

Adam J. Rondinone

Group Leader
Chemical Functionality Group
Center for Nanophase Materials Sciences
Oak Ridge National Laboratory
(865) 574-5035
rondinoneaj@ornl.gov



Education

Appalachian State University	Chemistry	B.S., 1997
Georgia Institute of Technology	Analytical Chemistry	Ph.D., 2001

Professional Experience

2011–p	Group Leader, Chemical Functionality Group, Center for Nanophase Materials Sciences (CNMS), Oak Ridge National Laboratory (ORNL)
2008–2010	Congressional Science Fellow, Office of U.S. Senator Lamar Alexander
2006–2011	Research Staff Member, Multiscale Functionality Group, CNMS
2003–2007	Research Associate, Chemical Sciences Division, ORNL
2001–2003	Wigner Fellow, Chemical Sciences Division, ORNL
1998–2001	Molecular Design Institute Fellow, Georgia Institute of Technology
1997–2001	Cherry Emerson Fellow, Georgia Institute of Technology
1997–1998	Graduate Research Assistant, Georgia Institute of Technology

Professional and Synergistic Activities

2012–p	Chairman, ORNL Research Conflict of Interest Committee
2010	ORNL Management Boot Camp
2004–2006	Member, ORNL Seed Committee
2007–p	Member, Sigma Xi
1997–p	Member, American Chemical Society
2005–p	Scientific Outreach, K-12 Students, College Students, High School Teachers
2000	National School on Neutron and X-Ray Scattering, Argonne National Laboratory

Honors and Awards

2007	DOE Office of Science Outstanding Mentor Award
2006	R&D 100 Award “NanoFermentation,”
2006	Micro/Nano 25 “NanoFermentation,”
2001	Wigner Fellowship, ORNL
2001	Sigma Xi Best Ph.D. Thesis
2000	Flashka Award, Georgia Institute of Technology

Legislative Activities

America COMPETES Reauthorization Act of 2010 – Public Law 111-358

- Lead Alexander staffer – worked to coordinate relevant Minority subcommittee activities and represent Minority conference preferences.

Mercury Export Ban Act – Public Law 110-414

- Negotiated with Majority and third parties to prevent mercury from being stored on the Oak Ridge Reservation.

Alexander-Webb Clean Energy Act of 2009

- Authored with staff of Senator Webb

Served as legislative assistant to Senator Alexander on science, climate and energy.

- Co-wrote a variety of energy and climate-change related speeches, op-eds and floor remarks.

- Regularly represented Senator Alexander in meetings with industry officials, lobbyists, constituents and staff of other legislators.
- Invited to speak before energy-industry officials on numerous occasions regarding Congressional business such as cap-and-trade and nuclear power licensing.

Patents/Applications/Disclosures

“Composite Scintillators for Radiation Detection,” S. Dai, A. Stephan, S. Brown, S. Wallace, and A. Rondinone, U. S. Patent #7,857,993, B2, Dec. 28, 2010.

“Microbially-Mediated Method for Synthesis of Non-Oxide Semiconductor Nanoparticles” T. Phelps, L. Love, J. Moon, A. Rondinone, L. Love, C. Duty, A. Madden, Y. Li, I. Ivanov, C. Rawn, U.S. Public. #2010/0330367 A1, Dec. 30, 2010.

“Microbially-Mediated Method for Synthesis of Non-oxide Semiconductor Nanoparticles” T. Phelps, L. Love, J. Moon, A. Rondinone, L. Love, C. Duty, A. Madden, Y. Li, I. Ivanov, C. Rawn, U.S. Public. #2010/0193752 A1, Aug. 5, 2010.

“Microbial-Mediated Method for Metal Oxide Nanoparticle Formation” T. Phelps, L. Love, J. Moon, L. Yearly, A. Rondinone, U.S. Public. #2010/0184179 A1, Jul. 22, 2010.

Publications (*More than 45 reviewed publications and two book chapters*) Full list follows CV

Research Synopsis

1. **Solvothermal Synthesis of Nanomaterials.** We utilize solvothermal approaches to develop chemistry and techniques necessary to access refractory nanomaterials that are challenging to synthesize with traditional wet methods.
2. **Nanomaterials Characterization.** We are developing new in situ characterization approaches using small-angle x-ray scattering (SAXS) to better understand the mechanisms and kinetic of solution-based nanomaterials synthesis.
3. **Catalysis.** We synthesize catalytic nanomaterials such as metals, oxides and graphenic carbons for use as gas-phase catalysts. We study the performance and mechanisms as a function of the nanomaterial properties including size, expression of crystal faces, and support chemistry.
4. **Energy Storage.** We synthesize and study nanomaterials for applications in electrical energy storage systems as electrodes and electrolytes.
5. **Medical Isotope Delivery.** We are working on new nanomaterials-based delivery media for the safe in vivo delivery of alpha-bearing isotopes for cancer therapy.
6. **Radiation Detection.** We have worked on a wide variety of scintillating nanomaterials for the low-cost detection of radiation and neutrons.

Collaborations: J. Avenell, S. Kennel, T. Richey, S. Kennel (Univ. of TN-Knoxville); V. Guliants and N. R. Shiju (Univ. of Cincinnati); B. Jang and M. Helleison (Univ. of Texas-Austin)

Graduate and Postdoctoral Advisors:

Graduate Advisor: Prof. Z. John Zhang (Georgia Institute of Technology)

Thesis Advisor and Postgraduate-Scholar Sponsor:

Postdoctoral Scholars (Recent): S. Brown (Univ. of TN-Knoxville); B. Kesanli (Univ. of Maryland); J. Woodward (Univ. of Florida); L. Yang (Univ. of Cincinnati-Ohio, currently with ORNL)

Total Graduate Students Advised: 0

Total Postdoctoral Scholars Advised: 4

PUBLICATIONS

Adam Rondinone

Center for Nanophase Materials Sciences Division
Oak Ridge National Laboratory
Oak Ridge, TN 37831
rondinoneaj@ornl.gov

Book Chapters

- S. Brown, S. Dai, and A. J. Rondinone, "Applications of Nanoparticles in Scintillation Detectors," Chapter 8 in *Antiterrorism and Homeland Defense: Polymers and Materials, Third Edition*, pp. 117-129, eds., J. G. Reynolds, G. E. Lawson, C. J. Koester: American Chemical Society, Washington, D.C. (2007).
- A. J. Rondinone and Z. J. Zhang, "Magnetic Characterization," Chapter 18 in *Handbook of Nanophase and Nanostructured Materials: Characterization*, Vol. 2; eds., Z. L. Wang, Y. Liu, Z. Zhang; Kluwer Academic/Plenum Publishers: New York, N.Y. (2002).

Peer-Reviewed Publications (Author of ~45 articles in refereed journals):

- Wu, Z. L.; Schwartz, V.; Li, M. J.; Rondinone, A. J.; Overbury, S. H., "Support Shape Effect in Metal Oxide Catalysis: Ceria-Nanoshape-Supported Vanadia Catalysts for Oxidative Dehydrogenation of Isobutane." *J Phys Chem Lett* 3 (11), 1517-1522 (2012).
- DeAngelis, M. T.; Rondinone, A. J.; Pawel, M. D.; Labotka, T. C.; Anovitz, L. M., "Sol-gel synthesis of nanocrystalline fayalite (Fe₂SiO₄)." *Am. Mineral* 97 (4), 653-656 (2012).
- Chen, J. H.; Yu, X.; Hong, K. L.; Messman, J. M.; Pickel, D. L.; Xiao, K.; Dadmun, M. D.; Mays, J. W.; Rondinone, A. J.; Sumpter, B. G.; Kilbey, S. M., "Ternary behavior and systematic nanoscale manipulation of domain structures in P3HT/PCBM/P3HT-b-PEO films." *J. Mater. Chem.* 22 (26), 13013-13022 (2012).
- Wu, Z. L.; Rondinone, A. J.; Ivanov, I. N.; Overbury, S. H., "Structure of Vanadium Oxide Supported on Ceria by Multiwavelength Raman Spectroscopy." *J Phys Chem C* 115 (51), 25368-25378 (2011).
- J. Woodward, S. J. Kennel, A. Stuckey, D. Osborne, J. Wall, A. J. Rondinone, R. F. Standaert, and S. Mirzadeh, "LaPO₄ Nanoparticles Doped with Actinium-225 that Partially Sequester Daughter Radionuclides," *Bioconjugate Chemistry* 22(4), 766 (2011).
- L. W. Yeary, J. W. Moon, C. J. Rawn, L. J. Love, A. J. Rondinone, J. R. Thompson, B. C. Chakoumakos, and T. J. Phelps, "Magnetic Properties of Bio-Synthesized Zinc Ferrite Nanoparticles," *Journal of Magnetism and Magnetic Materials* 323(23), 3043 (2011).
- J. W. Moon, C. J. Rawn, A. J. Rondinone, L. J. Love, Y. Roh, S. M. Everett, R. J. Lauf, and T. J. Phelps, "Large-Scale Production of Magnetic Nanoparticles Using Bacterial Fermentation," *Journal of Industrial Microbiology and Biotechnology* 37(10), 1023 (2010).
- J. W. Moon, C. J. Rawn, A. J. Rondinone, W. Wang, H. Vali, L. W. Yeary, L. J. Love, M. J. Kirkham, B. H. Gu, and T. J. Phelps, "Crystallite Sizes and Lattice Parameters of Nano-Biomagnetite Particles," *Journal of Nanoscience and Nanotechnology* 10(12), 8298 (2010).
- S. Mirzadeh, J. Woodward, R. F. Standaert, A. J. Rondinone, and S. J. Kennel, "Inorganic Nanoparticle Monoclonal Antibody Conjugates," *Journal of Labelled Compounds and Radiopharmaceuticals* 52, S98 (2009).
- E. Tuncer, A. J. Rondinone, J. Woodward, I. Sauers, D. R. James, and A. R. Ellis, "Cobalt Iron-Oxide Nanoparticle Modified Poly(Methyl Methacrylate) Nanodielectrics," *Applied Physics A: Materials Science & Processing* 94(4), 843 (2009).

- K. Xiao, A. J. Rondinone, A. A. Puzos, I. N. Ivanov, S. T. Retterer, and D. B. Geohegan, "Growth, Patterning, and One-Dimensional Electron Transport Properties of Self-Assembled Ag-TCNQF(4) Organic Nanowires," *Chemistry of Materials* **21**(18), 4275 (2009).
- S. H. Zhou, Z. Ma, G. A. Baker, A. J. Rondinone, Q. Zhu, H. M. Luo, Z. L. Wu, and S. Dai, "Self-Assembly of Metal Oxide Nanoparticles into Hierarchically Patterned Porous Architectures Using Ionic Liquid/Oil Emulsions," *Langmuir* **25**(13), 7229 (2009).
- S. S. Brown, A. J. Rondinone, M. D. Pawel, and S. Dai, "Ternary Cadmium Sulphide Selenide Quantum Dots as New Scintillation Materials," *Materials Technology* **23**(2), 94 (2008).
- B. Jang, M. Helleson, C. Shi, A. Rondinone, V. Schwartz, C. D. Liang, and S. Overbury, "Characterization of Al₂O₃ Supported Nickel Catalysts Derived from RF Non-Thermal Plasma Technology," *Topics in Catalysis* **49**(3-4), 145 (2008).
- S. J. Kennel, J. D. Woodward, A. J. Rondinone, J. Walls, Y. Huang, and S. Mirzadeh, "The Fate of MAb-Targeted Cd(^{125m}Te/ZnS) Nanoparticles *In Vivo*," *Nuclear Medicine and Biology* **35**(4), 501, (2008).
- Y. L. Li, S. M. Piffner, M. D. Dyar, H. Vali, K. O. Konhauser, D. R. Cole, A. J. Rondinone, and T. J. Phelps, "Degeneration of Biogenic Superparamagnetic Magnetite," *Geobiology* **7**(1), 25 (2009).
- N. R. Shiju, A. J. Rondinone, D. R. Mullins, V. Schwartz, S. H. Overbury, and V. V. Gulians, "Xanes Study of Hydrothermal Mo-V-Based Mixed Oxide. M1-Phase Catalysts for the (Amm)Oxidation of Propane," *Chemistry of Materials* **20**(21), 6611 (2008).
- N. R. Shiju, V. V. Gulians, S. H. Overbury, and A. J. Rondinone, "Toward Environmentally Benign Oxidations: Bulk Mixed Mo-V-(Te-Nb)-O M1 Phase Catalysts for the Selective Ammoxidation of Propane," *ChemSusChem* **1**(6), 519 (2008).
- D. B. Beach, A. J. Rondinone, B. G. Sumpter, S. D. Labinov, and R. K. Richards, "Solid-State Combustion of Metallic Nanoparticles: New Possibilities for an Alternative Energy Carrier," *Journal of Energy Resources Technology-Transactions of the ASME* **129**(1), 29 (2007).
- J. W. Moon, L. W. Yeary, A. J. Rondinone, C. J. Rawn, M. J. Kirkham, Y. Roh, L. J. Love, and T. J. Phelps, "Magnetic Response of Microbially Synthesized Transition Metal- and Lanthanide-Substituted Nano-Sized Magnetites," *Journal of Magnetism and Magnetic Materials* **313**(2), 283 (2007).
- A. J. Rondinone, M. Pawel, D. Travaglini, S. Mahurin, and S. Dai, "Metastable Tetragonal Phase CdWO₄ Nanoparticles Synthesized with a Solvothermal Method," *Journal of Colloid and Interface Science* **306**(2), 281 (2007).
- J. D. Woodward, S. J. Kennel, S. Mirzadeh, S. Dai, J. S. Wall, T. Richey, J. Avenell, and A. J. Rondinone, "In Vivo SPECT/CT Imaging and Biodistribution Using Radioactive (CdTe)-Te-125m/ZnS Nanoparticles," *Nanotechnology* **18**(17), 175103 (2007).
- J. D. Woodward, J. M. Pickel, L. M. Anovitz, W. T. Heller, and A. J. Rondinone, "Self-Assembled Colloidal Crystals from ZrO₂ Nanoparticles," *Journal of Physical Chemistry B* **110**(39), 19456 (2006).
- S. S. Brown, H. J. Im, A. J. Rondinone, and S. Dai, "Facile, Alternative Synthesis of Lanthanum Phosphate Nanocrystals by Ultrasonication," *Journal of Colloid and Interface Science* **292**(1), 127 (2005).
- L. J. Love, L. W. Yeary, J. W. Moon, T. J. Phelps, and A. J. Rondinone, "Characterization of Bio-Synthesized Magnetic Nanoparticles," *2005 IEEE/ASME International Conference on Advanced Intelligent Mechatronics, Vols. 1 and 2*, 111 (2005).
- S. Subramaniam, M. J. Lance, C. J. Rawn, B. C. Chakoumakos, and A. J. Rondinone, "Raman Spectroscopic Studies on Structure I and Structure II Trimethylene Oxide Hydrate," *Canadian Journal of Physics* **83**(9), 941 (2005).
- Z. T. Zhang, A. J. Rondinone, J. X. Ma, J. Shen, and S. Dai, "Morphologically Templated Growth of Aligned Spinel CoFe₂O₄ Nanorods," *Advanced Materials* **17**(11), 1415 (2005).
- S. W. Allison, G. T. Gillies, A. J. Rondinone, and M. R. Cates, "Nanoscale Thermometry via the Fluorescence of YAG:Ce Phosphor Particles: measurements from 7 to 77° C," *Nanotechnology* **14**(8), 859 (2003).

- B. C. Chakoumakos, C. J. Rawn, A. J. Rondinone, L. A. Stern, S. Circone, S. H. Kirby, Y. Ishii, C. Y. Jones, and B. H. Toby, "Temperature Dependence of Polyhedral Cage Volumes in Clathrate Hydrates," *Canadian Journal of Physics* **81**(1-2), 183 (2003).
- S. Circone, L. A. Stern, S. H. Kirby, W. B. Durham, B. C. Chakoumakos, C. J. Rawn, A. J. Rondinone, and Y. Ishii, "CO₂ Hydrate: Synthesis, Composition, Structure, Dissociation Behavior, and a Comparison to Structure I CH₄ Hydrate," *Journal of Physical Chemistry B* **107**(23), 5529 (2003).
- C. J. Rawn, A. J. Rondinone, B. C. Chakoumakos, S. Circone, L. A. Stern, S. H. Kirby, and Y. Ishii, "Neutron Powder Diffraction Studies as a Function of Temperature of Structure II Hydrate Formed from Propane," *Canadian Journal of Physics* **81**(1-2), 431 (2003).
- A. J. Rondinone, B. C. Chakoumakos, C. J. Rawn, and Y. Ishii, "Neutron Diffraction Study of Structure I and Structure II Trimethylene Oxide Clathrate Deuterate," *Journal of Physical Chemistry B* **107**(25), 6046 (2003).
- A. J. Rondinone, C. Y. Jones, S. L. Marshall, B. C. Chakoumakos, C. J. Rawn, and E. Lara-Curzio, "A Sapphire Cell for High-Pressure, Low-Temperature Neutron-Scattering Experiments on Gas Hydrates," *Canadian Journal of Physics* **81**(1-2), 381 (2003).
- T. G. Schaaff and A. J. Rondinone, "Preparation and Characterization of Silver Sulfide Nanocrystals Generated from Silver(I)-Thiolate Polymers," *Journal of Physical Chemistry B* **107**(38), 10416 (2003).
- C. Liu, B. S. Zou, A. J. Rondinone, and Z. J. Zhang, "Sol-Gel Synthesis of Free-Standing Ferroelectric Lead Zirconate Titanate Nanoparticles," *Journal of the American Chemical Society* **123**(18), 4344 (2001).
- A. J. Rondinone, C. Liu, and Z. J. Zhang, "Determination of Magnetic Anisotropy Distribution and Anisotropy Constant of Manganese Spinel Ferrite Nanoparticles," *Journal of Physical Chemistry B* **105**(33), 7967 (2001).
- A. J. Rondinone, A. C. S. Samia, and Z. J. Zhang, "A Chemometric Approach for Predicting the Size of Magnetic Spinel Ferrite Nanoparticles from the Synthesis Conditions," *Journal of Physical Chemistry B* **104**(33), 7919 (2000).
- A. J. Rondinone, A. C. S. Samia, and Z. J. Zhang, "Characterizing the Magnetic Anisotropy Constant of Spinel Cobalt Ferrite Nanoparticles," *Applied Physics Letters* **76**(24), 3624 (2000).
- C. Liu, A. J. Rondinone, and Z. J. Zhang, "Synthesis of Magnetic Spinel Ferrite CoFe₂O₄ Nanoparticles from Ferric Salt and Characterization of the Size-Dependent Superparamagnetic Properties," *Pure and Applied Chemistry* **72**(1-2), 37 (2000).
- C. Liu, B. S. Zou, A. J. Rondinone, and J. Zhang, "Chemical Control of Superparamagnetic Properties of Magnesium and Cobalt Spinel Ferrite Nanoparticles through Atomic Level Magnetic Couplings," *Journal of the American Chemical Society* **122**(26), 6263 (2000).
- C. Liu, B. S. Zou, A. J. Rondinone, and Z. J. Zhang, "Reverse Micelle Synthesis and Characterization of Superparamagnetic MnFe₂O₄ Spinel Ferrite Nanocrystallites," *Journal of Physical Chemistry B* **104**(6), 1141 (2000).
- A. J. Rondinone, A. C. S. Samia, Z. J. Zhang, "Superparamagnetic Relaxation and Magnetic Anisotropy Energy Distribution in CoFe₂O₄ Spinel Ferrite Nanocrystallites," *Journal of Physical Chemistry B* **103**(33), 6876 (1999).
- Q. Chen, A. J. Rondinone, B. C. Chakoumakos, and Z. J. Zhang, "Synthesis of Superparamagnetic MgFe₂O₄ Nanoparticles by Coprecipitation," *Journal of Magnetism and Magnetic Materials* **194**(1-3), 1 (1999).