrole Nanowires on Highly Ordered Pyrolytic Graphite (HOPG) Defects," Abstract 187, Pittsburgh Conference, New Orleans, Louisiana, March 1998.

"The Modeling of Growth Morphology of Underpotential Polymerization of Pyrrole," Abstract 186, Pittsburgh Conference, New Orleans, Louisiana, March 1998.

"Fabrication of Nanometer-scale Polypyrrole Wires on Ledges and Pits of Highly Ordered Pyrolytic Graphite," Abstract 556, Pittsburgh Conference, Atlanta, Georgia, March 1997.

"Kinetics and Spectroscopic Profiles of Pyridine Complexes at a Silver Electrode Using Surface-Enhanced Raman Spectroscopy (SERS) and Evolving Factor Analysis," Abstract 1162, Chicago, Illinois, Pittsburgh Conference, March 1996.

"Characterization of Scanning Tunneling Microscopy (STM) Tip Insulation Materials," Abstract 163P, Pittsburgh Conference, New Orleans, Louisiana, March 1995.

"Electrochemical Characterization of Octadecylthiol on Gold," 25th Meeting of the Federation of Analytical Chemistry and Spectroscopy Society (FACSS), October 1994.

"Effect of Polymer Electrode Morphology on Performance of a Lithium/Polypyrrole Battery," ACS Rocky Mountain Conference, Denver, Colorado, July, 1991.

"Effect of Morphology on Battery Performance of Electronically Conducting Polymer Electrodes," 177th Meeting of the Electrochemical Society, Montreal, Canada, May 1990.

12. Contributions to presentations & Professional development

:

Evaluation of a PSA System with a Modified 13X Zeolite at the National Carbon Capture Center, MC Ticona, A Ebner, CE Holland, MA Nicholson, RT Sanders, Z Frick, JA Ritter, 2025 AIChE Annual Meeting

Temperature-Vacuum Swing Adsorption Process for Direct Air Capture of CO2, JA Ritter, MA Nicholson, A Ebner 2022 AIChE Annual Meeting

Tvsa Cycle for Metabolic CO_2 Removal from Spacecraft Cabins Using a Structured Adsorbent: Bench Scale Parametric Study, PBCA Amalraj, MA Nicholson, A Ebner, JA Ritter, 2021 AIChE Annual Meeting

Attendance at The Electrochemical Society Meeting, Spring 2023, Boston, Massachusetts

Attendance at The Electrochemical Society Meeting, Spring 2018, Seattle, Washington

"Production of Ammonia with Pressure Swing Adsorption Utilized In Key Separation Steps," James A. Ritter, Armin D. Ebner, Shubhra Bhadra, Marjorie A. Nicholson, Charles E. Holland, and Felix Jegede, AIChE Annual meeting, Philadelphia PA, 2008

"Complex Metal Hydrides for Reversible Hydrogen Storage," Benjamin L. Bangasser, Marjorie A. Nicholson, Armin D. Ebner, and James A. Ritter, AIChE Annual meeting, November 5, 2007

"Reversible Hydrogen Storage in High Temperature Complex Hydrides," T. Wang, J. Wang, M. A. Nicholson, A. D. Ebner and J. A. Ritter, Fundamentals of Adsorption FOA9, Giardini Naxos, Italy, May 2007.

"High Capacity and High Temperature Complex Hydrides for Reversible Hydrogen Storage," J. Wang, T. Wang, M. A. Nicholson, A. D. Ebner and J. A. Ritter, 2nd Annual Korean-USA Joint Symposium on Hydrogen and Fuel Cell Technologies, Columbia, SC, May 2007.

"High Capacity Reversible Hydrogen Storage Materials," J. Wang, T. Wang, M. A. Nicholson, A. D. Ebner and J. A. Ritter, AIChE 2006 Annual Meeting, San Francisco, CA, November 2006.

"Synthesis of Metal Complex Hydride Reversible Hydrogen Storage Materials," J. Wang, T. Wang, M. A. Nicholson, A. D. Ebner and J. A. Ritter, AIChE 2006 Annual Meeting, San Francisco, CA, November 2006.