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Microstructural, magnetic anisotropy, and magnetic domain structure correlations in $L1_0$ FePd thin films J. R. SKUZA, C. CLAVERO, College of William and Mary, B. WINCHESKI, NASA Langley Research Center, W. CHEN, University of Virginia, O. AMPONSAH, N. NOGINOVA, Norfolk State University, R. A. LUKASZEW, College of William and Mary — Understanding microstructural, magnetic anisotropy, and magnetic domain structure correlations in materials with large perpendicular magnetic anisotropy (PMA) is of fundamental interest and it is also important in many technological applications such as next generation magneto-recording media and spin-transfer torque devices. $L1_0$ ordered phases in some binary alloys (FePd, FePt, MnAl) have PMA due to chemical ordering that can be controlled with adequate thin film deposition parameters. A detailed study on epitaxial FePd thin films grown by dc magnetron sputter deposition on MgO(001) substrates will be presented. XRD, MFM, SQUID magnetometry, and FMR were used to investigate structure-property correlations in these films. A quantitative analysis and correlation of the strong PMA to magnetic domain structure in these FePd thin films was accomplished with good agreement using an analytical energy model[1] and builds on previous work that had only correlated magnetic domain structure with film thickness.[2],[3] [1] C. Kooy and U. Enz, Philips Res. Reports **15**, 7 (1960). [2] V. Gehanno *et al.*, J. Magn. Magn. Mater. **172**, 26 (1997). [3] V. Gehanno *et al.*, Phys. Rev. B **55**, 12552 (1997).

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