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$Rb_xFe_2Se_2$: A study of superconductivity under high pressure MELISSA GOOCH, BING LV, LIANGZI DENG, Dept. of Physics at the University of Houston and TcSUH, TAKAKI MURAMATSU, Geophysical Laboratory, Carnegie Institution of Washington, JIM MEEN, Dept. of Chemistry at the University of Houston and TcSUH, YUYI XUE, BERND LORENZ, Dept. of Physics at the University of Houston and TcSUH, CHING-WU CHU, Dept. of Physics at the University of Houston and TcSUH; Lawrence Berkeley National Laboratory — Superconductivity was reported in $Rb_xFe_2Se_2$ in early 2011, after the discovery of similar Fe-based chalcogenides, $K_xFe_2Se_2$ and $Cs_xFe_2Se_2$ in December 2010. These Fe-based chalcogenides have similar structures to the iron pnictides, with a superconducting transition of approximately 30 K. Here we report the results of the physical characterization and the subsequent high-pressure study on two samples with slightly different compositions of $Rb_xFe_2Se_2$. From resistivity measurements, $Rb_{0.93(2)}Fe_{1.70(2)}Se_2$ (sample A) was found to be superconducting and $Rb_{0.90(1)}Fe_{1.78(1)}Se_2$ (sample B) was found to be semiconducting. Further sample characterization was conducted through magnetic and thermoelectric power measurements, which support the initial resistivity findings. High pressure resistivity measurements were conducted with a BeCu clamp cell up to approximately 1.8 GPa. Initially, the Tc of sample A increases slightly until p reaches $\sim$ 1GPa. However, at further increasing pressure, T_c starts to decrease and superconductivity is completely suppressed at about 6 GPa. Sample B was not found to be superconducting up to 1.8 GPa.

Melissa Gooch
Dept. of Physics at the University of Houston and TcSUH

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