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Lattice Distortion and Magnetic Order in $Ca_{10}(Fe_2As_2)_5(Pt_3As_8)^1$ AASHISH SAPKOTA, GREGORY S. TUCKER, MEHMET RAMAZANOGLU, Ames Laboratory, Dept. of Physics and Astronomy, Iowa State University, WEI TIAN, Oak Ridge National Laboratory (High Flux Isotope Reactor), NI NI, University of California, Los Angeles, ALAN I. GOLDMAN, ROBERT J. MCQUEENEY, ANDREAS KREYSSIG, Ames Laboratory, Dept. of Physics and Astronomy, Iowa State University — The $Ca_{10}(Fe_2As_2)_5(Pt_3As_8)$ compound is a member of the Febased high-temperature superconductor family. Recent work showed that this compound has a complex chemical structure with a skutterudite-type Pt-As intermediary layer sandwiched between tetrahedral Fe-As layers. We have studied the structural and magnetic properties of $Ca_{10}(Fe_2As_2)_5(Pt_3As_8)$ by single-crystal x-ray and neutron diffraction. Similar to other compounds in the iron arsenide family, we observed a lattice distortion from tetragonal to orthorhombic symmetry below approximately 110 K and stripe-like antiferromagnetic order below approximately 100 K. Both phase transitions are 2nd order in nature. The magnetic order and lattice distortion in the iron arsenides appear to be robust against deviations from simple structure motifs.

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