**K. Shawn Reeves**

Master Technician

Materials MicroÅnalysis Group

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**Education:**

North Carolina State University 1991-97 Graduate Studies *Materials Science and Engineering*

Tennessee Technological University, B.S. (1991) Cum Laude *Analytical Chemistry*

**Research Expertise:**

• Ultramicrotomy, especially of fuel cell materials

• TEM sample preparation

• SEM and (S)TEM analysis

**Research and Professional Experience:**

2010– *Present* Master Technician Oak Ridge National Laboratory

1998–2010 Technician Oak Ridge National Laboratory

1995-1997 Graduate fellowship program Oak Ridge Associated Universities

Summers 1989, 90, 91 Summer Research Internships Oak Ridge National Laboratory

**Honors and Awards:**

2023 CNMS Special Team Accomplishment “For establishing the first Cryo-EM laboratory at ORNL/CNMS”, Center for Nanophase Material Sciences, Oak Ridge National Laboratory

2013 Microscopy Society of America’s 2013 Outstanding Technologist for Physical Sciences Award

2005 Significant Event Award for PEM Fuel Cell Research

2004 Microscopy Society of America, Diatome Poster Award-Second Place

1995-97 High Temperature Materials Laboratory Graduate Fellowship at ORNL

1991-94 Electronic Materials Fellowship (NCSU)

1990 I.M. Kolthoff Enrichment Award in Analytical Chemistry (sponsored by the American Chemical Society)

1990-91 Fleetguard Chemistry Scholarship (TTU)

1989-90 Outstanding Senior Departmental Chemistry Major Award at Tennessee Technological University

1989 Undergraduate Award in Analytical Chemistry given by the Division of Analytical Chemistry of the American Chemical Society

1989 McDowell Chemistry Scholarship (TTU)

1986-90 University Academic Scholarship to TTU

**Journal Publications amd Presentations:**

Zeng, Y., Liang, J., Li, B., Yu, H., Zhang, B., Reeves, K.S., Cullen, D.A., Li, X., Su, D., Wang, G., Zhong, S., Xu, H., Macauley, N., Wu, G.,” Pt Nanoparticles on Atomic-Metal-Rich Carbon for Heavy-Duty Fuel Cell Catalysts: Durability Enhancement and Degradation Behavior in Membrane Electrode Assemblies” *ACS Catal* **13** (2023) 11871.

Patil, J.J., Lu,Z., Zachman, M.J., Chen, N., Reeves, K.S., Jana, A., Revia, G., MacDonald, B., Keller, B.D., Lara-Curzio, E., Grossman, J.C., Ferralis, N.,“ Chemical and Physical Drivers for Improvement in Permeance and Stability of Linker-Free Graphene Oxide Membranes” *Nano Lett*. **23** (2023) 6414.

Khandavalli, S., Chen, Y., Sharma-Nene, N., Rajan, K.S., Sur S., Rothstein J.P., Reeves, K.S., Cullen, D.A., Neyerlin, K.C., Mauger, S.A., Ulsh, M.,” Effect of isopropanol cosolvent on the rheology and spinnability of aqueous polyacrylic acid solutions” *J. Polymer Science* **61**(14) (2023) 1495.

Waldrop, K., Slack, J.J., Gumeci, C., Parrondo, J., Dale, N., Reeves, K.S., Cullen, D.A., More, K.L., Pintauro, P.N.,”Electrospun Nanofiber Electrodes for High and Low Humidity PEMFC Operation” *J. Electrochem. Soc.* **170**(2) (2023) 024507.

H. Yu, M.J. Zachman, K.S. Reeves, J.H. Park, N.N. Kariuki, L. Hu, R. Mukundan, K.C. Neyerlin, D.J. Myers, and D.A. Cullen “Tracking Nanoparticle Degradation Across Fuel Cell Electrodes by Automated Analytical Electron Microscopy” ACS Nano 16 (2022) 12083.

Alia, S.M., Reeves, K.S., Haoran, Y., Park, J., Kariuki, N., Kropf, A., Myers, D., Cullen, D.A.,”Electrolyzer Performance Loss from Accelerated Stress Tests and Corresponding Changes to Catalyst Layers and Interfaces” *J. Electrochem. Soc.* **169**(5) (2022) 054517.

Ergul-Yilmaz, B., Yang, Z., Basurrah, A.O., Perry, M.L., Reeves, K.S., Cullen, D.A.,” Nanocolumnar Pt:Ni Alloy Thin Films by High Pressure Sputtering for Oxygen Reduction Reaction” *J. Electrochem. Soc*., **168** (2021) 124509.

Alia, S.M., Reeves, K.S., Baxter, J.S., Cullen, D.A.,”The Impact of Ink and Spray Variables on Catalyst Layer Properties, Electrolyzer Performance , and Electrolyser Durability” *J. Electrochem. Soc.* **167** (2020) 144512.

Slack, John J., Brodt, M., Cullen, David A., Reeves, Kimberly S., More, Karren L., Pintauro, Peter N.,“Impact of Polyvinylidene Fluoride on Nanofiber Cathode Structure and Durability in Proton Exchange Membrane Fuel Cells” *J. Electrochem. Soc.,* **167**(5) (2020) 054517.

Waldrop, K., Slack, J., Gumeci, C., Dale, N., Reeves, K.S., Cullen, D.A., More, K.L., Pintauro, P.N.,”Electrospun Particle/Polymer Fiber Electrodes with a Neat Nafion Binder for Hydrogen/Air Fuel Cells” *ECS Transactions* **92**(8) (2019) 595.

Bhagia, S., Meng, X., Evans, B.R., Dunlap, J.R., Bali, G., Chen, J., Reeves,, K.S., Ho, H.C., Davison, B.H., Pu, Y., Ragauskas, A.J., “Ultrastructure and Enzymatic Hydrolysis of Deuterated Switchgrass” *Scientific Reports* 8 (2018) 13226.

Sneed, Brian T., Cullen, David A., Reeves, Kimberly S., Dyck, Ondrej E., Langlois, David A., Mukundan, Rangachary, Borup, Rodney L., More, Karren L., “3D Analysis of Fuel Cell Electrocatalyst Degradation on Alternate Carbon Supports” *ACS Applied Materials & Interfaces,* **9**(35) (2017) 29839.

Sun, X-G., Wan, S., Guang, H.Y., Fang, Y., Reeves, K.S., Chi, M., Dai, S., “New Promising Lithium Malonatoborate Salts for High Voltage Lithium Ion Batteries” *J Mater. Chem. A*, **5** (2017) 1233.

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Cullen, D. A., More, K. L., Reeves, K. S., Vernstrom, G. D., Atanasoska, L. L., Haugen, G. M., Atanasoski, R. T., “Characterization of Durable Nanostructured Thin Film Catalysts Tested Under Transient Conditions Using Analytical Aberration-Corrected Electron Microscopy” *ECS Transactions* **41**(1) (2011) 1099.

More, K.L., Reeves, K.S., Borup, R., “Pt-Co Bimetallic Catalysts for PEM Fuel Cell Cathodes” *Microscopy And Microanalysis,* **15**(2009) 146.

Meyer, H. M., III, Reeves, K. S., More, K. L*., “*XPS Analysis of Fuel Cell Membrane Prepared Using an Ultra-Low-Angle-Microtomy Technique*”Microscopy And Microanalysis,* **15**(2009) 1130.

K.L. More, K.S. Ailey, R.A. Lowden, and H.T. Lin, “Evaluating the Effect of Oxygen Content in BN Interfacial Coatings on the Stability of SiC/BN/SiC Composites” *Composites Part A: Applied Science and Manufacturing*, **30**(4) (1999) 463.

R.F. Davis, M.D. Bremser, O.H. Nam, W.G. Perry, T. Zheleva, and K.S. Ailey, “Chemical Considerations Regarding the Vapor-Phase Epitaxy of Binary and Ternary III-Nitride Thin Films” *Synthesis and Characterization of Advanced Materials, ACS Symp Ser* **681** (1998) 12.

K.S. Ailey, K.L. More, and R.A. Lowden, “The Stability of BN Interfacial Coatings in CFCC Systems During Oxidation and Exposure to Moisture”, presented at the Annual meeting of the American Ceramic Society, Cincinnati, OH, 1997.

R.F. Davis, M.D. Bremser, W.G. Perry, and K.S. Ailey, “Growth of AlN, GaN, and AlxGa1-xN Thin Films on Vicinal and On-axis 6H-SiC(0001) Substrates” *Journal of the European Ceramic Society,* **17**(15-16) (1997) 1775.

K.S. Ailey, K.L. More, and R.A. Lowden, “The Stability of BN Interfacial Coatings in CFCC Systems During Oxidation and Exposure to Moisture”, presented at the Annual meeting of the Microscopy Society of America, Aug. 10-14, Cleveland, OH, 1997.

K.S. Ailey, K.L. More, and R.A. Lowden, “The Stability of BN Interfacial Coatings in CFCC Systems During Oxidation and Exposure to Moisture”, in the Proceedings of Microscopy and Microanalysis 1997, G.W. Bailey et al. editors, Springer, Springer-Verlag, New York (1997) 729.

L.F. Allard, K.S. Ailey, A.K. Datye and W.C. Bigelow, “An Ex-Situ Reactor with Anaerobic Specimen Transfer Capabilities for TEM Studies of Reactive (Catalyst) Specimens”, in the Proceedings of Microscopy and Microanalysis 1997, G.W. Bailey et al. editors, Springer, Springer-Verlag, New York (1997) 595.

R.F. Davis, M.J. Paisley, Z. Sitar, D.J. Kester, K. S. Ailey, K. Linthicum, L.B. Rowland, S. Tanaka, and R.S. Kern, “Gas-source Molecular Beam Epitaxy of III-V Nitrides” *Journal of Crystal Growth*, **178**(1-2) (1997) 87.

S.H. Overbury, D.R. Huntley, D.R. Mullins, K.S. Ailey, and P.V. Radulovic, “Surface Studies of Model Supported Catalysts: NO Adsorption on Rh/CeO2(001)” *Journal of Vacuum Science & Technology A-Vacuum Surfaces and Films* **15**(3) (1997).

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R.F. Davis, T.W. Weeks, M.D. Bremser, S. Tanaka, R.S. Kern, Z. Sitar, K.S. Ailey, W.G. Perry, and C. Wang, “Growth of AlN and GaN Thin Films via OMVPE and Gas Source MBE and their Characterization” *Solid-State Electronics* **41**(2) (1997) 129.

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R.F. Davis, M.D. Bremser, W.G. Perry, T. Jeleva, and K.S. Ailey, “Chemical Considerations Regarding the Chemical Vapor Deposition of Binary and Ternary III-Nitride Thin Films” in Abstracts of Papers of the American Chemical Society 212 (1996) 13.

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T.W. Weeks, M.D. Bremser, K.S. Ailey, E. Carlson, W.G. Perry, E.L. Piner, N.A. ElMasry, and R.F. Davis, “Undoped and Doped GaN Thin Films Deposited on High-Temperature Monocrystalline AlN Buffer Layers on Vicinal and On-axis Alpha(6h)-SiC(0001) Substrates via Organometallic Vapor Phase Epitaxy”, *Journal of Materials Research*  **11**(4) (1996) 1011.

T.W. Weeks, M.D. Bremser, K.S. Ailey, E. Carlson, W.G. Perry, and R.F. Davis, “GaN Thin Films Deposited via Organometallic Vapor Phase Epitaxy on Alpha(6h)-SiC(0001) Using High-Temperature Monocrystalline AlN Buffer Layers”, *Applied Physics Letters* **67**(3) (1995) 401.

K.S. Ailey, C. Wang, E. Carlson, K.J. Linthicum, K.L. More and R.F. Davis, “TEM Characterization of GaN and AlN Thin Films Deposited via MBE”, presented at the *Second Workshop on Wide Bandgap Nitrides* symposium, St. Louis, MO, October 17-18, 1994.

R.F. Davis, M.J. Paisley, Z. Sitar, D.J. Kester, K. S. Ailey, and C.O. Wang, “Deposition of III-V Nitride Thin Films by Molecular-Beam Epitaxy”, *Microelectronics Journal* **25**(8) (1994) 661.

D.J. Kester, K.S. Ailey, D. J. Lichtenwalner, and R.F. Davis, “Growth and Characterization of Cubic Boron-Nitride Thin-Films”, *Journal of Vacuum Science & Technology A-Vacuum Surfaces and Films* **12**(6) (1994) 3074.

D.J. Kester, K.S. Ailey, and R.F. Davis, “Deposition and Characterization of Boron-Nitride Thin-Films”, *Diamond and Related Materials* **3**(4-6) (1994) 332.

D.J. Kester, K.S. Ailey, R.F. Davis, and K.L. More, “Phase Evolution in Boron-Nitride Thin-Films”, *Journal of Materials Research* **8**(6) (1993) 1213.

K.S. Ailey, C. Wang and R.F. Davis, “Characterization of Aluminum Nitride and Gallium Nitride Films Deposited by Modified Gas Source Molecular Beam Epitaxy”, presented at the International Conference on Silicon Carbide and Related Materials, Washington D.C., 1993.

A. Vasudev, K.L. More, K.S. Ailey-Trent, and R.F. Davis, “Kinetics and Mechanisms of High-Temperature Creep in Polycrystalline Aluminum Nitride”, *Journal of Materials Research* **8**(5) (1993) 1101.

J. Sumakeris, Z. Sitar, K.S. Ailey-Trent, K.L. More, and R.F. Davis, “Layer-by-Layer Epitaxial-Growth of GaN at Low Temperatures”, *Thin Solid Films* **225**(1-2) (1993) 244.

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K.S. Ailey, and C.W. McGowan, “The Use of Ammoniacal Hydrogen Peroxide to Trap Volatile Sulfur Compounds Produced by the Reaction of Coal with Perchloric-Acid”, presented at the Tennessee Academy of Sciences meeting, Cookeville, TN, November, 1988.