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**Magnetic anisotropy modulation in $Fe_3O_4/BaTiO_3(100)$ epitaxial structures** C.A.F. VAZ, J. HOFFMAN, A. POSADAS, C.H. AHN, Department of Applied Physics and Center for Research on Interface Structures and Phenomena, Yale University, New Haven, CT 06520 — Renewed interest in 'classical' ferroic materials has been accompanied by the study of a new class of multiferroic composite materials, based on magnetic and dielectric multilayer structures. One motivation is the search for materials that allow independent control of both the magnetic and electric properties. In this context, we investigate the modulation of the magnetic anisotropy of a 10 nm magnetite ($Fe_3O_4$) film grown epitaxially by off-axis magnetron sputtering on (001)$BaTiO_3$ (BTO). SQUID and magnetoresistance measurements as a function of temperature show a series of discontinuities that are attributed to changes in the strain of the magnetite film via elastic coupling with the substrate, as the latter undergoes a series of structural phase transitions. Magnetic hysteresis loops carried out at temperatures above and below each transformation in the BTO elucidate the variation of the effective anisotropy of the $Fe_3O_4$ film. The possibility of using the piezoelectric response of BTO to modulate the magnetic anisotropy of magnetite films is discussed.

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