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A study of the magnetic hysteresis of a single magnetic element using a sensitive microcantilever torque magnetometer[1] L. GAO, L. YUAN, K.H.P. KIM, S.H. LIOU, University of Nebraska, Lincoln, NE 68588, M.D. CHABOT, University of San Diego, San Diego, CA 92110, D.H. MIN, J.M. MORELAND, National Institute of Standards and Technology, Boulder, CO 80305
— A sensitive microcantilever torque magnetometer (MTM) has been developed for measuring the magnetic properties of nanomagnets. The sensitivity of the technique at room temperature in air was demonstrated by the successful measurement of the magnetization switching of a single micronmeter sized $Ni_{80}Fe_{20}$element. The permalloy dot has a size of 1.5 μm in diameter and 30 nm in thickness with a moment of 5.5×10^{-11} emu. The sensitivity of our current MTM instrument can be estimated as 10^{-12} emu, which is about three orders better than commercial SQUID. The hysteresis loop indicates that the switching process of the element is dominated by the domain wall propagation through the element gradually.

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