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Structure and Magnetic Interactions in FeS: A low-T_c superconductor S. J. KUHN, University of Notre Dame and Oak Ridge National Laboratory , M. R. ESKILDSEN, University of Notre Dame, L. DEBEER-SCHMITT, L. LI, C. DE LA CRUZ, A. S. SEFAT, Oak Ridge National Laboratory (ORNL) — Tetragonal-phase iron sulfide (FeS), with the same structure as the well-known superconductor FeSe ($T_c \sim 8$ K), was recently discovered as a superconductor with a T_c of ~ 5 K [1]. Although it has been difficult to synthesize this binary in pure tetragonal, crystalline, and superconducting form by various methods (e.g.[2]), the simple low-temperature hydrothermal method yields pure FeS products. Careful composition and particle size analyses, in addition to the results of neutron diffraction and magnetization across transition temperature(s), will be presented. Preliminary results show high sensitivity of pure products to synthesis procedure, particle sizes of $\sim$40 nm, and phase transitions in addition to T_c. We explain reasons for superconductivity. [1]Lai, X. et al, Jour. Amer. Chem. Soc, 137. 10148 (2015). [2] Sines, I. T. et al. Jour. Sol. Stat. Chem, 196. 17 (2012). The work of AS, LL, and SJK is supported by the U.S. Department of Energy (DOE), Office of Science, Basic Energy Sciences (BES); SJK is supported by the DOE, Office of Science Graduate Student Research (SCGSR) Award. MRE is funded by the Office of BES (DE-FG02-10ER46783). The work at ORNLs High Flux Isotope Reactor (HFIR) was sponsored by the Scientific User Facilities Div., BES (LDS, CC)

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