

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Using multiple antiferromagnet/ferromagnet interfaces as a probe of grain size dependent exchange bias in polycrystalline Co/Fe<sub>50</sub>Mn<sub>50</sub>**<sup>1</sup> B. BOLON, M.A. HAUGEN, A. ABIN-FUENTES, J. DENEEN, C.B. CARTER, C. LEIGHTON, Dept. of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, MN 55455 — We have used ferromagnet/antiferromagnet/ferromagnet trilayers and ferromagnet/antiferromagnet multilayers to probe the grain size dependence of exchange bias in polycrystalline Co/FeMn. X-ray diffraction and transmission electron microscopy characterization show that the FeMn grain size increases with increasing FeMn thickness in the Co (30 Å) / FeMn system. Hence, in Co (30 Å) / FeMn / Co (30 Å) trilayers the two Co layers “sample” different FeMn grain sizes at the two antiferromagnet/ferromagnet interfaces. For FeMn thicknesses above  $\sim 100$  Å, where simple bilayers have a thickness independent exchange bias, we are therefore able to deduce the influence of grain size on the exchange bias and coercivity (and their temperature dependence) by measuring trilayer and multilayer samples with varying FeMn thickness. Increasing the average grain size results in a large decrease in exchange bias energy. We interpret the results as being due to a decrease in uncompensated spin density with increasing grain size, further evidence for the importance of defect generated uncompensated spins.

<sup>1</sup>Work supported by NSF MRSEC.

B. Bolon  
University of Minnesota

Date submitted: 29 Nov 2005

Electronic form version 1.4