# Northwestern McCORMICK SCHOOL OF ENGINEERING

# Surfaces & Interfaces in Quantum Materials

Matthew Cheng, Yea-Shine Lee, Dr. Arslan Shehzad, Dr. Paul Masih Das, Dr. Roberto dos Reis Collaborators: Profs. M. Kanatzidis, C. Wolverton, M. Hersam, K. Aydin, N. Stern, V. Chandrasekhar



Complex Nanoparticle Systems Structural evolution of multicomponent metal oxide Carolin Wahl, Liban Jibril, Dr. Xiaobing Hu, Dr. Roberto dos Reis nanocrystals in polymer nanoreactors Collaborators: Prof C. Mirkin, C. Wolverton



Department of Materials Science & Engineering

Chen, P.-C., Du, J.S. et al. J. Am. Chem. Soc. 2017, 139.

# Dravid Research Group Atomic and Nanoscale Phenomena in Advanced Materials

## Heteroanionic Materials Chi Zhang, Dr. Roberto dos Reis

Collaborators: Profs. K. Poeppelmeier, S. Haile, M. Kanatzidis, J. Rondinelli, T. Marks • Understand, design, and tune heteroanionic materials for wide applications • S/TEM techniques used to study the structure of new compounds, determine the distribution and degree of order-disorder of two or more anions, and identify the positions of anions with atomic precision EELS techniques used for elemental analysis, particularly for light anions  $\bullet \bullet \bullet \times 100 \bullet$ . . . . . 2 nm TEM images and EELS analysis of Mo-N-O particles **HRSTEM** images of BiAgOSe



- & Company UNIVERSITY OF CALIFORNIA SANTA CRUZ Argonne A NATIONAL LABORATORY Alumni: 45 PhD graduates with PennState McKinsey a variety of placements including: **Current:** 11 PhD students, including 4 co-advised with Professors C. Mirkin, V. Backman, E. Scott, and K. Poeppelmeier **Research:** h-index: 107; over two dozen patents, including light-induced gas sensors, theranostic nanoparticles, and nanolithography **Synergy:** Developed NUANCE and SHyNE centers; ability to work closely with dozens of talented research scientists Outreach: Group members participate in and serve on the boards of a number of outreach activities, including GradSWE, BGSA, Junior Science Club, Letters to a Pre-Scientist, SHIP, MatSAIC, and MSSA; NSF-NNCI National Leadership; Chicago Area Museums **Education:** Course and curriculum development; hands-on labs as the norm; >1200 graduated microscopy students



Hierarchically Architectured Thermoelectrics Dr. Songting Cai, Yukun Liu, Dr. Roberto dos Reis

Collaborators: Profs. M. Kanatzidis, C. Wolverton, J. Snyder

Optimize thermoelectric performance via all-length-scale microstructural architecture • S/TEM analysis to elucidate underlying principles of their formation and properties





## Materials for Energy & the Environment



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