Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Angular dependence of magnetization in single crystalline cobalt nanowires KINJAL GANDHA, KEVIN ELKINS, NARAYAN POUDYAL, J. PING LIU, University of Texas at Arlington — In this work, the magnetization behavior of Co nanowires has been investigated by applying the Stoner-Wohlfarth model. The single crystalline cobalt nanowires with a diameter of about 15 nm and a mean length of 200 nm were synthesized via a solvothermal chemical process that have high coercivity up to 12.5 kOe. It is found that the c-axis (002) or the easy magnetization direction of the single-crystalline wires is along the long axis of the nanowires. Particular attention has been paid to the angular dependence of magnetic properties on the applied magnetic field orientation with respect to the c-axis. The angular dependence of coercivity has been modeled and it was revealed that the coherent mode rotation gives the best fitting with the experimental observations. In addition, surface oxidized Co nanowires have also been studied that provided us a unique opportunity to understand the exchange bias in the aligned Co/CoO core-shell nanostructures. Ferromagnetic nanowires of this type are ideal building blocks for future bonded, consolidated and thin film magnets with high energy density and high thermal stability.

Kinjal Gandha
University of Texas at Arlington

Date submitted: 05 Nov 2015 Electronic form version 1.4