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Coexistence of superconductivity and ferromagnetism in $\mathbf{BaFe_{1.8}Co_{0.2}As_2}$ MARIO S. DA LUZ, Montana State Univerty, R. K. BOLLINGER, Montana State University, J. J. NEUMEIER, Montana State Univerty, A. SEFAT, M. A. MCGUIRE, R. JIN, B. C. SALES, D. MANDRUS, Oak Ridge National Laboratory — Thermal expansion and heat capacity measurements were performed on three single crystals of $BaFe_{1.8}Co_{0.2}As_2$ with superconducting transition temperatures T_c = 16.5, 19, and 22 K . The thermal expansion coefficients μ_i (i = a and c axis) are highly anisotropic. Magnetization measurements reveal the presence of ferromagnetism at the same transition temperature as superconductivity in some of the samples. The ferromagnetism has a small moment on the order of 0.5x10^{-3} μ_B/Fe (μ_B is the Bohr magneton). Thus, two phases: superconductivity and magnetism coexist in some $BaFe_{1.8}Co_{0.2}As_2$ samples. This ferromagnetism could be associated with a canted (non- collinear) antiferromagnetic order. This material is based upon work supported by the U. S. Department of Energy (DE-FG02-07ER46269) and the National Science Foundation (DMR-050476 and DMR-0552458).

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