

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

High Pressure Superconductivity and Amorphization in Iron Chalcogen $\text{Fe}(\text{Se}_{0.5}\text{Te}_{0.5})$ to 70 GPa¹ A.K. STEMSHORN, G.M. TSOI, Y.K. VOHRA, University of Alabama at Birmingham (UAB), S.T. WEIR, Lawrence Livermore National Laboratory (LLNL) — Superconductivity and structural phase transitions in Iron-based layered superconductor $\text{Fe}(\text{Se}_{0.5}\text{Te}_{0.5})$ has been studied to high pressures of 70 GPa and temperature of 10 K using designer diamond anvils and x-ray diffraction using a synchrotron source. Four probe electrical resistance measurements show onset of superconductivity (T_c) at 14 K at ambient pressure with T_c increasing with increasing pressure to 19 K at a pressure of 3.6 GPa. At higher pressures beyond 3.6 GPa, T_c decreases and extrapolation suggests non superconducting behavior above 10 GPa. X-ray diffraction studies at room temperature show transformation from ambient pressure tetragonal phase to an amorphous phase above 11 GPa and the amorphous phase remains stable till the highest pressure of 70 GPa. The amorphous phase is observed to revert back to the parent tetragonal PbO structure upon decreasing pressure.

¹We acknowledge support from DOE Grant No. DE-FG52-10NA29660 and Department of Education Grant No. P200A090143.

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Date submitted: 18 Nov 2009

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