Abstract Submitted
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Effects of Co substitution on thermodynamic and transport properties and anisotropic H_{c2} in $Ba(Fe_{1-x}Co_x)_2As_2$.[1] NI NI, M. E. TILLMAN, J-Q. YAN, A. KRACHER, S. L. BUD'KO, P. C. CANFIELD, Ames Lab / Iowa State University, S. T. HANNAHS, NHMFL, Tallahassee — Single crystal samples of $Ba(Fe_{1-x}Co_x)_2As_2$, x< 0.12, have been characterized by microscopic, thermodynamic and transport measurements. With increasing Co concentration, the features of the structural and magnetic transitions are suppressed at a rate of roughly 15K per percent of Co. Superconductivity is stabilized at low temperatures for 0.038 $\leq$x and up through our highest doping level of x = 0.114. The superconducting region has a dome like appearance with maximum T_c values ($\sim$ 23 K) found near x $\sim$ 0.07. The T – x phase diagram shows that either the existence of superconductivity in both the tetragonal and the orthorhombic (AFM) phase or there is a structural phase separation. Anisotropic H_{c2} data clearly show that the superconductivity which occurs in samples that show features associated with the transition to the low temperature orthorhombic state is 50% smaller than that found in samples that remain in the tetragonal phase. These data show that the superconductivity is sensitive to the suppression of the higher temperature phase transition.

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