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Crystal structure, Magnetic, and Anomalous Schottky Specific Heat of Rare Earth Dialuminides[1] ARJUN PATHAK, KARL A. GSCHNEIDNER, JR., VITALIJ PECHARSKY, The Ames Laboratory, U.S. Department of Energy, Iowa State University, Ames, Iowa 50011, USA — Materials with structural transformations or distortions coupled to magnetic transitions show interesting magnetostrictive, magnetoresistive, and magnetocaloric behavior and are, therefore, important subject of study in condensed matter physics. The importance of either coupled or decoupled magnetostructural transformations has been shown for many materials starting from high temperature superconductors and perovskites to multifunctional intermetallics. The anomalies close to 0 K encompass another playground for the fundamental physics, and they range from the Kondo effect and heavy fermion behavior to quantum criticality and nuclear Schottky specific heat. These remarkable behaviors are ultimately related to the interplay between localized and delocalized electrons, for which lanthanides are truly the best model provided by nature. In particular, the rare earth dialuminides, which have simple cubic Laves phase structure at room temperature have long been the system of choice to understand the fundamentals of rare earth magnetism and low temperature anomalies. In this presentation, we will discuss the low temperature crystal structure, magnetic and thermodynamic properties of binary and pseudobinary rare earth dialuminides by means of low temperature x-ray diffraction, magnetization and heat capacity measurements.

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