Michael Alan McGuire

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Research emphasis

Magnetic, thermoelectric, and superconducting materials; cleavable materials; solid state chemistry and crystal growth of complex and new inorganic compounds; magnetic, thermal, and transport properties; crystallography and structure-property relationships.

Education

2001 – 2006	**Cornell University**	**Ph.D. Physics**
1999 – 2001	**University of Mississippi**	**M.S. Physics**
1995 – 1999	**University of Mississippi**	**B.S. Physics**

Research Experience

2007 – present **Materials Science and Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN**
Senior R&D Staff, Correlated Electron Materials Group (Eugene P. Wigner Fellow 2007-2009)

2006 – 2007 **Department of Chemistry, Princeton University, Princeton, NJ**
Postdoctoral Research Associate

2002 – 2006 **Department of Chemistry and Chemical Biology, Cornell University, Ithaca, NY**
Graduate Research Assistant
▪ Dissertation: "*Exploring Thallium Compounds, Chevrel Phases, and Other Chalcogenides as Thermoelectric Materials*"

2000 – 2001 **Department of Physics and Astronomy, University of Mississippi, Oxford, MS**
Graduate Research Assistant
▪ Thesis: "*Resonant Ultrasound Spectroscopy Studies of Clathrate Thermoelectrics*"

Fellowships, Memberships, and Awards

Fellow of the American Physical Society, 2017
Eugene P. Wigner Fellowship, Oak Ridge National Laboratory, 2007-2009
Cornell University Fellowship, Cornell University, 2001-2002

Member **AAAS, American Physical Society, American Crystallographic Association, American Chemical Society**

Highly Cited Researcher, Clarivate Analytics, 2018
Excellence in Technology Transfer Award, Federal Laboratory Consortium, 2018
R&D 100 Award, 2017
Excellence in Technology Transfer Award, Southeast Region of the Federal Laboratory Consortium, 2017
Highly Cited Researcher, Thompson Reuters, 2014
Significant Event Award, Oak Ridge National Laboratory, 2013
Gordon Battelle Prize, Oak Ridge National Laboratory, 2011
Directors Award for Outstanding Team Accomplishment, Oak Ridge National Laboratory, 2009
Scientific Research Team Award, Oak Ridge National Laboratory, 2009
Significant Event Award, Oak Ridge National Laboratory, 2008
Graduate Student Achievement Award, University of Mississippi, 2001
Taylor Medal, University of Mississippi, 1999

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h-index = 48 WOS/Publons, 55 Google Scholar; ORCID

Full Publication List:

(245) J. Zhang, J. Yan, S. Calder, Q. Zheng, M.A. McGuire, D.L. Abernathy, Y. Ren, S.H. Lapidus, K. Page, H. Zheng, J.W. Freeland, J.D. Budai, R.P. Hermann, "long-Range Antiferromagnetic Order in a Rocksalt High Entropy Oxide" **CHEMISTRY OF MATERIALS** 31, 3705 (2019). DOI: 10.1021/acs.chemmater.9b00624

(244) J.Q. Yan, S. Okamoto, M.A. McGuire, A.F. May, R.J. McQueeney, B.C. Sales, "Evolution of structural, magnetic, and transport properties in $MnBi_{2-x}Sb_xTe_4$" **PHYSICAL REVIEW B** 100, 104409 (2019). DOI: 10.1103/PhysRevB.100.104409

(243) Z. Sun, Y. Yi, T. Song, G. Clark, B. Huang, Y. Shan, S. Wu, D. Huang, C. Gao, Z. Chen, M.A. McGuire, T. Cao, D. Xiao, W.-T. Liu, W. Yao, X. Xu, S. Wu "Giant nonreciprocal second-harmonic generation from antiferromagnetic bilayer CrI_3" **NATURE** 572, 497 (2019). DOI: 10.1038/s41586-019-1445-3

(242) Q. Zheng, M.A. McGuire, A.F. May "STEM Study of Structure and Local Short-Range Orders in the $Fe_{5-x}GeTe_2$ Crystals with Ferromagnetism Near Room Temperature" **MICROSCOPY AND MICROANALYSIS** 25, 956 (2019). DOI: 10.1017/S1431927619005518

(241) J.-Q. Yan, S. Okamoto, Y. Wu, Q. Zheng, H.D. Zhou, H.B. Cao, M.A. McGuire "Magnetic order in single crystals of $Na_3Co_2SbO_6$ with a honeycomb arrangement of $3d^7$ Co^{2+} ions" **PHYSICAL REVIEW MATERIALS** 3, 074405 (2019). DOI: 10.1103/PhysRevMaterials.3.074405

(240) Y.Y. Jiao, Z.Y. Liu, M.A. McGuire, S. Calder, J.-Q. Yan, B.C. Sales, J.P. Sun, Q. Cui, N.N. Wang, Y. Sui, Y. Uwatoko, B.S. Wang, X.L. Dong, J.-G. Cheng, "High-pressure phase of $CrSb_2$: A new quasi-one-dimensional itinerant magnet with competing interactions" **PHYSICAL REVIEW MATERIALS** 3, 074404 (2019). DOI: 10.1103/PhysRevMaterials.3.074404

(239) M.A. McGuire, Q. Zheng, J. Yan, B.C. Sales, "Chemical disorder and spin-liquid-like magnetism in the van der Waals layered 5d transition metal halide $Os_{0.55}Cl_2$" **PHYSICAL REVIEW B**, 99, 214402 (2019). DOI: 10.1103/PhysRevB.99.214402

(238) X. Cai, T. Song, N.P. Wilson, G. Clark, M. He, X. Zhang, T. Taniguchi, K. Watanabe, W. Yao, D. Xiao, M.A. McGuire, D.H Cobden, X. Xu, "Atomically Thin $CrCl_3$: An In-Plane Layered Antiferromagnetic Insulator" **NANO LETTERS** 19, 3993 (2019). DOI:10.1021/acs.nanolett.9b01317

(237) M.A. McGuire, T. Pandey, S. Mu, D.S. Parker, "Ferromagnetic Spin-1/2 Dimers with Strong Anisotropy in $MoCl_5$" **CHEMISTRY OF MATERIALS** 31, 2952 (2019). DOI:10.1021/acs.chemmater.9b00416

(236) C.L. Saiz, M.A. McGuire, S.R.J. Hennadige, J. van Tol, S.R. Singamaneni, "Electron Spin Resonance Properties of CrI3 and CrCl3 Single Crystals" **MRS ADVANCES** (2019) DOI: 10.1557/adv.2019.241

(235) A. Li, J.X. Yin, J. Wang, Z. Wu, J. Ma, A.S. Sefat, B.C. Sales, D.G. Mandrus, M.A. McGuire, R. Jin, C. Zhang, P. Dai, B. Lv, C.W. Chu, X. Liang, P.H. Hor, C.S. Ting, S.H. Pan, "Surface terminations and layer-resolved tunneling spectroscopy of the 122 iron pnictide superconductors" Physical Review B 99, 134520 (2019). DOI: 10.1103/PhysRevB.99.134520

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(231) M.T.K. Kolambage, M.A. McGuire, L.D. Sanjeewa, C.D. McMillen, J.W. Kolis, "Hydrothermal Synthesis of Lanthanide Rhenium Oxides: Structures and Magnetism of $Ln_2Re_2O_7(OH)$ (Ln = Pr, Nd) and $Ln_4Re_2O_{11}$ (*Ln* = Eu, Tb)" **JOURNAL OF SOLID STATE CHEMISTRY** 275, 149 (2019). DOI: 10.1016/j.jssc.2019.03.008

(230) L.D. Sanjeewa, V.O. Garlea, M.A. McGuire, C.D. McMillen, J.W. Kolis, "Magnetic Ground State Crossover in a Series of Glaserite Systems with Triangular Magnetic Lattices" **INORGANIC CHEMISTRY** 58, 2813 (2019). DOI: 10.1021/acs.inorgchem.8b03418

(229) S.M. Neumayer, E.A. Eliseev, M.A. Susner, A, Tselev, B.J. Rodriguez, J.A. Brehm, S.T. Pantelides, G. Panchapakesan, S. Jesse, S.V. Kalinin, M.A. McGuire, A.N. Morozovska, P. Maksymovych, N. Balke, "Giant negative electrostriction and dielectric tunability in a van derWaals layered ferroelectric" **PHYSICAL REVIEW MATERIALS** 3, 024401 (2019). DOI: 10.1103/PhysRevMaterials.3.024401

(228) T. Song, M.W.-Y. Tu, C. Carnahan, X. Cai, T. Taniguchi, K. Watanabe, M.A. McGuire, D.H. Cobden, D. Xiao, W. Yao, X. Xu "Voltage Control of a van der Waals Spin-Filter Magnetic Tunnel Junction" **NANO LETTERS** 19, 915 (2019). DOI: 10.1021/acs.nanolett.8b04160

(227) V.O. Garlea, L.D. Sanjeewa, M.A. McGuire, C.D. Batista, A.M. Samarakoon, D. Graf, B. Winn, F. Ye, C. Hoffmann, J.W. Kolis "Exotic magnetic field-induced spin-superstructures in a mixed honeycomb triangular lattice system" **PHYSICS REVIEW X** 9, 011038 (2019). DOI: 10.1103/PhysRevX.9.011038

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Magnetic Field Annealing" **MICROSCOPY AND MICROANALYSIS** 24, 958 (2018). DOI: 10.1017/S1431927618005287

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(219) N. Balke, S.M. Neumayer, J.A. Brehm, M.A. Susner, B.J. Rodriguez, S. Jesse, S.V. Kalinin, S.T. Pantelides, M.A. McGuire, P. Maksymovych, "Locally controlled Cu-ion transport in layered ferroelectric $CuInP_2S_6$" **ACS APPLIED MATERIALS AND INTERFACES** 10, 27188 (2018). DOI: 10.1021/acsami.8b08079

(218) M.A. McGuire, B.C. Sales, "Spin-glass behavior and vacancy order in van der Waals layered β-$MoCl_4$" **PHYSICAL REVIEW MATERIALS** 2, 074007 (2018). DOI: 10.1103/PhysRevMaterials.2.074007

(217) A. A. Aczel, L.M. DeBeer-Schmitt, T.J. Williams, M.A. McGuire, N.J. Ghimire, L. Li, D. Mandrus, "Extended exchange interactions stabilize long-period magnetic structures in $Cr_{1/3}NbS_2$" **APPLIED PHYSICS LETTERS** 113, 032404 (2018). DOI: 10.1063/1.5038021

(216) S. Mukhopadhyay, D.S. Parker, B.C. Sales, A.A. Puretzky, M.A. McGuire, L. Lindsay, "Two-channel model for ultralow thermal conductivity of crystalline Tl_3VSe_4" **SCIENCE** 360, 1455 (2018). DOI: 10.1126/science.aar8072

(215) K.L. Seyler, D. Zhong, B .Huang, X. Linpeng, N.P. Wilson, T. Taniguchi, K. Watanabe, W. Yao, D. Xiao, M.A. McGuire, K.-M.C. Fu, X. Xu, "Valley Manipulation by Optically Tuning the Magnetic Proximity Effect in WSe_2/CrI_3 Heterostructures" **NANO LETTERS** 18, 3823 (2018). DOI: 10.1021/acs.nanolett.8b01105

(214) Y. Choi, P.J. Ryan, M.A. McGuire, B.C. Sales, J.-W. Kim, "Giant magnetostriction effect near onset of spin reorientation in MnBi" **APPLIED PHYSICS LETTERS** 112, 192411 (2018). DOI: 10.1063/1.5026408

(213) T. Song, X. Cai, M.W. Tu, X. Zhang, B. Huang, N.P. Wilson, K.L. Seyler, L. Zhu, T. Taniguchi, K. Watanabe, M.A. McGuire, D.H. Cobden, D. Xiao, W. Yao, X. Xu, "Giant tunneling magnetoresistance in spin-filter van der Waals heterostructures" **SCIENCE**, 360, 1214 (2018). DOI: 10.1126/science.aar4851

(212) B. Huang, G. Clark, D.R. Klein, D. MacNeill, E. Navarro-Moratalla, K.L. Seyler, N. Wilson, M.A. McGuire, D.H. Cobden, D. Xiao, W. Yao, P. Jarillo-Herrero, X. Xu, "Electrical control of 2D magnetism in bilayer CrI_3" **NATURE NANOTECHNOLOGY**, 13, 544 (2018). DOI:10.1038/s41565-018-0121-3

(211) G. Pokharel, A.F. May, D.S. Parker, S. Calder, G. Ehlers, A. Huq, S.A.J. Kimber, H. Suriya Arachchige, L. Poudel, M.A. McGuire, D. Mandrus, and A.D. Christianson "Negative thermal expansion and magnetoelastic coupling in the breathing pyrochlore lattice material $LiGaCr_4S_8$" **PHYSICAL REVIEW B** 97, 134117 (2018). DOI: 10.1103/PhysRevB.97.134117

(210) R. Morrow, M.A. McGuire, J. Yan, P.M. Woodward "The Crystal Structure and Magnetic Behavior of Quinary Osmate and Ruthanate Double Perovskites La*ABB*'O_6 (*A* = Ca, Sr; *B* = Co, Ni; *B*' = Ru, Os)" **INORGANIC CHEMISTRY** 57, 2989 (2018). DOI: 10.1021/acs.inorgchem.7b02282

(209) T.S. Pellizzeri, M.A. McGuire, C. McMillen, Y. Wen, G. Chumanov, J. Kolis "Two Halide-Containing Cesium Manganese Vanadates: Synthesis, Characterization, and Magnetic Properties" **DALTON TRANSACTIONS** 47, 2619 (2018). DOI: 10.1039/C7DT04642A

(208) K.L. Seyler, D. Zhong, D.R. Klein, S. Gao, X. Zhang, B. Huang, E. Navarro-Moratalla, L. Yang, D.H. Cobden, M.A. McGuire, W. Yao, D. Xiao, P. Jarillo-Herrero, X. Xu, "Ligand-field helical luminescence in a 2D ferromagnetic insulator" **NATURE PHYSICS** 14, 277 (2017). DOI:10.1038/s41567-017-0006-7

(207) L.D. Sanjeewa, V.O. Garlea, M.A. McGuire, M. Frontzek, C.D. McMillen, K. Fulle, J.W. Kolis, "Investigation of a Structural Phase Transition and Magnetic Structure of $Na_2BaFe(VO_4)_2$: A Triangular Magnetic Lattice with a Ferromagnetic Ground State" **INORGANIC CHEMISTRY** 56, 14842 (2017). DOI: 10.1021/acs.inorgchem.7b02024

(206) A. Belianinov, M.J. Burch, H.E. Hysmith, A.V. Ievlev, V. Iberi, M.A. Susner, M.A. McGuire, P. Maksymovych, M. Chyasnavichyus, S. Jesse, O.S. Ovchinnikova, "Chemical Changes in Layered Ferroelectric Semiconductors Induced by Helium Ion Beam" **SCIENTIFIC REPORTS** 7, 16619 (2017). DOI:10.1038/s41598-017-16949-3

(205) Y.Q. Cai, Y.Y. Jiao, Q. Cui, J.W. Cai, Y. Li, B.S. Wang, M.T. Fernandez-Diaz, M.A. McGuire, J.-Q. Yan, J.A. Alonso, J.-G. Cheng, "Giant reversible magnetocaloric effect in the pyrochlore $Er_2Mn_2O_7$ due to a cooperative two-sublattice ferromagnetic order" **PHYSICAL REVIEW MATERIALS**, 1, 064408 (2017). DOI: 10.1103/PhysRevMaterials.1.064408

(204) M.A. McGuire, J. Yan, P. Lampen-Kelley, A.F. May, V.R. Cooper, L. Lindsay, A. Puretzky, L. Liang, S. KC, E. Cakmak, S. Calder, B.C. Sales, "High-temperature magnetostructural transition in van der Waals-layered α-$MoCl_3$" **PHYSICAL REVIEW MATERIALS**, 1, 064001 (2017). DOI: 10.1103/PhysRevMaterials.1.064001

(203) R. Roccanova, W. Ming, V.R. Whiteside, M.A. McGuire, I.R. Sellers, M.-H. Du, B. Saparov, "Synthesis, Crystal and Electronic Structures, and Optical Properties of $(CH_3NH_3)_2CdX_4$ (X = Cl, Br, I)" **INORGANIC CHEMISTRY**, 56, 13878 (2017). DOI: 10.1021/acs.inorgchem.7b01986

(202) B.C. Sales, K. Jin, H. Bei, J. Nichols, M.F. Chisholm, A.F. May, N.P. Butch, A.D. Christianson, M.A. McGuire, "Quantum critical behavior in the asymptotic limit of high disorder in the medium entropy alloy $NiCoCr_{0.8}$" **NPJ QUANTUM MATERIALS** 2, 33 (2017). DOI:10.1038/s41535-017-0042-7

(201) L. Poudel, C. de la Cruz, M.R. Koehler, M.A. McGuire, V. Keppens, D. Mandrus, A.D. Christianson, "$LaCu_{6-x}Ag_x$: A promising host of an elastic quantum critical point" **PHYSICA B** 536, 479 (2017). DOI: 10.1016/j.physb.2017.08.066

(200) M.A. Susner, M. Chyasnavichyus, M.A. McGuire, P. Ganesh, P. Maksymovych "Metal Thio- and Selenophosphates as Multi-Functional van der Waals Layered Materials" **ADVANCED MATERIALS**, 1602852 (2017). DOI: 10.1002/adma.201602852

(199) M. A. Susner, M. Chyasnavichyus, A.A. Puretzky, Q. He, B.S. Conner, Y. Ren, D.A. Cullen, P. Ganesh, D. Shin, H. Demir, J.W. McMurray, A.Y. Borisevich, P. Maksymovych, M.A. McGuire "Cation−Eutectic Transition via Sublattice Melting in $CuInP_2S_6/In_{4/3}P_2S_6$ van der Waals Layered Crystals" **ACS NANO** 11, 7060 (2017). DOI: 10.1021/acsnano.7b02695

(198) J.Q. Yan, B.C. Sales, M.A. Susner, M.A. McGuire, "Flux growth in a horizontal configuration: An analog to vapor transport growth" **PHYSICAL REVIEW MATERIALS** 1, 023402 (2017). DOI: 10.1103/PhysRevMaterials.1.023402

(197) H. Xia, J. Dai, Y. Xu, Y. Yin, X. Wang, Z. Liu, M. Liu, M.A. McGuire, X. Li, Z. Li, C. Jin, Y. Yang, J. Zhou, Y. Long, "Magnetism and the spin state in cubic perovskite $CaCoO_3$ synthesized under high pressure" **PHYSICAL REVIEW MATERIALS** 1, 024406 (2017). DOI: 10.1103/PhysRevMaterials.1.024406

(196) M.A. McGuire, "Crystal and Magnetic Structures in Layered, Transition Metal Dihalides and Trihalides" **CRYSTALS** 7, 121 (2017). DOI:10.3390/cryst7050121

(195) M.A. McGuire, G. Clark, S. KC, W.M. Chance, G.E. Jellison, Jr., V.R. Cooper, X. Xu, B.C. Sales, "Magnetic behavior and spin-lattice coupling in cleavable van der Waals layered $CrCl_3$ crystals" **PHYSICAL REVIEW MATERIALS** 1, 014001 (2017). DOI: 10.1103/PhysRevMaterials.1.014001

(194) A. Choudhury, S. Mohapatra, H.Y. Asl, S.H. Lee, Y.S. Hor, J. Medvedeva, D.L. McClane, G.E. Hilmas, M.A. McGuire, A.F. May, H. Wang, S. Dash, A. Welton, P. Boolchand, K.P. Devlin, J. Aitken, R. Herbst-Irmer, V. Patříček, "New insights into the structure, chemistry, and properties of Cu_4SnS_4" **JOURNAL OF SOLID STATE CHEMISTRY**, 253, 192 (2017). DOI: 10.1016/j.jssc.2017.05.033

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(192) M.A. McGuire, V.O. Garlea, S. KC, V.R. Cooper, J.-Q. Yan, H. Cao, B.C. Sales, "Antiferromagnetism in the van der Waals layered spin-lozenge semiconductor $CrTe_3$" **PHYSICAL REVIEW B** 95, 144421 (2017). DOI: 10.1103/PhysRevB.95.144421

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(190) B. Huang, G. Clark, E. Navarro-Moratalla, D.R. Klein, R. Cheng, K.L. Seyler, D. Zhong, E. Schmidgall, M.A. McGuire, D.H. Cobden, W. Yao, D. Xiao, P. Jarillo-Herrero, X. Xu, **NATURE** 546, 270 (2017). DOI: 10.1038/nature22391

(189) B.S. Conner, M.A. Susner, P. Lampen-Kelley, A.F. May, M.A. McGuire, J.-Q. Yan, B.C. Sales, "Heat capacity, resistivity, and angular dependent magnetization studies of single crystal $Nd_{1+\varepsilon}Fe_4B_4$ for $\varepsilon \approx 1$" **JOURNAL OF MAGNETISM AND MAGNETIC MATERIALS** 435, 100 (2017). DOI: 10.1016/j.jmmm.2017.04.002

(188) B.S. Conner, M.A. McGuire, M.A. Susner, B.C. Sales, "Phase relationships in the $CeFe_8Co_3$(Ti,Si) system" **JOURNAL OF ALLOYS AND COMPOUNDS** 712, 30 (2017). DOI: 10.1016/j.jallcom.2017.04.048

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(186) M.A. McGuire, O. Rios, B.S. Conner, W.G. Carter, M. Huang, K. Sun, O. Palasyuk, B. Jensen, L. Zhou, K. Dennis, I.C. Nlebedim, M.J. Kramer "Magnetic field control of microstructural development in melt-spun $Pr_2Co_{14}B$" **JOURNAL OF MAGNETISM AND MAGNETIC MATERIALS** 430, 85 (2017). DOI: 10.1016/j.jmmm.2016.12.101

(185) L.D. Sanjeewa, M.A. McGuire, C.D. McMillen, V.O. Garlea, J.W. Kolis, "Polar materials with isolated V^{4+} s = ½ triangles: $NaSr_2V_3O_3(Ge_4O_{13})Cl$ and $KSr_2V_3O_3(Ge_4O_{13})Cl$" **CHEMISTRY OF MATERIALS** 29, 1404 (2017). DOI: 10.1021/acs.chemmater.6b05320

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