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Collapsed tetragonal phase in $SrCo_2As_2$ under high pressure W.T. JAYASEKARA, B.G. UELAND, A. KREYSSIG, ABHISHEK PANDEY, N.S. SANGEETHA, Ames Laboratory U.S. DOE and Department of Physics and Astronomy, Iowa State University, Ames, Iowa 50011, USA, G. FABBRIS, YEJUN FENG, D. HASKEL, Advanced Photon Source, Argonne National Laboratory, Argonne, Illinois 60439, USA, D.C. JOHNSTON, A.I. GOLDMAN, Ames Laboratory U.S. DOE and Department of Physics and Astronomy, Iowa State University, Ames, Iowa 50011, USA — $SrCo_2As_2$ possesses the same tetragonal $ThCr_2Si_2$ structure as the $A Fe_2As_2$ (A = Ca, Sr, Ba) family of high-temperature superconductors but does not manifest magnetic order or superconductivity down to a temperature of 1.8 K. Nevertheless, inelastic neutron scattering data show the presence of magnetic fluctuations peaked at a wavevector of (1/2 1/2 1), which corresponds to the stripe antiferromagnetic propagation vector found for $A Fe_2As_2$. Here, we present evidence from high-energy x-ray diffraction experiments which show that $SrCo_2As_2$ undergoes a transition to a collapsed-tetragonal phase characterized by a 10% reduction of the c-lattice parameter for an applied pressure of 5 GPa at 7 K. This fascinating result opens another path for studying the role of magnetic ordering, spin fluctuations, and magnetoelastic coupling in the development of superconductivity in the Fe-pnictides and related materials. – Work at Ames Laboratory was supported by US DOE, Office of Basic Energy Sciences, Division of Materials Sciences and Engineering under Contract No. DE-AC02-07CH11358. This research used resources of the Advanced Photon Source, a US DOE, Office of Science User Facility.

Wageesha T. Jayasekara
Ames Laboratory / Iowa State University

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