WPI CHEMISTRY & BIOCHEMISTRY

Department of Chemistry and Biochemistry
Worcester Polytechnic Institute

Wednesday, April 1st, 2026
12:00 PM
Gateway Park 1002

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"Magnetic Lanthanide Polychalcogenides: Growing Nanocrystals in 2-Dimensions."

Inspired by novel magnetic behavior observed in atomically thin 2-dimensional nanosheets, we have synthesized and characterized three classes of lanthanide chalcogenide nanosheets. The first class, the $LnTe_3$ (Ln = lanthanide) are Van der Waals antiferromagnets. Identifying reactive tellurium reagents was key to this synthesis, and solution conditions could be tailored control nanosheet thickness to <10 nm thick. The second class, the $LnSe_2$ materials were prepared using single source precursors: $Ln(Se_2PPh_2)_3Phen$ (Ph = phenyl, Phen = phenanthroline) and trivalent lanthanides (Ln). Because the nanosheets tended to stack, this was an ideal system to investigate growth mechanisms using Transmission Electron Microscopy. Finally, we have developed a synthesis for $EuSe_2$ a metastable, and metamagnetic material with divalent europium. Metamagnetism occurs when materials exhibit antiferromagnetism at low magnetic fields and becomes ferromagnetic at higher fields. This work is the first example in which anisotropic magnetism was demonstrated for nanosheet powders.

Host: Dr. Bruce Bursten