Edward Andrew Payzant
Distinguished R&D Staff Member
Oak Ridge National Laboratory
Oak Ridge, TN, 37831-6475

Summary:

Andrew Payzant is a Distinguished R&D Staff Member in the Neutron Scattering Division at Oak Ridge National Laboratory. He was previously affiliated with ORNL's High Temperature Materials Laboratory (HTML) and the Center for Nanophase Materials Science (CNMS). For the past five years, he has led the Engineering Materials Group in the Neutron Sciences Directorate, with responsibility for the engineering and applied science research program, research staff, and neutron scattering beamlines at ORNL's Spallation Neutron Source and High Flux Isotope Reactor. His research at ORNL has mainly been directed to the development and application of neutron and x-ray in-situ diffraction methods for characterization of structure, texture, and residual stress across a broad range of ceramics and alloys, including metal weldments, superconducting ceramics, rare earth permanent magnets, photovoltaic thin films, hydrogen storage materials, gas separation membranes, solid oxide fuel cells, and lithium ion batteries. Characterization under non-equilibrium conditions is a particular specialty. He has coauthored over 200 scientific papers and 3 patents, is a Fellow of the JCPDS - International Center for Diffraction Data, and Chair of the ICDD Board of Directors. He has been elected to the 2021 Class of Fellows of ASM International.

Education:

University of Western Ontario, Canada	Engineering Science	Ph.D.	1995
Tech University of Nova Scotia, Halifax, Canada	Engineering Physics	M.A.Sc.	1989
Tech University of Nova Scotia, Halifax, Canada	Engineering Physics	B.Eng.	1987
Dalhousie University, Halifax, Canada	Physics	B.Sc.	1984

Research and Professional Experience:

2017-present	Materials Engineering Group Leader, Neutron Scattering Division, ORNL
2013-2017	Engineering Materials Group Leader, Chemical and Engineering Materials Division, ORNL
2016-present	Distinguished R&D Staff Member, Chemical and Engineering Materials Division, ORNL
2012-2016	Senior R&D Staff Member, Chemical and Engineering Materials Division, ORNL
2002-2012	Senior R&D Staff Member, Materials Science and Technology Division, ORNL
1997-2002	R&D Staff Member, Metals and Ceramics Division, ORNL
1995-1997	ORNL Postdoctoral Research Associate
1992-1994	Engineer, The Electrofuel Manufacturing Co., Ltd., Toronto, Canada
1989-1991	Research Assistant, Canadian University-Industry Consortium on Advanced Ceramics

Professional Affiliations

ASM International (member since 1993)
- Oak Ridge Chapter (member since 1997, chair 2001- 02, various exec committee positions)
- ASM Nominating Committee (member 2019)
- Editorial Advisory Committee – *Advanced Materials and Processes* (member 2007-2012, chair 2011)
- ASM Content Committee (member 2011)
- ASM Intl Student Paper Contest Selection Committee (member 2013-16, chair 2015-16)
- ASM Technical Subcommittee on Residual Stress (member)

International Center for Diffraction Data (member since 2003)
- Chair of Board of Directors (2020-2024); Board of Directors Member at Large (2018-2020)
- Non-Ambient Diffraction Subcommittee Chair (2004 - 2018); Nominating Committee (2015-16)

Member - Neutron Scattering Society of America, AAAS
Member - Los Alamos LANSCE Proposal Review Committee (2006 - 2014)
Member - BES Program Review Committee for the Lujan Center at LANL (2013)
Member - Argonne APS Proposal Review Committee (2015 - present)
Editorial Board Member – *Materials* (2018 - present)
Associate Editor – *Journal of Nanomaterials* (2010 - present)

Honors and Awards

Fellow, ASM International (2021)
American Welding Society, A.F. Davis Silver Medal Award (2019)
ORNL Significant Event Award (2013)
US DOE Office of Science Outstanding Mentor Award (2009)
Fellow, International Center for Diffraction Data (2006)
ORNL Educational Programs Support Award (2005)
High Temperature Materials Laboratory Staff Member of the Year (2002)
UWO Materials Engineering Department Teaching Assistant Award (1993 and 1994)
Ontario Graduate Scholar (1993)
NSERC Postgraduate Scholar (1991)

Graduate and Postdoctoral Advisors:

Graduate Advisor (The University of Western Ontario): Hubert Wylam King, FRSA, FCIM
Postdoctoral Advisor (Oak Ridge National Laboratory): Camden R. Hubbard, FASM, FACerS

Postdoctoral Scholars:

Scott A. Speakman (2002-2005), now at Malvern-PANalytical, Inc.
Melanie J. Kirkham (2010-2012), now at ORNL NSD
Lindsay M. Sochalsky-Kolbus (2013-2015), now teaching K-12, Indianapolis, IN
Jeffrey R. Bunn (2014-2016), now at ORNL NSD
Christopher M. Fancher (2016-2019), now at ORNL MSTD

Miscellaneous:

Invited Speaker - "Challenges and Rewards Using High-Temperature Diffraction," 2018 Denver X-ray Conference, Westminster, CO, Aug 2018
Invited Speaker - "An overview of residual stress characterization of additive manufactured parts at the ORNL neutron user facilities", Residual Stress Summit, Dayton, Oct 2017
Invited Speaker - "*in-situ* and *ex-situ* characterization of lithium ion batteries using x-ray and neutron diffraction methods," 2017 Denver X-ray Conference, Big Sky, Aug 2017
Invited Speaker - "In situ characterization capabilities at the SNS and HFIR relevant to advanced manufacturing", Opportunities for In-Situ Characterization During Advanced Manufacture Workshop, Chicago, Aug 2016
Invited Speaker - "Neutron Scattering at ORNL in support of materials science and engineering research", American Conference on Neutron Scattering, Long Beach, July 2016
Invited Speaker - "VULCAN and NRSF and their application to industrial components", 1st Annual Meeting on Residual Strain and Stress Analysis, Tokyo, Oct 2015
Invited Speaker - "Neutron scattering at ORNL to support materials science and engineering research", Annual Meeting of the Swedish Neutron Scattering Society, Stockholm, May 2015
Invited Speaker - "Neutron Scattering Science", Cummins-ORNL Joint Materials Functional Excellence Conference, Oak Ridge, Apr 2015
Invited Speaker - "Neutron Scattering for Materials Science and Engineering Applications", Pratt & Whitney, Feb 2015
Invited Speaker - "Neutron Scattering for Characterization of Engineering Materials", Hartford Chapter of ASM International, Feb 2015
Invited Speaker - "The Spallation Neutron Source", Tennessee Society of Professional Engineers (TSPE) Knoxville Chapter Meeting, July 2014
Plenary Speaker - "The Science and Applications of Neutron Diffraction at the ORNL User Facilities", ICDD Spring Meeting, Newtown Square, March 2014
Journal cover – *Journal of Polymer Science Part B: Polymer Physics,* Vol. 52, No. 1 (Jan 2014)
Instructor - "High Temperature Diffraction", 10th LANSCE School on Neutron Scattering, Jan 2014
Invited Speaker - "In-situ Chemistry Mapping of Hydrogen Storage Materials by Neutron Diffraction", MS&T'13, Montréal, Oct 2013
Workshop Instructor - "Hands-on Rietveld Analysis", 62nd Denver X-ray Conference, Aug 2013
Journal cover – *Advanced Materials & Processes,* Vol. 171, No. 3 (March 2013)
Short Course Instructor - "X-ray Diffraction in Geoscience", 2012 GSA Annual Meeting, Nov 2012
Journal cover – *Journal of the American Chemical Society,* Vol. 134 (Sept 5, 2012)
Session co-Chair - "Industrial Applications of XRD", 61st Denver X-ray Conference, Aug 2012
Educational Symposium Chair - " Microscopy, Modeling and Beyond: Advanced Techniques for Characterization of Microstructure", Oak Ridge Chapter of ASM International, May 2012
First Prize Award - Poster - "In Situ XRD Characterization of Thin Film Electrodes for Lithium Ion Batteries", 60th DXC, Aug 2011
Session co-Chair - "Industrial Applications of XRD", 60th Denver X-ray Conference, Aug 2011
Workshop Instructor - "Non-Ambient X-ray Diffraction", 60th Denver X-ray Conference, Aug 2011
Journal back cover – *Advanced Functional Materials,* Vol. 21 (Feb 2011)
Workshop Instructor - "X-ray Scattering Methods for Characterization of Nanomaterials", MRS 2010 Fall Meeting, Dec 2010
Workshop Instructor - "X-Ray Scattering Methods for Characterization of Advanced Materials", MRS 2009 Fall Meeting, Dec 2009
First Prize Award - Poster - "Using XRD to measure MFI zeolite unit cell changes and explain membrane permeation", 58th Denver X-ray Conference, Aug 2009
Workshop Instructor - "Non-Ambient X-ray Diffraction", 57th Denver X-ray Conference, Aug 2008
Session co-Chair - "Industrial Applications of XRD", 57th Denver X-ray Conference, Aug 2008
Journal cover - *Powder Diffraction* Vol. 23 (June 2008)
Session co-Chair - "Industrial Applications of XRD", 56th Denver X-ray Conference, Aug 2007
Session co-Chair - "Non-ambient Crystallography", 2007 ACA Conference, Salt Lake City, July 2007
Plenary Speaker - "Characterization of Carbon by Neutrons", Carbon 2007 Conference, Seattle, July 2007
Session co-Chair - "Industrial Applications of XRD", 55th Denver X-ray Conference, Aug 2006
Invited Speaker - "Neutron Diffraction Strain Scanning with "Real" Materials", MECA-SENS Conference, Oct 2005
Session co-Chair - "Industrial Applications of XRD", 54th Denver X-ray Conference, Aug 2005
Invited Speaker - "High temperature XRD in-situ characterization of processing of $CuInSe_2$ photovoltaic thin films", 2005 ACA Conference, Orlando, June 2005
Invited Speaker - "Locating Hydrogen with Neutrons", Annual Fossil Energy Materials Conference, Knoxville, June 2004
Invited Speaker - "In-situ high-temperature powder diffraction studies of phase transformations", 6th LANSCE User Group Meeting, Los Alamos, Oct 2003
Invited Speaker - " Time resolved high temperature diffraction studies of ion conducting ceramic oxides," Gordon Research Conference on High Temperature Materials, Processes and Diagnostics, Aug 2002
Invited Speaker - "Bismuth Oxide Based Ceramics for Oxygen Ion Transport - Crystallography and Properties", 131st TMS Annual Meeting, Seattle, Feb 2002
Session co-Chair - "Fundamentals of Advanced Materials for Energy Conversion", 131st TMS Annual Meeting, Seattle, Feb 2002
First Prize Award - Poster - "High temperature x-ray diffraction studies during hydriding of Zr_2Fe", 2001 Denver X-ray Conference, Aug 2001
First Prize Award - Poster - "High temperature powder diffraction study of phase transformations in the bismuth calcium oxide system", 2000 Denver X-ray Conference, Aug 2000
Journal cover – *Journal of Materials Science,* Vol. 35 (June 2000)
Invited Speaker - "Time resolved characterization of crystallization and phase transformations by HTXRD", 1998 Denver X-ray Conference, Colorado Springs, Aug 1998
Workshop Instructor - "Non-Ambient X-ray Diffraction", 1998 Denver X-ray Conference, Colorado Springs, Aug 1998
First Prize Award - Poster - "Comparative studies of monodispersed ultrafine ceramic precursor particles by various homogeneous precipitation methods", American Ceramic Society 22nd Annual Cocoa Beach Conference, Jan 1998
Invited Speaker - "Applications of neutron diffraction using the High Flux Isotope Reactor", Pennsylvania State University Chapter of ASM International, Nov 1997

LIST OF PUBLICATIONS (as of April 2021)

Refereed Journals

177. N.E. Peterson, J.R. Einhorn, C.M. Fancher, J.R. Bunn, **E.A. Payzant** and S.R. Agnew, "Quantitative texture analysis using the NOMAD time-of-flight neutron diffractometer," *J Appl. Cryst.* **54** 867-877 (2021) doi: 10.1107/S1600576721003022

176. A. Nycz, Y. Lee, M. Noakes, D. Ankit, C. Masuo, S. Simunovic, J. Bunn, L. Love, V. Oancea, **A. Payzant**, C. Fancher, "Effective Residual Stress Prediction Validated with Neutron Diffraction Method for Metal Large-Scale Additive Manufacturing," *Materials & Design* **205** 109751 (2021) doi: 10.1016/j.matdes.2021.109751

175. Stylianos Chatzidakis, Wei Tang, Roger Miller, **Andrew Payzant**, Jeff Bunn, Charles Bryan, John Scaglione, and Jy-An Wang, "Neutron diffraction illustrates residual stress behavior of welded alloys used as radioactive confinement boundary," *Intl. J. Pressure Vessels & Piping.* **191** 104348 (2021) doi: 10.1016/j.ijpvp.2021.104348

174. Niyanth Sridharan, Jeffrey Bunn, Michael Kottman, Chris Fancher, **Andrew Payzant**, Mark Noakes, Andrzej Nycz, Lonnie Love, Badri Narayanan, S.S. Babu, "Consumable development to tailor residual stress in parts fabricated using directed energy deposition processes," *Additive Manuf.* **39** 101837 (2021) doi: 10.1016/j.addma.2021.101837

173. D.E. Nicholson, S.A. Padula II, O. Benafan, J.R. Bunn, **E.A. Payzant**, K. An, D. Penumadu, R. Vaidyanathan, "Mapping of texture and phase fractions in heterogeneous stress states during multi- axial loading of biomedical superelastic NiTi," *Adv. Mater.* **33** 2005092 (2021) doi: 10.1002/adma.202005092

172. K. Appavoo, J. Nag, B. Wang, W. Luo, G. Duscher, **E.A. Payzant**, M.Y. Sfeir, S.T. Pantelides, and R.F. Haglund, Jr., "Doping-driven electronic and lattice dynamics in the phase-change material vanadium dioxide," *Phys. Rev. B* **102** 115148 (2020) doi: 10.1103/PhysRevB.102.115148

171. I.C. Noyan, J.R. Bunn, M.K. Tippett, **E.A. Payzant**, B. Clausen and D.W. Brown, "Experimental determination of precision, resolution, accuracy and trueness of time-of-flight neutron diffraction strain measurements," *J. Appl. Cryst.* **53**, 494-511 (2020) doi: 10.1107/S1600576720002150

170. C.M. Fancher, C.M. Hoffmann, M. Frontzek, J.R. Bunn, and **E.A. Payzant**, "Probing orientation information using 3-dimensional reciprocal space volume analysis," *Rev. Sci. Instrum.* **90**, 013902 (2019) doi: 10.1063/1.5034135

169. H. Elsazadeh, **E.A. Payzant**, P.A. Cornwell, J.R. Bunn, and D.K. Aidun, "Exploring the cooling process for residual stress reduction in dissimilar welds," *Welding J.* **97**, 315-S (2018) doi: 10.29391/2018.97.027

168. P.A. Cornwell, J.R. Bunn, C.M. Fancher, **E.A. Payzant**, and C.R. Hubbard, "Current Capabilities of the Residual Stress Diffractometer at the High Flux Isotope Reactor," *Rev. Sci. Instrum.* **89**, 092804 (2018) doi: 10.1063/1.5037593

167. S.B. Puplampu, D. Penumadu, R. Ma, T.J. Truster, R. Woracek, **E.A. Payzant**, and J.R. Bunn, "Degradation and onset of plastic anisotropy in marine aluminum alloy due to fire exposure by bulk neutron diffraction and in situ loading," *Mater. Sci. Engin. A* **700**, 583–591 (2017) doi: 10.1016/j.msea.2017.06.050

166. M.A. Steiner, J.R. Bunn, A.D. Stoica, J.R. Einhorn, E. Garlea, **E.A. Payzant**, and S.R. Agnew, "Path length dependent neutron diffraction peak shifts observed during residual stress measurements in U - 8 wt% Mo castings," *J. Appl. Cryst.* **50**, 851-858 (2017) doi: 10.1107/S1600576717005295

165. D. Mohanty, B. Mazumder, A. Devaraj, A. Safa-Sefat, A. Huq, **E.A. Payzant**, L.A. David, Jianlin Li, D.L. Wood, III, and C. Daniel, "Resolving the degradation pathways in high-voltage oxides for high-energy- density lithium-ion batteries; Alternation in chemistry, composition and crystal structures," *Nano Energy* **36**, 76-84 (2017) doi: 10.1016/j.nanoen.2017.04.008

164. N. Hempel, J.R. Bunn, T. Nitschke-Pagel, **E.A. Payzant**, and K. Dilger, "Study on the residual stress relaxation in girth-welded steel pipes under bending load using diffraction methods," *Mater. Sci. Engin. A* **688**, 289-300 (2017) doi: 10.1016/j.msea.2017.02.005

163. A. Aman, R. Jordan, Y. Chen, R. Stadelmann, M. Lugovy, N. Orlovskaya, **E.A. Payzant**, C. de la Cruz, M.J. Reece, T. Graule, and J. Kübler, "Non-congruence of high-temperature mechanical and structural behaviors of $LaCoO_3$ based perovskites," *J. Eur. Ceram. Soc.* **37**, 1563-1576 (2017) doi: 10.1016/j.jeurceramsoc.2016.11.005

162. S.W. Jorgensen, T. Johnson, **E.A. Payzant**, and H.Z. Bilheux, "Anisotropic storage medium development in a full-scale sodium alanate based hydrogen storage system," *Int. J. Hydrogen Energy* **41**, 13557-13574 (2016) doi: 10.1016/j.ijhydene.2016.05.057

161. H. Wang, M.J. Kirkham, T.R. Watkins, **E.A. Payzant**, J.R. Salvador, A.J. Thompson, J. Sharp, D. Brown, and D. Miller, "Neutron and x-ray powder diffraction study of skutterudite thermoelectrics," *Powder Diffraction* **31**, 16-22 (2016) doi: 10.1017/S0885715615000937

160. L. Poudel, C. de la Cruz, **E.A. Payzant**, A.F. May, M. Koehler, A.E. Taylor, H.B. Cao, M.A. McGuire, W. Tain, M. Matsuda, H. Jeen, H.N. Lee, T. Hong, S. Calder, H. Zhou, M.D. Lumsden, V. Keppens, D. Mandrus, and A.D. Christianson, "Structural and magnetic phase transitions in $CeCu_{6-x}T_x$ (T = Ag, Pd)," *Phys. Rev. B* **92**, 214421 (2015) doi: 10.1103/PhysRevB.92.214421

159. D.R. Economy, M.J. Cordill, **E.A. Payzant**, and M.S. Kennedy, "Residual stress within nanoscale metallic multilayer systems during

thermal cycling," *Mater. Sci. Engin. A* **648**, 289-298 (2015) doi: 10.1016/j.msea.2015.09.082

158. L.N. Brewer, M.S. Bennett, B.W. Baker, **E.A. Payzant**, and L.M. Sochalski-Kolbus, "Characterization of residual stress as a function of friction stir welding parameters in oxide dispersion strengthened (ODS) steel MA956," *Mater. Sci. Engin. A* **647**, 313-321 (2015) doi: 10.1016/j.msea.2015.09.020

157. Guixin Cao, D. J. Singh, G. Samolyuk, Liang Qiao, C. Parish, Siwei Tang, Jing Ke, Yanwen Zhang, Hangwen Guo, Wenbin Wang, Jieyu Yi, C. Cantoni, W. Siemons, **E.A. Payzant**, T.Z. Ward, M.D. Biegalski, B.C. Sales, David Mandrus, G.M. Stocks, and Zheng Gai, "Tailoring of a metastable material: α-$FeSi_2$ thin film," *Phys. Rev. Lett.* **114**, 147202 (2015) doi: 10.1103/PhysRevLett.114.147202

156. D. Mohanty, A. Safa-Sefat, **E.A. Payzant**, D.L. Wood, III, and C. Daniel, "Unconventional Irreversible Structural Changes in a High-Voltage Li-Mn-Rich Oxide for Lithium-Ion Battery Cathodes," *J. Power Sources* **283**, 423-428 (2015) doi: 10.1016/j.jpowsour.2015.02.087

155. L.M. Sochalski-Kolbus, **E.A. Payzant**, P.A. Cornwell, T.R. Watkins, S.S. Babu, R.R. Dehoff, M. Lorentz, O. Ovchinnikova, and C. Duty, "Comparison of residual stresses in Inconel 718 simple parts made by electron beam melting and direct laser metal sintering," *Met. Mat. Trans. A* **46** [3], 1419-1432 (2015) doi: 10.1007/s11661-014-2722-2

154. Zhilin Xie, R.G. Blair, N. Orlovskaya, and **E.A. Payzant**, "Hexagonal OsB_2 reduction upon heating in H_2 containing environment," *Adv. Appl. Ceram.*, **114** [2], 114-120 (2015) doi: 10.1179/1743676114Y.0000000212

153. Yan Chen, N. Orlovskaya, **E.A. Payzant**, T. Graule, and J. Kuebler, "A search for temperature-induced time-dependent structural transitions in 10mol%Sc_2O_3–1mol%CeO_2–ZrO_2 and 8mol%Y_2O_3–ZrO_2 electrolyte ceramics," *J. Eur. Ceram. Soc.*, **35**, 951-958 (2015) doi: 10.1016/j.jeurceramsoc.2014.08.030

152. D. Mohanty, Jianlin Li, D.P. Abraham, A. Huq, A. Safa-Sefat, **E.A. Payzant**, D.L. Wood, III, and C. Daniel, "Unraveling the voltage fade mechanism in layer Li-Mn-rich electrode: origin of the tetrahedral cations for spinel conversion," *Chem. Mater.*, **26**, 6272-6280 (2014) doi: 10.1021/cm5031415

151. Zhilin Xie, R.G. Blair, N. Orlovskaya, D.A. Cullen, and **E.A. Payzant**, "Thermal stability of hexagonal OsB_2," *J. Solid State Chem.* **219**, 210-219 (2014) doi: 10.1016/j.jssc.2014.07.035

150. Zhilin Xie, M. Graule, N. Orlovskaya, **E.A. Payzant**, D.A. Cullen, and R.G. Blair, "Novel high pressure hexagonal OsB_2 by mechanochemistry," *J. Solid State Chem.* **215**, 16-21(2014) doi: 10.1016/j.jssc.2014.03.020

149. N. Gallego, C. Contescu, H.M. Meyer, J.Y. Howe, R.A. Meisner, **E.A. Payzant**, M.J. Lance, S. Yoon, M. Denlinger, and D.L. Wood, "Advanced surface and microstructural characterization of natural graphite anodes for lithium ion batteries," *Carbon* **72**[1], 393-401 (2014) doi: 10.1016/j.carbon.2014.02.031

148. M.D. Montasserasadi, D. Mohanty, A. Huq, L. Heroux, **E.A. Payzant**, and J.B. Wiley, "Topochemical synthesis of alkali-metal hydroxide layers within double- and triple-layered perovskites," *Inorg. Chem.* **53**[3], 1773-1778 (2014) doi: 10.1021/ic402957c

147. K.A. Perry, K.L. More, **E.A. Payzant**, R.A. Meisner, B.G. Sumpter, and B.C. Benicewicz, "A comparative study of phosphoric acid-doped *m*-PBI membranes," *J. Polymer Sci. B: Polymer Physics* **52**[1], 26-35 (2014) doi: 10.1002/polb.23403

146. S.N. Ude, C.J. Rawn, R.A. Peascoe, M.J. Kirkham, G.L. Jones, and **E.A. Payzant**, "Mayenite synthesized using the citrate sol-gel method," *Ceramics Intl.* **40**[1], 1117-1123 (2014) doi: 10.1016/j.ceramint.2013.06.112

145. T.R. Watkins, H.Z. Bilheux, K. An, **E.A. Payzant**, R.R. Dehoff, C.E. Duty, W.H. Peter, C.A. Blue, and C.A. Brice, "Neutron characterization for additive manufacturing," *Advanced Materials & Processes* **171**[3], 23-27 (2013)

144. D. Mohanty, A. Safa-Sefat, Jianlin Li, R.A. Meisner, A.J. Rondinone, **E.A. Payzant**, D.P. Abraham, D.L. Wood, III, and C. Daniel, "Correlating cation ordering and voltage fade in a lithium- and manganese-rich layered-layered lithium-ion battery cathode oxide; a joint magnetic susceptibility and TEM study," *Phys. Chem. Chem. Phys.,* **15**[44], 19496-19509 (2013) doi:10.1039/C3CP53658K

143. M.D. Gram, J.S. Carpenter, **E.A. Payzant**, A. Misra, and P.M. Anderson, "X-ray diffraction studies of forward and reverse plastic flow in nanoscale layers during thermal cycling," *Mater. Res. Lett.*, **1**[4], 233-243 (2013) doi: 10.1080/21663831.2013.843602

142. D. Mohanty, A. Huq, **E.A. Payzant**, A. Safa-Sefat, Jianlin Li, D.P. Abraham, D.L. Wood, III, and C. Daniel, "Neutron diffraction and magnetic susceptibility studies on a high-voltage $Li_{1.2}Mn_{0.55}Ni_{0.15}Co_{0.10}O_2$ lithium-ion battery cathode; an insight to the crystal structure," *Chem. Mater.*, **25**[20], 4064-4070 (2013) doi: 10.1021/cm402278q

141. R.C. Bowman, Jr., **E.A. Payzant**, P. R. Wilson, D. P. Pearson, A. Ledovskikh, D. Danilov, P.H.L. Notten, K. An, H. D. Skorpenske, and D. L. Wood, III, "Characterization and analyses of degradation and recovery of $LaNi_{4.78}Sn_{0.22}$ hydrides following thermal aging," *J. Alloys Compounds* **580**, S207-S210 (2013) doi: 10.1016/j.jallcom.2013.03.129

140. D. Saha, **E.A. Payzant**, A.S. Kumbhar, and A.K. Naskar, "Sustainable mesoporous carbons as storage and controlled-delivery media for functional molecules," *ACS Appl. Mater. Interfaces* **5**, 5868-5874 (2013) doi: 10.1021/am401661f

139. S.M. Everett, C.J. Rawn, D.J. Keffer, D.L. Mull, **E.A. Payzant**, and T.J. Phelps "Kinetics of methane hydrate decomposition studied via *in situ* low temperature x-ray powder diffraction," *J. Phys. Chem. A* **117**, 3593-3598 (2013) doi: 10.1021/jp4020178

138. D. Mohanty, A.S. Sefat, S. Kalnaus, Jianlin Li, R.A. Meisner, **E.A. Payzant**, D.P. Abraham, D.L. Wood, III, and C. Daniel, "Investigating phase transformation in $Li_{1.2}Co_{0.1}Mn_{0.55}Ni_{0.15}O_2$ lithium-ion battery cathode during high-voltage hold (4.5 V) via magnetic, x-ray diffraction and electron microscopy studies," *J. Mater. Chem. A* **1**, 6249-6261 (2013) doi: 10.1039/C3TA10304H

137. D. Mohanty, S. Kalnaus, R.A. Meisner, Jianlin Li, **E.A. Payzant**, D.L. Wood, III, and C. Daniel, "Structural transformation in a $Li_{1.2}Co_{0.1}Mn_{0.55}Ni_{0.15}O_2$ lithium-ion battery cathode during high-voltage hold," *RSC Adv.* **3**, 7479-7485 (2013) doi: 10.1039/C3RA40510A

136. Y.H. Ma, C.H. Chen, J. Catalano, F. Guazzone, and **E.A. Payzant**, "Synthesis, annealing, and performance of Pd-Au asymmetric composite membranes for hydrogen purification," *Ind. Engr. Chem. Res.* **52**, 8732-8744 (2013) doi:10.1021/ie302740f

135. Shan Wu, W. Li, M. Lin, Q. Burlingame, Q. Chen, **A. Payzant**, Kai Xiao, and Q.M. Zhang, "Aromatic polythiourea dielectrics with ultrahigh breakdown field strength, low dielectric loss, and high electric energy density," *Adv. Mater.* **25**, 1734-1738 (2013) doi: 10.1002/adma.201204072

134. Kai Xiao, W. Deng, J.K. Keum, Mina Yoon, I.V. Vlassiouk, K.W. Clark, An-Ping Li, I.I. Kravchenko, G. Gu, **E.A. Payzant**, B.G. Sumpter, S.C. Smith, J.F. Browning, and D.B. Geohegan, "Surface-induced orientation control of CuPc molecules for the epitaxial growth of highly ordered organic crystals on graphene," *J. Am. Chem. Soc.* **135**, 3680-3687 (2013) doi: 10.1021/ja3125096

133. D. Mohanty, S. Kalnaus, R.A. Meisner, K.J. Rhodes, Jianlin Li, **E.A. Payzant**, D.L. Wood, III, and C. Daniel, "Structural transformation of a lithium-rich $Li_{1.2}Co_{0.1}Mn_{0.55}Ni_{0.15}O_2$ cathode during high voltage cycling resolved by in-situ x-ray diffraction," *J. Power Sources* **229**, 239-248 (2013) doi: 10.1016/j.jpowsour.2012.11.144

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