

Abstract Submitted
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Detection of Bottom Electrode Oxidation in Magnetic Tunnel Junctions via Exchange Bias Effect¹ WEI CHEN, Department of Physics, University of Virginia, NAM DAO, KEVIN WEST, DAVID KIRKWOOD, JIWEI LU, STUART WOLF, Department of Materials Science and Engineering, University of Virginia, NANOSTAR TEAM — The oxidation of the bottom ferromagnetic (FM) electrode in a magnetic tunnel junction (MTJ) is detrimental for high tunneling magnetoresistance (TMR). This has long been a tricky problem for the fabrication of MTJs. We propose a method to detect such oxidation by measuring the exchange bias effect from the CoO/FM system if the FM surface is oxidized and CoO is formed. Along with the moderate exchange bias even more significant training effect and increased FM coercivity are observed at low temperature that depend on the oxidation level. All of these effects help in the detection of the FM surface oxidation. MTJs with MgO and vanadium oxide as tunnel barrier candidates are tested by this technique with the purpose of optimizing the barrier quality for best TMR performance.

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