Nancy J. Dudney

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Physical Chemistry of Materials Group
Materials Science & Technology Division
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Research Interests:

- Novel materials for hybrid vehicle batteries (current)
- Synthesis and properties of ceramic films by magnetron sputtering (current)
- Properties and fabrication of thin-film rechargeable lithium batteries
- Synthesis and properties of heterogeneous catalysts
- Properties and synthesis of composite films
- Ionic transport in composite solid state electrolytes
- Hydration, ion exchange, and Raman spectroscopy of β- and β -aluminas
- Defects and conductivity of MgO
- Galvanic cell measurements of mixed conductors
- Electronic conduction in nonstoichiometric ceramic oxides

Education:

- Ph.D, Ceramics (1979), Massachusetts Institute of Technology
- Bachelor of Science in Chemistry (1975), College of William and Mary

Professional appointments:

- Distinguished Senior Research Staff (2010), Materials Science and Technology Division, ORNL
- Senior Research Staff (2006-2010), Materials Science and Technology Division, ORNL
- Group Leader (1999-2006), Thin Film Ceramics, Solid State Division, ORNL
- Research Staff Member (1981-1999), Solid State Division, ORNL
- Wigner Fellow (1979-1981), ORNL

Honors and Awards:

- Corporate Fellow, 2015
- UT Battelle Distinguish Inventor, for > 14 patents
- Fellow, Electrochemical Society, 2013

- EFRC Scientific Advisory committee for the Northeastern Center for Chemical Energy Storage (NCCES)
- R&D100 Award, (2011) CeramClad™: Rapid Metal Coating Process
- R&D100 Award, (2010) Sulfur-Carbon Nanocomposite Cathode Material and Additives for Lithium-Sulfur Batteries
- R&D 100 Award 2009 “PulseForge 3100, Pulse Thermal Processing”
- R&D 100 Award 1996 Thin-Film Batteries Invention
- Award for Excellence in Technology Transfer, Federal Laboratory Consortium, National Award, (2012) “Pulse Thermal Processing”
- Award for Excellence in Technology Transfer, Federal Laboratory Consortium, National Award, 2004
- Award for Excellence in Technology Transfer, Federal Laboratory Consortium, Southeast Region, 2003
- YWCA Tribute to Women Award, Science and Technology, 2005
- Lockheed Martin Energy Research Corp, Technical Achievement Award (Invention), 1996 Team Award
- DOE Materials Science Research Competition Award for Significant Implication for DOE Related Technologies in Solid State Physics, 1994
- Technical Achievement Award, Martin Marietta Energy Systems, Inc., 1993 Team Award
- Technical Achievement Award, Martin Marietta Energy Systems, Inc., 1989
- Distinguished Scientific Achievement Award, East Tennessee Section of the Association of Women in Science 1989
- Wigner Postdoctoral Fellow, Oak Ridge National Laboratory, 1978–1981
- Sigma Xi, 1977
- American Institute of Chemists Outstanding Senior Award, 1975
- Phi Beta Kappa, 1975

Professional Affialiations:

- *Program Chair,* BLI-7 June 2014, ANL
- *Member,* Electrochemical Society, Ways and Means Committee
- Electrochemical Society, Battery Division Executive Committee
- *Member* at large 2004-2006, *Treasurer* 2006-2008, *Chairman* 2008-2010.
- American Ceramic Society
- *Associate Editor*, Journal of the American Ceramic Society, 1986–2012
- *Abstracter*, American Ceramics Society, 1987–1991
- *Member,* DOE-EPSCoR Advisory Committee to University of Puerto Rico, 2003-2005
- *Mentor*, 8 postdoctoral researchers and graduate students
- *Member,* SURA/ORNL Summer Cooperative Research Program, 2001 and 2003
- *Participant:* NEMI (National Electronics Manufacturing Initiative) Roadmap Workshop on Energy Storage Systems, June 1995

- *Participant*, DOE Advanced Lithium Solid State Batteries Workshop, July 1999
- *Participant,* Research Assistance Task Force on Beta-Alumina for Sodium-Sulfur Cells, Oak Ridge, Tennessee, March 1983
- *Judge*, Annual Southern Appalachian Science and Engineering Fairs, 1987–1994
- *Member,* Oak Ridge National Laboratory, Ph.D. Recruiting Committee, 1981–82
- *Member,* Local Committee, International Conference on Fast Ionic Transport in Solids, Gatlinburg, Tennessee, May 1981
- *Chairman,* Ceramics graduate student organization
- *Member,* American Ceramic Society, International Society for Solid State Ionics, Materials Research Society, Electrochemical Society, North American Catalysis Society

Invited Lectures:

1. Gordon Research on Ceramics, 2014.
2. ASM Educational Symposium, NTRC, 2014.
3. Gordon Research Conference on Batteries, Ventura CA, 2014.
4. ACS April 2013.
5. "Stability and Performance of High-Voltage Cathodes with Lipon Coatings**,"** Fall ECS, Honolulu, 2012.
6. "Batteries and Battery Materials by Vapor Deposition," Fall AVS, Tampa, FL, 2012.
7. "Transport and Mechanical Properties of Bilayer and Composite Electrolytes for Li-metal Batteries," Fall MRS, Boston, MA, 2012.
8. "Thin Film Oxide Materials for Rechargeable Lithium Batteries," Fall MRS, Boston, MA, 2012.
9. "Transport and Mechanical Properties of Pure and Composite Solid Electrolytes," Beyond Li-ion Batteries, 5th meeting, Berkeley, CA, 2012.
10. "Transport and Mechanical Properties of Pure and Composite Solid Electrolytes," Applied Materials, Inc. Santa Clara CA, 2012.
11. "Solid Electrolytes for Li Battery Applications," Advanced Energy Storage Materials and Systems: Lithium and Beyond, Electronic Materials and Applications 2012, American Ceramic Society, Orlando, FL 2012.
12. "Lipon Solid Electrolyte for High-Voltage Lithium Batteries," ECS Annual Spring Meeting, Montreal, 2011.
13. "Batteries and Battery Materials by Vapor Deposition," Drexel University, Department of Materials Science Seminar, 2010.
14. "Lithium Phosphorus Oxynitride Solid Electrolyte: Applications Beyond Thin Film Batteries," American Chemical Society, Boston, 2010.
15. "Physical Properties and Synthesis of Thin Film Materials for Batteries," Regensberg 2010, Meeting of the German Physical Society (DGP) 2010. German Physical Society.
16. "Electrical Energy Storage for Transportation and Grid Application," Wake Forest Symposium, 2010. Wake Forest University, Energizing the Future, 2-day symposium.

Speaker and panel member for discussion.

17. “Challenges for Rechargeable Batteries with Metallic Lithium Anodes,” MS&T2009, Pittsburgh, Materials for Energy Storage Symposium, 2009.
18. “Thin Film Rechargeable Lithium Batteries,” MicroPower Sources, STAR workshop by Advisory Group on Electron Devices (AGED) for DOD, Bethesda, MD, 2009.
19. “Lithium Phosphorous Oxynitride (Lipon) Electrolyte for Rechargeable Batteries with Three-Dimensional Architectures,” MRS Spring 2009.
20. “Rechargeable Lithium Batteries, Progress and Challenges,” Chemical Engineering Department Seminar, University of Maryland, 2008.
21. “Thin Film Rechargeable Batteries,” Wearable Warfighter Power workshop at US Army Research Laboratory, 2007.
22. “Thin Film Rechargeable Batteries for Energy Harvesting, Spring MRS Meeting,” San Francisco, 2008.
23. “Thin Film Lithium and Lithium-ion Batteries,” IUPAC and ACE Conference on Macromolecules for a Safe, Sustainable and Healthy World, “Brooklyn, NY, 2007.
24. “Self-Assembled Mesoporous Carbon Materials for Electrochemical Double Layer Capacitors Advanced Capacitors World Summit 2007,” San Diego.
25. “Thin Film Rechargeable Batteries,” UTA Workshop on Piezoelectric Energy Harvesting, University Texas Arlington, 2007.
26. “Properties of Thin Film Materials for Rechargeable Lithium Batteries,” Wake Forest University, Physics Department Seminar, Winston-Salem, NC, 2006.
27. “Synthesis and Properties of Thin Film Materials for Rechargeable Lithium Batteries,” Tennessee Technological University, Chem. Eng. Department Seminar, Cookeville, TN, 2006.
28. “Mine Safety Workshop,” 2005.
29. “Controlling the Composition of thin Films for Rechargeable Lithium Batteries,” First Earnest B Yeager Frontiers in Electrochemical Science and Technology, 2005.
30. “Micro- and Nano- Scale Rechargeable Batteries: State of the Art and Current Research,” National Academy of Sciences, Committee on Nanotechnology for the Intelligence Community, 2003.
31. “Solid State Thin-Film Rechargeable Lithium Batteries,” 3rd Thin Film and Nanotechnology for Energy Conversion and Storage, September 2003, NASA Glenn.
32. “Synthesis and Properties of Thin Film Materials for Rechargeable Lithium Batteries,” Carnegie Mellon University, 2003.
33. “Thin Film Materials and Designs for Rechargeable Batteries,” Material Research Society Meeting, 2002.
34. “Analysis of Thin Film Lithium Batteries with Cathodes of 50 nm to 4 µm Thick LiCoO2,” International Meeting on Lithium Batteries, 2002.
35. "Rechargeable Thin-Film Batteries with LiMn2O4 and LiCoO2 Cathodes," 3rd Hawaii Battery Conference, 2001.
36. “Addition of a Thin-Film Inorganic Solid Electrolyte (Lipon) as a Protective Film in Lithium

Batteries with a Liquid Electrolyte," DOE Workshop on Advanced Lithium Solid State Batteries, 1999.

37. "Thin-Film Material for Rechargeable Lithium Batteries and Their Incorporation into Hybrid Batteries," American Ceramic Society Annual Meeting, 1998.
38. "Thin-Film Rechargeable Lithium Batteries," American Ceramic Society Annual Meeting, 1995.
39. "Thin-Film Rechargeable Lithium Batteries with Amorphous LixMn2O4 Cathodes," The Electrochemical Society Meeting, 1995.
40. "Magnetron Sputter Deposition of Li2O-SiO2-P2O5 Thin Films," American Vacuum Society, Tennessee Valley Chapter, Annual Symposium, Oak Ridge, 1991.
41. "Sputter Deposition of Lithium Silicate-Lithium Phosphate Amorphous Electrolytes," Materials Research Society, Boston, Massachusetts, Fall Meeting, 1990.
42. "Enhanced Ionic Conductivity in Silver Halide-Alumina Composites," Society of Photographic Science & Engineering Annual Meeting, 1989.
43. "Enhanced Ionic Conduction in Silver Halide Composites," Eastman Kodak, Rochester, New York, 1989.
44. "Enhanced Ionic Conduction in Composite Electrolytes," University of North Carolina at Chapel Hill, 1988.
45. "Enhanced Ionic Conduction in Composite Electrolytes," Solid State Ionics Symposium, Materials Research Society, Boston, Massachusetts, Fall Meeting, 1988.
46. "Enhanced Ionic Conduction in Composite Electrolytes," 6th International Conference on Solid State Ionics, Garmisch-Partenkirchen, West Germany, 1987.
47. "Enhanced Ionic Conductivity in Composite Electrolytes," Clemson University, Clemson, South Carolina, 1987.

Publications

1. Nancy J. Dudney; Juchuan Li, "Using All Energy in a Battery," *Science,* Vol 347, Issue 6218 (2015) 131-132.
2. Guang-Ling Song; Nancy J. Dudney; Juchuan Li; et al., "The Possibility of Forming a Sacrificial Anode Coating for Mg," *Corrosion Science*, Vol 87 (2014) 11-14.
3. Raymond R. Unocic; Xiao-Guang Sun; Robert L. Sacci; et at., "Direct Visualization of Solid Electrolyte Interphase Formation in Lithium-Ion Batteries with In Situ Electrochemical Transmission Electron Microscopy," *Microscopy and Microanalysis*, Vol 20, Issue 4 (2014) 1029-1037.
4. Juchuan Li; Nancy J. Dudney; Jagjit Nanda; et al., "Artificial Solid Electrolyte Interphase to Address the Electrochemical Degradation of Silicon Electrodes," *ACS Applied Materials & Interfaces*, Vol 6, Issue 13 (2014) 10083-10088.
5. Ezhiylumurugan Rangasamy; Juchuan Li; Gayatri Sahu; et at., "Pushing the Theoretical Limit of Li-CFx Batteries: A Tale of Bifunctional Electrolyte," *Journal of the American Chemical Society*, Vol 136, Issue 19 (2014) 6874-6877.

6. Raymond R. Unocic; Robert L. Sacci; Gilbert M. Brown; et al., “Quantitative Electrochemical Measurements Using In Situ ec-S/TEM Devices,” *Microscopy and Microanalysis*, Vol 20, Issue 2 (2014) 452-461.
7. Jagjit Nanda; Surendra K. Martha; Wallace D. Porter; et at., “Thermophysical properties of LiFePO4 cathodes with carbonized pitch coatings and organic binders: Experiments and first-principals modeling,” *Journal of Power Sources*, Vol 251, (2014) 8-13.
8. Gayatri Sahu; Zhan Lin; Juchuan Li; et al., “Air-stable, high-conduction solid electrolytes of arsenic-substituted Li4SnS4,” *Energy & Environmental Science,* Vol 7, Issue 3 (2014) 1053-1058.
9. Ira Bloom; Lynn Trahey; Ali Abouimrane; et al., “Effect of interface modifications on voltage fade in 0.5Li(2)MnO(3)center dot 0.5LiN(0.375)Mn(0.375)CO(0.25)O(2) cathode materials,” Vol 249, (2014) 509-514.
10. Robert L. Sacci; Nancy J. Dudney; Karren L. More; et at., “Direct visualization of initial SEI morphology and growth kinetics during lithium deposition by in situ electrochemical transmission electron microscopy,” *Chemical Communications,* Vol 50, Issue 17 (2014) 2104-2107.
11. Wyatt E. Tenhaeff; Ezhiyl Rangasamy; Yangyang Wang; Alexei P. Sokolov; Jeff Wolfenstine; Jeffery Sakamoto; Nancy J. Dudney; et at., “Resolving the Grain Boundary and Lattice Impedance of Hot-Pressed Li7La3Zr2O12 Garnet Electrolytes,” *Chemelectrochem,* Vol 1, Issue 2 (2014) 375-378.
12. Dhamodaran Santhanagopalan; Danna Qian; Thomas McGilvray; et al., “Interface Limited Lithium Transport in Solid-State Batteries,” *Journal of Physical Chemistry Letters,* Vol 5, Issue 14 (2014) 298-303.
    A. K. Kercher; J. O. Ramey; K. J. Carroll; et al., “Mixed Polyanion Glass Cathodes: Iron Phosphate Vanadate Glasses,” *Journal of the Electrochemical Society,* Vol 161, Issue 14 (2014) A2210-A2215.
13. Gayatri Sahu; Ezhiylmurugan Rangasamy; Juchuan Li; et al., “A high-conduction Ge substituted Li3AsS4 solid electrolyte with exceptional low activation energy,” *Journal of Materials Chemistry,* Vol 2, Issue 27 (2014) 10396-10403.
14. Loic Baggetto; Debasish Mohanty; Roberta A. Meisner; et al., “Degradation mechanisms of lithium-rich nickel manganese cobalt oxide cathode thin films,” *RSC Advances,* Vol 4, Issue 45 (2014) 23364-23371.
15. Robert L. Sacci; Leslie A. Adamczyk; Gabriel M. Veith; et al., “Dry Synthesis of Lithium Intercalated Graphite Powder and Fiber,” *Journal of the Electrochemical Society,* Vol 161, Issue 4 (2014) A614-A619.
16. Ezhiylmurugan Rangasamy; Gayatri Sahu; Jong Kahk Keum; et al., “A high conductivity oxide-sulfide composite lithium superionic conductor,” *Journal of Materials Chemistry A,* Vol 2, Issue 12 (2014) 4111-4116.
17. Surendra K. Martha; Jagjit Nanda; Hui Zhou; et al., “Electrode architectures for high capacity multivalent conversion compounds: iron (II and III) fluoride,” *RSC Advances,* Vol 4, Issue 13 (2014) 6730-6737.

18. Gabriel M. Veith; Andrew R. Lupini; Loic Baggetto; et al., “Evidence for the Formation of Nitrogen-Rich Platinum and Palladium Nitride Nanoparticles,” *Chemistry of Materials,* Vol 25, Issue 24 (2013) 4936-4945.
19. Yi-Chun Lu; Ethan J. Crumlin; Thomas J. Carney; et al., “Influence of Hydrocarbon and CO2 on the Reversibility of Li-O-2 Chemistry Using In Situ Ambient Pressure X-ray Photoelectron Spectroscopy,” *Journal of Physical Chemistry C,* Vol 117, Issue 49 (2013) 25948-25954.
20. Hui Zhou; Jagjit Nanda; Surendra K. Martha; et al., “Formation of Iron Oxyfluoride Phase on the Surface of Nano-Fe3O4 Conversion Compound for Electrochemical Energy Storage,” *Journal of Physical Chemistry Letters,* Vol 4, Issue 21 (2013) 3798-3805.
21. Sergiy Kalnaus; Wyatt E. Tenhaeff; Jeffery Sakamoto; A. S. Sabau; C. Daniel; N. J. Dudney, “Analysis of composite electrolytes with sintered reinforcement structure for energy storage applications,” *Journal of Power Sources,*Vol 241, (2013) 178-185.
22. Juchuan Li; Loic Baggetto; Surendra K. Martha; et al., “An Artificial Solid Electrolyte Interphase Enables the Use of a LiNi0.5Mn1.5O4 5 V Cathode with Conventional Electrolytes,” *Advanced Energy Materials,* Vol 3, Issue 10 (2013) 1275-1278.
23. Katie L. Browning; Loic Baggetto; Raymond R. Unocic; Nancy J. Dudney; Gabriel M. Veith, “Gas evolution from cathode materials: A pathway to solvent decomposition concomitant to SEI formation,” *Journal of Power Sources,* Vol 239 (2013) 341-346.
24. Zhan Lin; Zengcai Liu; Wujun Fu; et al., “Lithium Polysulfidophosphates: A Family of Lithium-Conducting Sulfur-Rich Compounds for Lithium-Sulfur Batteries,” *Angewandte Chemie-International Edition,* Vol 52, Issue 29 (2013) 7460-7463.
25. Nancy J. Dudney; Conference: 245th National Meeting of the American-Chemical-Society (ACS), “Exploring battery chemistry using thin film materials,” *Abstracts of Papers of the American Chemical Society,* Vol 245, Meeting Abstract: 198-ENFL; (2013).
26. Zhan Lin; Zengcai Liu; Nancy J. Dudney; et al., “Lithium Superionic Sulfide Cathode for All-Solid Lithium-Sulfur Batteries,” *ACS Nano,* Vol 7, Issue 3 (2013) 2829-2833.
27. Zhan Lin; Zengcai Lin; Wujun Fu; Nancy J. Dudney; Chengdu Liang, “Phosphorous Pentasulfide as a Novel Additive for High-Performance Lithium-Sulfur Batteries,” *Advanced Functional Materials,* Vol 32, Issue 8, Special Issue: SI (2013) 1064-1069.
28. Loïc Baggetto; Nancy J. Dudney; Gabriel M. Veith; “Surface chemistry of metal oxide coated lithium manganese nickel oxide thin film cathodes studied by XPS,” *Electrochimica Acta,* Vol 90 (2013) 135-147.
29. Gabriel M. Veith; Loïc Baggetto; Leslie A. Adamczyk; Bingkun Guo; Suree S. Bown; Xiao-Guang Sun; Austin A. Albert; James R. Humble; Craig E. Barnes; Michael J. Bojdys; Sheng Dai; Nancy J. Dudney, “Electrochemical and Solid-State Lithiation of Graphitic C3N4,” *Chemistry of Materials,* Vol 25, Issue 3 (2013) 503-508.
30. Zengcal Liu; Wujun Fu; E. Andrew Payzant; et al., “Anomalous High Ionic Conductivity of Nanoporous beta-Li3PS4,” *Journal of the American Chemical Society,* Vol 135, Issue 3 (2013) 975-978.
31. Jonghyun Park; Sergiy Kalnaus; Sangwoo Han; Y. K. Lee; G. B. Less; Nancy J. Dudney;

Claus Daniel, “In situ atomic force microscopy studies of lithium (de)intercalation-induced morphology changes in LixCoO2 micro-machined thin film electrodes,” *Journal of Power Sources,* Vol 222 (2013) 417-425.

32. R. R. Unocic; X-G Sun; D. H. Alsem,; et al.; “Application of In-situ Electrochemical Liquid Cells for Electrical Energy Storage Research,” *Advances in Imaging and Electron Physics,* Vol 179 Book Series: Advances in Imaging and Electron Physics (2013) 176-178.
33. Yoongu Kim; Nancy J. Dudney; Miaofang Chi; et al., “A Perspective on Coatings to Stabilize High-Voltage Cathodes: LiMn1.5Ni0.5O4 with Sub-Nanometer Lipon Cycled with LiPF6 Electrolyte,” *Journal of the Electrochemical Society,* Vol 160, Issue 5 (2013) A3113-A3125.
34. Surendra K. Martha; Jagjit Nanda; Yoongu Kim; R. Unocic; S. Pannala; Nancy J. Dudney, “Solid electrolyte coated high voltage layered-layered lithium-rich composite cathode: Li1.2Mn0.525Ni0.175Co0.1O2,” *Journal of Materials Chemistry A,* Vol 1, Issue 18 (2013) 5587-5595.
35. Surendra K. Martha; Jagjit Nanda; Gabriel M. Veith; Nancy J. Dudney, “Surface studies of high voltage lithium rich composition: Li1.2Mn0.525Ni0.175Co0.1O2,” *Journal of Power Sources,* Vol 216 (2012) 179-186.
36. Yi-Chun Liu; Ethan J. Crumlin; Gabriel M. Veith; Jonathon Harding; Eva Mutoro; Loïc Baggetto; Nancy J. Dudney; Zhi Liu; Yang Shao-Horn, “In Situ Ambient Pressure X-ray Photoelectron Spectroscopy Studies of Lithium-Oxygen Redox Reactions,” *Scientific Reports,* Vol 2, Article Number: 715 (2012).
37. N. Balke; E. A. Eliseev; S. Jesse; S. Kalnaus; C. Daniel; N. J. Dudney; A. N. Morozovska; S. V. Kalinin, “Three-dimensional vector electrochemical strain microscopy,” *Journal of Applied Physics,* Vol 112, Issue 5, Article Number: 052020 (2012).
38. Loïc Baggetto; Nancy Dudney; Sheng Dai; et al., Conference: 244th National Fall Meeting of the American-Chemical-Society (ACS), “Surface modifications of Li-Mn-Ni-O spinel thin film cathodes studied by X-ray photoelectron spectroscopy,” *Abstracts of Papers of the American Chemical Society,* Vol 244, Meeting Abstract: 593-ENFL (2012).
39. Loïc Baggetto; Raymond R. Unocic; Nancy J. Dudney; et at., “Fabrication and characterization of Li-Mn-Ni-O sputtered thin film high voltage cathodes for Li-ion batteries,” *Journal of Power Sources,* Vol 211 (2012) 108-118.
40. Nina Balke; Sergiy Kalnaus; Nancy J. Dudney; et al., “Local Detection of Activation Energy for Ionic Transport in Lithium Cobalt Oxide,” *NANO Letters,* Vol 12, Issue 7 (2012) 3399-3403.
41. Joseph A. Singh; Steven H. Overbury; Nancy J. Dudney; et al., “Gold Nanoparticles Supported on Carbon Nitride: Influence of Surface Hydroxyls on Low Temperature Carbon Monoxide Oxidation,” *ACS Catalysis,* Vol 2, Issue 6 (2012) 1138-1146.
42. Gabriel M. Veith; Jagjit Nanda; Laetitia H. Delmau; Nancy J. Dudney, “Influence of Lithium Salts on the Discharge Chemistry of Li-Air Cells,” *Journal of Physical Chemistry Letters,* “Vol 3, Issue 10 (2012) 1242-1247.
43. Jagjit Nanda; Hassina Bilheux; Sophie Voisin; Gabriel M. Veith; R. Archibald; L. Walker;

S. Allu; Nancy J. Dudney; S. Pannala, “Anomalous Discharge Product Distribution in Lithium-Air Cathodes,” *Journal of Physical Chemistry C,* Vol 116, Issue 15 (2012) 8401-8408.

44. Sergiy Kalnaus; Adrian S. Sabau; Wyatt E. Tenhaeff; Nancy J. Dudney; Claus Daniel, “Design of composite polymer electrolytes for Li ion batteries based on mechanical stability criteria,” *Journal of Power Sources,* Vol 201 (2012) 280-287.
45. Jane Y. Howe; Lynn A. Boatner; James A. Kolopus; et al., “Vacuum-tight sample transfer stage for a scanning electron microscopic study of stabilized lithium metal particles,” *Journal of Materials Science,* Vol 47, Issue 3 (2012) 1572-1577.
46. Surendra K. Martha; Jagjit Nanda; Gabriel M. Veith; Nancy J. Dudney, “Electrochemical and rate performance study of high-voltage lithium-rich composition: Li1.2Mn0.525Ni0.175Co0.1O2,” *Journal of Power Sources,* Vol 199 (2012) 220-226.
47. Jun Qu; Huaqing Li; John J. Henry, Jr.; Surendra K. Martha; Nancy J. Dudney, “Self-aligned Cu-Si core-shell nanowire array as a high-performance anode for Li-ion batteries,” *Journal of Power Sources,* Vol 198, (2012) 312-317.
48. W. E. Tenhaeff; K. A. Perry; N. J. Dudney, “Impedance Characterization of Li Ion Transport at the Interface between Laminated Ceramic and Polymeric Electrolytes,” *Journal of the Electrochemical Society,* Vol 159, Issue 12 (2012) A2118-A2123.
49. Surendra K. Martha; Nancy J. Dudney; James O. Kiggans; et al., “Electrochemical Stability of Carbon Fibers Compared to Aluminum as Current Collectors for Lithium-Ion Batteries,” *Journal of the Electrochemical Society,* Vol 159, Issue 10 (2012) A1652-A1658.
50. Asymmetric Rate Behaviors of Si Anodes for Lithium-Ion Batteries: Ultrafast De-Lithiation vs. Sluggish Lithiation at high current densities Juchuan Li.
51. A Long-Lived Solid-State Lithium Battery for High Voltage Cathodes, Adv Mat
52. The possibility of forming a sacrificial anode coating for MgMixed polyanion glass cathodes: Iron phosphate vanadate glasses, Kercher, J ECS 2014 161, A2210.
53. The Influence of Hydrocarbon and CO2 on the Reversibility of Li-O2 Chemistry Using In Situ Ambient Pressure X-ray Photoelectron Spectroscopy, Yi-chun Lu… YShao-Horn J Phys Chem C 2013 117 25948.
54. Advanced lithium battery cathodes using dispersed carbon fibers as current collector, S. K. Martha, J. O. Kiggans, J. Nanda, N. J. Dudney, *J. Electrochem. Soc.* 158 (9) (2011) A1060-A1066.
55. Stephen Jesse, Nina Balke, Eugene Eliseev, Alexander Tselev, Nancy J. Dudney, Anna N. Morozovska, and Sergei V. Kalinin, “Direct Mapping of Ionic Transport in a Si Anode on the Nanoscale: Time Domain Electrochemical Strain Spectroscopy Study” ACS Nano 5 [12] (2011) 9682-9695. Doi:101021/nm203141g.
56. Kevin J. Rhodes, Roberta Meisner, Melanie Kirkham, Nancy Dudney and Claus Daniel “In Situ XRD of Thin Film Tin Electrodes for Lithium Ion Batteries” J. Electrochem. Soc. 159 (3) A294-299 (2012).
57. Jane Y. Howe, Lynn A. Boatner, James A. Kolopus, Larry R. Walker, Chengdu Liang,

Nancy J. Dudney , Charles R. Schaich**, "**Vacuum-tight sample transfer stage for a scanning electron microscopic study of stabilized lithium metal particles", J Mater Sci, 47[3] (2011) 1572-7, DOI 10.1007/s10853-011-6029-z.

58. Kyler J. Carroll, Ming-Che Yang, Gabriel M. Veith, Nancy J. Dudney, and Ying Shirley Meng "Intrinsic Surface Stability in LiMn2–xNixO4–δ (x = 0.45, 0.5) High Voltage Spinel Materials for Lithium Ion Batteries", *Electrochemical and Solid-State Letters*, 15 (5) A72-A75 (2012).
59. Kevin Rhodes, Robera Meisner, Yoongu Kim, Nancy Dudney and Claus Daniel, "Evolution of Phase Transformation Behavior in Li(Mn1.5Ni0.5)O4 Cathodes Studied by In Situ XRD", *J Electrochem. Soc*. 158 (8) A890-897 (2011).
60. Sergiy Kalnaus, Adrian S. Sabau, Sarah Newman, Wyatt E Tenhaeff, Claus Daniel, Nancy J Dudney, "Effective conductivity of particulate polymer composite electrolytes using random resistor network method", *Solid State Ionics*, 119-200 (2011) 44-53.
61. WE Tenhaeff, X Yu, K Hong, KA Perry, NJ Dudney, Ionic Transport Across Interfaces of Solid Glass and Polymer Electrolytes for Lithium Ion Batteries," J Electrochem Soc. 158 [10] A1143-9 (2011).
62. EG Herbert, WE Tenhaeff, NJ Dudney, GM Pharr, "Mechanical characterization of Lipon films using nanoindentation", *Thin Solid Films*, **520** (2011) 413-418.
63. Gabriel M. Veith*, Jagjit Nanda, Jane Howe, and Nancy J. Dudney "Spectroscopic characterization of solid discharge products in Li-Air cells with aprotic carbonate electrolytes", J. Phys. Chem. C (2011) **115**, 14325-14333.
64. Yoongu Kim, Gabriel M. Veith, Jagjit Nanda, Raymond R. Unocic, Miaofang Chi, and Nancy J. Dudney*, A nano-scale interfacial coating of a solid Li-ion conductor on Li1-xCoO2 particles, Yoongu Kim*, Electrochimica Acta. 56 (2011) 6573-6580 doi:10.1016/j.electacta.2011.03.070
65. Gabriel M. Veith and Nancy J. Dudney, "Current collectors for Rechargeable Li-Air Batteries," J. Electrochem. Soc. 158 (6) A658-663 (2011).
66. Surendra K. Martha, James O. Kiggans, Jagjit Nanda, Nancy J. Dudney, "Advanced Lithium Battery Cathodes using Loose Carbon Fibers as the Current Collector", J. Electrochemical Soc. 158 [9] (2011) A1060-1066.
67. Kevin Rhodes, Nancy Dudney, Edgar Lara-Curzio, and Claus Daniel, "Understanding the Degradation of Silicon Electrodes for Lithium-Ion Batteries Using Acoustic Emission," J Electrochem. Soc. 157 (12) A1354-60 (2010)
68. AK Kercher, JO Kiggans, NJ Dudney, "Carbon Fiber Paper Cathodes for Lithium Ion Batteries," J. Electrochem Soc. 157 (2010) A1323.
69. Analysis of Cycling Induced Fatigue in Electrode Materials for Lithium Ion Batteries, Kevin Rhodes, C. Daniel, E. Lara-Curzio, N Dudney, J Electrochem. Soc.
70. Fan Xu, Nancy J. Dudney, Gabriel M. Veith, Yoongu Kim, Can Erdonmez, Wei Lai, and Yet-Ming Chiang Properties of Lithium Phosphorus Oxynitride (Lipon) for 3D Solid-State Lithium Batteries, , J Mat. Res 25 [8] (2010) 1507-15.
71. Nina Balke, Stephen Jesse, Yoongu Kim, Leslie Adamczyk, Alexander Tselev, Ilia N.

Ivanov, Nancy J. Dudney and Sergei V. Kalinin, “Real Space Mapping of Li-Ion Transport in Amorphous Si Anodes with Nanometer Resolution,” Nano Letters 10 (2010) 3420-3425.

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US patents:

8,017,273 Lightweight, durable lead-acid batteries
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6,218,049 Cathode for an electrochemical cell
6,168,884 Battery with an in-situ activation plated lithium anode
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5,567,210 Method for making an electrochemical cell
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8,719,961 Docket No. 2329.1
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8,597,838 > Docket No. 201102602.0
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US Published Applications:

20120082905 HIGH ENERGY DENSITY ALUMINUM BATTERY
20120082904 HIGH ENERGY DENSITY ALUMINUM BATTERY
20110294008 Lightweight, Durable Lead-Acid Batteries
20110052998 SULFUR-CARBON NANOCOMPOSITES AND THEIR APPLICATION AS CATHODE MATERIALS IN LITHIUM-SULFUR BATTERIES

20090269666Lightweight, Durable Lead-Acid Batteries

20080274344METHOD TO PREPARE NANOPARTICLES ON POROUS MEDIUMS

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20060021975Pulse thermal processing of functional materials using directed plasma arc