

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Anisotropic structural and magnetic properties of the field-aligned superconducting system $\text{SmFeAsO}_{1-x}\text{F}_x$ ($x = 0.05, 0.1, 0.2, 0.25,$ and 0.3)¹ Y.B. YOU, J.W. WANG, M.F. TAI, H.C. KU, Dept. of Physics, National Tsing Hua University, Hsinchu, Taiwan, Y.Y. HSU, Dept. of Physics, National Taiwan Normal University, Taipei, Taiwan — Anisotropic structural and magnetic properties of the field-aligned superconducting system $\text{SmFeAsO}_{1-x}\text{F}_x$ ($x = 0.05, 0.1, 0.2, 0.25, 0.3$) are reported. Due to the Fe spin-orbital related anisotropic exchange coupling, all the tetragonal microcrystalline powders in epoxy were aligned at room temperature using the field-rotation method where the tetragonal ab -plane is parallel to the magnetic alignment field B_a of 0.9 T and the c -axis parallels to the rotating axis. Anisotropic magnetic properties are studied through low temperature magnetic measurements along the c -axis and paralleled to the ab -plane of aligned samples in both ZFC and FC modes. The under-doped compound ($x = 0.1$) is not superconducting with an antiferromagnetic Néel temperature $T_N \sim 40\text{K}$, while the two optimum-doped compounds ($x = 0.2$ and 0.25) show high superconducting transition temperatures T_c of 49K and 50K, respectively. The variation of anisotropic structural and magnetic properties for this system are discussed and compared with the previously reported 52 K anisotropic superconductor $\text{Sm}_{0.95}\text{La}_{0.05}\text{FeAsO}_{0.85}\text{F}_{0.15}$.

¹This work was supported by NSC98-2112-M-007-013-MY3.

H. C. Ku
Dept. of Physics, National Tsing Hua University, Hsinchu, Taiwan

Date submitted: 29 Nov 2010

Electronic form version 1.4