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Perpendicular Anisotropy in Cobalt-nanodots on Rutile TiO2(110)[1] N. WIDJAJA, University of Tennessee, JIANDI ZHANG, Florida International University, C.G. ZHOU, ORNL, MINGHU PAN, University of Tennessee and ORNL, E.W. PLUMMER, University of Tennessee, J. SHEN, ORNL —
We report the structural and magnetic properties of self-assembled Co-nanodots on rutile TiO_2(110) substrates. Co-dots with different coverage density were prepared inside a UHV chamber (base pressure $< 1x10^{-10}$ Torr) by thermally evaporating Co-source on the well ordered rutile TiO_2(110) surface. The size of the Co-dots can be tuned by changing the coverage density and the dose rate of Co independently. The in-situ STM imaging indicates that the size of the Co-dots ranges from 0.5 nm to 1 nm. The magnetization of the systems was measured ex-situ using a Quantum Design SQUID magnetometer after they were capped with NaCl. The magnetization as a function of field measured at various temperatures for $2<T<250$K reveals significant perpendicular anisotropy. The origin of the anisotropy is explained in terms of the competition between magnetocrystalline anisotropy and shape anisotropy of the nanodots.

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