Abstract Submitted
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Tetragonal-to-orthorhombic lattice distortion and domains in $Ca(Fe_{1-x}Co_x)_2As_2$ single crystals A. KREYSSIG, E.C. BLOMBERG, G.S. TUCKER, A. SAPKOTA, S. RAN, S.L. BUD'KO, P.C. CANFIELD, M.A. TANATAR, R. PROZOROV, A.I. GOLDMAN, Ames Laboratory US DOE, Department of Physics and Astronomy, Iowa State University — Similarly to other Fe-based pnictide superconductors, $Ca(Fe_{1-x}Co_x)_2As_2$ single crystals show a tetragonal-to-orthorhombic lattice distortion that is suppressed with increasing Co concentration. However, in contrast to other Fe-based pnictide superconductors, an unprecedented 45° rotation of the domain patterns in polarized-light microscopic studies has been observed for Co concentrations $x \approx 0.2$ at temperatures around the onset of antiferromagnetic order and lattice distortion. We present a high-resolution high-energy x-ray diffraction study demonstrating that the observed change in domain arrangement is related to the coexistence of the tetragonal and orthorhombic phases in a well-defined geometric configuration allowed by a special relationship between the lattice parameters of both phases in these compounds.

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