Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Growth conditions for pulsed laser deposited $FeTeO_y$ superconducting thin films and observation of a low temperature structural transition[1] LAHIRU NARANGAMMANA, University of Connecticut, Storrs, CT, YUEFENG NIE, Cornell University, Ithaca, NY, JOSEPH BUDNICK, University of Connecticut, Storrs, CT, XUERONG LIU, JOHN HILL, GENDA GU, Brookhaven National Laboratory, Upton, NY, CHRISTOF NIEDERMAYER, Paul Scherrer Institut Villigen, PSI, Switzerland, BARRETT WELLS, University of Connecticut, Storrs, CT — FeTe thin films were grown by pulsed laser deposition and oxygen was incorporated to make superconducting $FeTeO_y$. The Te concentration of the films was highly dependent on growth temperature, due to the evaporation of Te at higher temperatures. Films grown using a porous, unreacted Fe/Te target showed islanding, an open structure, and a strong c axis texture. Oxygen could be easily added or removed by low temperature anneals. Films grown using a dense, polycrystalline conglomerate for a target and a short target-substrate distance had better epitaxy, and were dense, continuous and smooth. Post processing of oxygen on these films was difficult, but we were able to control oxygen concentration during growth using a small oxygen partial pressure. Initial low temperature diffraction studies of these films using both x-rays and neutrons indicate a sudden change in c axis lattice parameter at the superconducting T_C, but continued exposure of the beam drives out oxygen. Dense epitaxial films should allow for studying this phase change.

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[1]Supported by DOE through contact # DE-FG02-08ER46801 (Uconn)

Date submitted: 22 Nov 2011 Electronic form version 1.4