

Philip Yox

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Education

Iowa State University, Ames, IA (2017-2022)
· Ph.D. Chemistry · Cumulative GPA: 3.61/4.0

Concordia University Nebraska, Seward, NE (2013-2017)
B.S. Chemistry & Physics · Cumulative GPA: 3.91/4.0

Research Experience

Graduate Thesis Research 2017-2022 · Iowa State University, Ames, IA · Thesis: *“Exploratory Synthesis of Extended Covalent Pnictide Frameworks”* · Advisors: Kirill Kovnir and Javier Vela

Developed synthetic skills pertaining to solid state chemistry while utilizing scattering techniques and electron microscopy for sample characterization. Frequent trips to synchrotron light sources for in-situ and high-resolution scattering experiments. Investigated transport properties for novel materials.

Chateaubriand Fellowship January - May 2020 · CNRS CRISMAT Caen, France · Advisor: O. I. Lebedev
Gained experience with transmission electron microscopy and analyzed complex electron diffraction patterns for structural studies of unconventional clathrates. Experience cut short by COVID-19.

Summer Undergraduate Research Scholar · NSF REU · May-August 2016 · University Nebraska Lincoln, Lincoln, NE · Advisor: Alexander Sinitskii
Investigated solution-phase exfoliation of layered material TiS_3 .

Publications

18. Medina Gonzalez, A.M.†; **Yox, P.** †; Chen, Y.; Adamson, M.; Rosales, B.; Svay, M.; Smith, E.; Schaller, R.; Wu, K.; Rossini, A.; Kovnir, K.; Vela, J. Solution grown ternary semiconductors: Nanostructuring and stereoelectronic lone pair distortions in I-V-VI₂ materials. (†equal contribution) *Chem. Mater.* **2022**, *Accepted*
17. **Yox, P.**; Porter, A.; Dorn, R.; Kyveryga, V.; Rossini, A.; Kovnir, K. Semiconducting silicon phosphorous frameworks for caging exotic polycations. *Chem. Commun.* **2022**, DOI: 10.1039/D2CC02304K.
16. Sarkar, A.; Viswanathan, G.; **Yox, P.**; Harycki, S.; Cerasoli, F.T.; Wang, J.; Perras, F.A.; Gundlach-Graham, A.; Donadio, D.; Kovnir, K. Evolution of Structure and Transport Properties of the $\text{Ba}_8\text{Cu}_{16}\text{P}_{30}$ Clathrate-I Framework with the Introduction of Ga. *Appl. Phys. Lett.* **2022**, 1120, 191901.
15. Akopov, G.; Hewage, N.W.; Viswanathan, G.; **Yox, P.**; Wu, K.; Kovnir, K. Non-Linear Optical Properties of the $(\text{RE})_3\text{CuGeS}_7$ Family of Compounds. *Z. Anorg. Allg. Chem.* **2022**, DOI: 10.1002/zaac.202200096.
14. Tener, Z.; Yannello, V.; Garlea, V.; Lapidus, S.; **Yox, P.**; Kovnir, K.; Stoian, S.; Shatruk, M. Evolution of Bonding and Magnetism via Changes in Valence Electron Count in $\text{CuFe}_{2-x}\text{Co}_x\text{Ge}_2$. *Inorg. Chem.* **2022**, 61, 4257-4269.
13. Akopov, G.; Viswanathan, G.; Hewage, N.; **Yox, P.**; Wu, K.; Kovnir, K. Pd and octahedra to not get along; Square planar $[\text{PdS}_4]$ units in non-centrosymmetric $\text{La}_6\text{PdSi}_2\text{S}_{14}$. *J. Alloys Compd.* **2022**, 902, 163756.
12. Adamson, M.; **Yox, P.**; Hernandez, T.; Wang, F.; Vela, J. Phase Evolution, Polymorphism, and Catalytic Activity of Nickel Dichalcogenide Nanocrystals. *Chem. Mater.* **2022**, 34, 2, 746-755.

11. **Yox, P.**; Lebedev, O.I.; Donadio, D.; Kovnir, K. Unprecedented superstructure in the type I family of clathrates. *Chem. Commun.* **2021**, 57, 13780-13783
10. Akopov, G.; Hewage, N.W.; **Yox, P.**; Viswanathan, G.; Lee, S.J.; Hulsebosch, L.P.; Cady, S.D.; Paterson, A.L.; Perras, F.A.; Xu, W.; Wu, K.; Mudryk, Y.; Kovnir, K. Synthesis-Enabled Exploration of Chiral and Polar Multivalent Quaternary Sulfides. *Chem. Sci.* **2021**, 12, 14718-14730.
9. Medina-Gonzalez, A. M.; **Yox, P.**; Chen, Y.; Adamson, M. A. S.; Svay, M.; Smith, E. A.; Schaller, R. D.; Rossini, A. J.; Vela, J. Ternary ACd₄P₃ (A = Na, K) Nanostructures via a Hydride Solution-Phase Route. *ACS Materials Au* **2021**, 1, 2, 130-139.
8. **Yox, P.**; Lee, S. J.; Wang, L.-L.; Kovnir, K. Crystal structure and properties of layered pnictides BaCuSi₂Pn₃ (Pn = P,As). *Inorg. Chem.* **2021**, 60, 8, 5627-5634
7. Lee, S.; Carnahan, S.; Akopov, G.; **Yox, P.**; Wang, L.-L.; Rossini, A.; Wu, K.; Kovnir, K. Noncentrosymmetric Tetrel Pnictides RuSi₄P₄ and IrSi₃P₃: Nonlinear Optical Materials with Outstanding Laser Damage Threshold. *Adv. Funct. Mater.* **2021**, 2010293.
6. Owens-Baird, B.; **Yox, P.**; Lee, S. J.; Carroll, X. B.; Grass Wang, S.; Chen, Y.-S.; Lebedev, O. I.; Kovnir, K. Chemically Driven Superstructural Ordering Leading to Giant Unit Cells in Unconventional Clathrates Cs₈Tl₁₈Sb₂₈ and Cs₈Cd₁₈Sb₂₈. *Chem. Sci.* **2020**, 11, 10255-10264
5. Mark, J.; McBride, B.; Lee, S.; **Yox, P.**; Kovnir, K. Synthesis, crystal growth, and transport properties of van-der-Waals tetrel pnictide GeAs₂. *ACS Appl. Energy Mater.* **2020**, 3, 4168-4172
4. Wang, J.; **Yox, P.**; Kovnir, K. Flux Growth of Phosphide and Arsenide Crystals. *Front. Chem.* **2020**, 8, 186
3. Daniels, C. L.; Knobloch, M.; **Yox, P.**; Adamson, M. A. S.; Chen, Y.; Dorn, R. W.; Wu, H.; Zhou, G.; Fan, H.; Rossini, A. J.; Vela, J. Intermetallic Nanocatalysts from Heterobimetallic Group 10-14 Pyridine-2-Thiolate Precursors. *Organometallics* **2020**, 39, 7, 1092-1104
2. Owens-Baird, B.; Xu, J.; Petrovykh, D.Y.; Bondarchuk, O.; Ziouani, Y.; Gonzalez-Ballesteros, N.; **Yox, P.**; Sapountzi, F.M.; Niemantsverdriet, H.; Kolen'ko, Yu.V.; Kovnir, K. NiP₂: A Story of Two Divergent Polymorphic Multifunctional Materials. *Chem. Mater.* **2019**, 31, 3407-3418.
1. Wang, J.; **Yox, P.**; Voyles, J.; Kovnir, K. Synthesis, Crystal Structure, and Properties of Three La-Zn-P Compounds with Different Dimensionality of Zn-P Framework. *Cryst. Growth & Design.* **2018**, 18, 4076-4083.

Honors/Awards

ISU Research Excellence, Iowa State University, 2022
 Frank J. Moore and Thoreen Beth Moore Fellowship, Iowa State University 2020, 2021
 Chateaubriand Fellowship 2019
 Teaching Excellence Award, Iowa State University, 2019
 Sleight Graduate Fellowship, Iowa State University, 2019
 High Distinction Graduate, Concordia University, 2017
 Outstanding Lab Assistant, Concordia University, 2017
 Tennis Scholar Athlete, 2015-2016
 Term honors List, Concordia University
 Freshman Chemistry Student of the Year, Concordia University, 2014
 Chemistry/Natural Sciences Scholarship, Concordia University, 2016
 East Texas Communities Foundation Chemistry Scholarship, 2013

Conferences, Presentations, and Workshops

Poster - Gordon Research Conference, Solid-State Chemistry 2022 "Solution synthesis and structure of I-VI₂ semiconductors" July 24-29 2022
Talk - American Chemical Society Spring 2022 "Structure and properties of I-V-VI₂ semiconducting nanocrystals" March 2022
Poster - North American Solid State Chemistry Conference 2021 "Complex Superstructural Ordering in Type I Clathrates Ba₈M₁₆As₃₀ (M = Cu, Au)" July 29, 2021
Talk - Virtual Conference on Thermoelectrics 2020 "Synthesis, crystal structure, and transport properties of two polymorphs of Ba₈Cu₁₆As₃₀ clathrate" July 21, 2020

National Neutron and X-ray Scattering School (virtual) 2020

Poster · Mid-West Regional Meeting (ACS), Iowa State University, Ames IA 2018

"Synthesis of Zn_8Sb_7 : A coveted thermoelectric" October 23, 2018