

Jason F. Khoury
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Professional Preparation

The Ohio State University	Chemistry	B.S. (honors), 2015
Northwestern University	Chemistry	Ph.D., 2020
Princeton University	Chemistry	Postdoctoral Fellow, 2020 – 2023

Products

Publications

1. Salters, T.H.; Orlandi, F.; Berry, T.; **Khoury, J.F.**, Whittaker, E.; Manuel, P.; Schoop, L.M. Charge density wave-templated spin cycloid in topological semimetal $\text{NdSb}_x\text{Te}_{2-x-\delta}$. *Phys. Rev. Mater.* **2023**, *7*, 044203.
2. Song, X.; Singha, R.; Cheng, G.; Yeh, Y.-W.; Kamm, F.; **Khoury, J.F.**; Pielnhofer, F.; Batson, P.E.; Yao, N.; Schoop, L.M. Synthesis of an aqueous, air-stable superconducting $1\text{T}'\text{-WS}_2$ monolayer-ink. *Sci. Adv.* **2023**, *9*, eadd6167.
3. **Khoury, J.F.**; Song, X.; Schoop, L.M. Ln_3MBi_5 (Ln = Pr, Nd, Sm; M = Zr, Hf): Intermetallics with Hypervalent Bismuth Chains. *Z. Anorg. Allg. Chem.* **2022**, e202200123.
4. **Khoury, J.F.**; Han, B.; Jovanovic, M.; Singha, R.; Song, X.; Queiroz, R.; Ong, N.P.; Schoop, L.M. A Class of Magnetic Topological Material Candidates with Hypervalent Bi Chains. *J. Am. Chem. Soc.* **2022**, *144*, 9785-9796. (DOI: 10.1021/jacs.2c02281)
5. Song, X.; Schneider, S.M.; Cheng, G.; **Khoury, J.F.**; Jovanovic, M.; Yao, N.; Schoop, L.M. Kinetics and Evolution of Magnetism in Soft-Chemical Synthesis of CrSe_2 from KCrSe_2 . *Chem Mater.* **2021**, *33*, 8070-8078. (DOI: 10.1021/acs.chemmater.1c02620)
6. Singha, R.; Salters, T.H.; Teicher, S.M.L.; Lei, S.; **Khoury, J.F.**; Ong, N.P.; Schoop, L.M. Evolving Devil's staircase magnetization from tunable charge density waves in nonsymmorphic Dirac semimetals. *Adv. Mater.* **2021**, *33*, 2103476. (DOI: 10.1002/adma.202103476)
7. **Khoury, J.F.** and Schoop, L.M. Chemical Bonds in Topological Materials. *Trends Chem.* **2021**, *3*, 700-715. (DOI: 10.1016/j.trechm.2021.04.011)
8. Slade, T.J.; Pal, K.; Grovogui, J.A.; Bailey, T.P.; Male, J.; **Khoury, J.F.**; Zhou, X.; Chung, D.Y.; Snyder, G.J.; Uher, C.; Dravid, V.P.; Wolverton, C.; Kanatzidis, M.G. Contrasting SnTe-NaSbTe_2 and SnTe-NaBiTe_2 Thermoelectric Alloys: High Performance Facilitated by Increased Cation Vacancies and Lattice Softening. *J. Am. Chem. Soc.* **2020**, *142*, 12524-12535. (DOI: 10.1021/jacs.0c05650)
9. **Khoury, J.F.**; Rettie, A.J.E.; Robredo, I.; Krogstad, M.J.; Malliakas, C.D.; Bergara, A.; Vergniory, M.G.; Osborn, R.; Rosenkranz, S.; Chung, D.Y.; Kanatzidis, M.G. The subchalcogenides $\text{Ir}_2\text{In}_8\text{Q}$ (Q = S, Se, Te): Dirac semimetal candidates with re-entrant structural modulation. *J. Am. Chem. Soc.* **2020**, *142*, 6312-6323. (DOI: 10.1021/jacs.0c00809)
10. **Khoury, J.F.**; He, J.; Pfluger, J.E.; Hadar, I.; Balasubramanian, M.; Stoumpos, C.C.; Zu, R.; Gopalan, V.; Wolverton, C.; Kanatzidis, M.G. $\text{Ir}_6\text{In}_{32}\text{S}_{21}$, a polar, metal-rich

- semiconducting subchalcogenide. *Chem. Sci.* **2020**, *11*, 870-878. (DOI: 10.1039/C9SC05609B)
11. **Khoury, J. F.**; Rettie, A.J.E.; Khan, M.A.; Ghimire, N.J.; Robredo, I.; Pfluger, J.E.; Pal, K.; Wolverton, C.; Bergara, A.; Jiang, J.S.; Schoop, L.M.; Vergniory, M.G.; Mitchell, J.F.; Chung, D.Y.; Kanatzidis, M.G. A new three-dimensional subsulfide $\text{Ir}_2\text{In}_8\text{S}$ with Dirac semimetal behavior. *J. Am. Chem. Soc.* **2019**, *141*, 19130-19137. (DOI: 10.1021/jacs.9b10147)
 12. **Khoury, J. F.**; Hao, S.; Stoumpos, C. C.; Yao, Z.; Malliakas, C. D.; Aydemir, U.; Slade, T. J.; Snyder, G. J.; Wolverton, C.; Kanatzidis, M.G. Quaternary Pavonites $\text{A}_{1+x}\text{Sn}_{2-x}\text{Bi}_{5+x}\text{S}_{10}$ ($\text{A}^+ = \text{Li}^+, \text{Na}^+$): Site Occupancy Disorder Defines Electronic Structure. *Inorganic Chemistry* **2018**, *57*, 2260-2268. (DOI: 10.1021/acs.inorgchem.7b03091)
 13. Sharits, A. R.; **Khoury, J.F.**; Woodward, P.M. Evaluating NaREMGWO_6 ($\text{RE} = \text{La}, \text{Gd}, \text{Y}$) Doubly Ordered Double Perovskites as Eu^{3+} Phosphor Hosts. *Inorg. Chem.* **2016**, *55*, 12383-12390. (DOI: 10.1021/acs.inorgchem.6b02295)

Presentations

1. **Khoury, J.F.**; Han, B.; Jovanovic, M.; Singha, R.; Song, X.; Queiroz, R.; Ong, N.P.; Schoop, L.M. A Class of Magnetic Topological Material Candidates with Hypervalent Bi Chains. Beckman Symposium, Irvine, CA, August 2023 (Oral Presentation)
2. **Khoury, J.F.**; Han, B.; Jovanovic, M.; Singha, R.; Song, X.; Queiroz, R.; Ong, N.P.; Schoop, L.M. A Class of Magnetic Topological Material Candidates with Hypervalent Bi Chains. MRS Spring 2023, San Francisco, CA, April 2023 (Oral Presentation)
3. **Khoury, J.F.**; Han, B.; Jovanovic, M.; Singha, R.; Song, X.; Queiroz, R.; Ong, N.P.; Schoop, L.M. A Class of Magnetic Topological Material Candidates with Hypervalent Bi Chains. APS March Meeting, Las Vegas, NV, March 2023 (Oral Presentation)
4. **Khoury, J.F.**; Han, B.; Jovanovic, M.; Singha, R.; Song, X.; Queiroz, R.; Ong, N.P.; Schoop, L.M. A New Class of Magnetic Topological Materials with Hypervalent Bi Chains. Gordon Research Conference on Solid State Chemistry, New London, NH, July 2022 (Poster)
5. **Khoury, J.F.**; Rettie, A.J.E.; Khan, M.A.; Ghimire, N.J.; Robredo, I.; Pfluger, J.E.; Pal, K.; Wolverton, C.; Bergara, A.; Jiang, J.S.; Schoop, L.M.; Vergniory, M.G.; Mitchell, J.F.; Chung, D.Y.; Kanatzidis, M.G. Topological Matter School, Donostia-San Sebastian, Spain, August 2019 (Poster)
6. **Khoury, J.F.**; Rettie, A.J.E.; Khan, M.A.; Ghimire, N.J.; Robredo, I.; Pfluger, J.E.; Pal, K.; Wolverton, C.; Bergara, A.; Jiang, J.S.; Schoop, L.M.; Vergniory, M.G.; Mitchell, J.F.; Chung, D.Y.; Kanatzidis, M.G. North American Solid State Chemistry Conference, Golden, CO, August 2019 (Poster)
7. **Khoury, J.F.**; Rettie, A.J.E.; Pfluger, J.E.; Chung, D.Y.; Wolverton, C.; Kanatzidis, M.G. Gordon Research Conference on Solid State Chemistry, New London, NH, July 2018 (Poster)
8. **Khoury, J.F.**; Hao, S.; Stoumpos, C.C.; Yao, Z.; Malliakas, C.D.; Aydemir, U.; Slade, T.J.; Snyder, G.J.; Wolverton, C.; Kanatzidis, M.G. North American Solid State Chemistry Conference, Santa Barbara, CA, August 2017 (Poster)
9. **Khoury, J.F.**; Woodward, P.M. American Chemical Society National Meeting, Denver, CO, March 2015 (Poster)

Synergistic Activities

1. Teaching and Mentoring (2013 – present): Worked as a teaching assistant for general chemistry laboratory and recitation both as an undergraduate at The Ohio State University for one semester and at Northwestern University for four quarters. Responsible for groups of up to 25 students in laboratory and recitation by assisting them with experiments, administering quizzes and exams, and grading lab reports and assignments. Mentored 3 undergraduate students and 7 junior graduate students in the Kanatzidis lab, and initiated a new, previously unfunded research direction in the lab that resulted in a new NSF grant for future graduate students. Mentored 4 graduate students and 2 undergraduates in the Schoop lab, where I assisted with experiments, paper writing, and professional development.
2. Volunteer Scientific Outreach (2011 – 2020): Tutored high school students in chemistry and mathematics as an undergraduate at The Ohio State University from 2011 – 2015, and served as a tutor for general and organic chemistry for undergraduates during the same time period. As a Northwestern graduate student, served as a science outreach assistant for 4th grade elementary school students from 2015 – 2020, visiting Lincolnwood Elementary from 2015 – 2017 and Hayt Elementary from 2017 – 2020 as part of Science in the Classroom (SITC).
3. BIPmeister (2018 – 2019): Primary organizer for Basolo Ibers Pearson (BIP) chalk talk inorganic graduate seminar series. Responsible for recruiting speakers, organizing the agenda and calendar, and determining content choices for the series as a whole.
4. Hierarchical Materials Cluster Program Seminar Series Organizer (2017): Organized seminar series for awardees of the Hierarchical Materials Cluster Program (HMCP) fellowship in Materials Science and Engineering, setting the agenda and organizing speakers as well as compiling all presentations for future use.
5. PLU Member (2018 – 2020): Member of Northwestern's Chemistry Honor Society Phi Lambda Upsilon. Performed service acts such as distributing lab coats to undergraduates with financial need and assisting with choosing PLU seminar speakers.

Honors and Awards

Princeton University

Arnold O. Beckman Postdoctoral Fellowship 2021

Northwestern University

Hierarchical Materials Cluster Program Fellowship 2017

PLU Marple Schweitzer Travel Grant Award 2018

North American Solid State Chemistry Conference Poster Presentation Award 2019

The Ohio State University

Arts and Sciences Undergraduate Research Scholarship 2011

Ohio House of Science and Engineering (OHSE) Scholarship 2011

Gary A. Marconi Scholarship 2013

Gary Booth Scholarship 2014

ACS P3 Presidential Award 2015

Education and Experience

Arizona State University, School of Molecular Sciences, Tempe, AZ

Assistant Professor

2023 – present

Synthetic solid-state chemistry to discover new quantum materials with strongly interacting electrons. Understanding the link between crystal and electronic structure for quantum phase transitions and electronic instabilities. The group specializes in solid-state synthesis, crystal growth, X-ray crystallography, and physical property measurements (electronic transport, magnetism, thermal measurements, etc.).

Princeton University, Department of Chemistry, Princeton, NJ

Postdoctoral Research Advisor: Leslie M. Schoop

2020 - 2023

Utilizing hypervalent bonding to design correlated one-dimensional topological materials for quantum computing. Synthesized quantum materials via metal flux and chemical vapor transport, and performed electronic, thermal, and magnetic measurements to characterize their properties.

Northwestern University, Department of Chemistry, Evanston, IL

PhD Advisor: Mercuri G. Kanatzidis

2015 – 2020

Flux synthesis of subchalcogenide intermetallic materials for applications in superconductivity and topological behavior. Reaction methodology development of subvalent materials in indium flux. Electronic transport measurements including resistivity, hall effect, and magnetoresistance.

The Ohio State University, Department of Chemistry and Biochemistry, Columbus, OH

Undergraduate Advisor: Patrick M. Woodward

2011 – 2015

Synthesis and characterization of europium (III) doped perovskites for use as red phosphors. Synthesis and characterization of halide perovskites containing organic cations with semiconducting properties