Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Variation of transition temperatures and residual resistivity ratio in vapor-grown FeSe and Fe(Se,S)[1] A. E. BÖHMER, Ames Laboratory/Iowa State University, V. TAUFOUR, UC Davis, L. XIANG, U. S. KALUARACHCHI, M. A. TANATAR, B. G. UELAND, A. KREYSSIG, W. E. STRASZHEIM, Ames Laboratory/Iowa State University, T. WOLF, IFP, Karlsruhe Institute of Technology, R. PROZOROV, A. I. GOLDMAN, S. L. BUD'KO, P. C. CANFIELD, Ames Laboratory/Iowa State University — We report on the vapor growth and physical properties of single-crystalline FeSe and Fe(Se,S). Significant variations of sample morphology resulting from slight modifications of the growth conditions are observed. The superconducting transition temperature, T_c, of different FeSe samples varies between 8.8 K and 3 K, and the structural transition temperature, T_s, varies between 90 K and 72 K, respectively. We find that those variations cannot be correlated with the sample composition, measured by WDS. Instead, we point out a clear correlation between T_s, T_c and disorder, as measured by the residual resistivity ratio. Notably, T_s and T_c are linearly correlated with each other[2]. On the other hand, a small amount of sulfur-substitution suppresses T_s but enhances T_c. We will compare and discuss the effects of various perturbations—disorder, chemical substitution and hydrostatic pressure—on the transition temperatures and properties of FeSe.

[1]Supported by the USDOE/Office of Science BES Materials Science and Engineering Division under contract DE-AC02-07CH11358.
[2]Böhmer et al., PRB 94, 024526 (2016).

A. E. Böhmer
Ames Laboratory/Iowa State University

Date submitted: 11 Nov 2016 Electronic form version 1.4