

Abstract Submitted  
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**High-Efficiency Magnetization Measurements of Variable Composition Co-Fe-Ni Alloys with a Scanning Hall Probe Microscope** GIRFAN SHAMSUTDINOV, DEBABRATA MISHRA, BORIS NADGORNY, Department of Physics and Astronomy, Wayne State University, Detroit, MI 48201, ZHAO PENG, Department of Physics, Ohio State University, Columbus, OH 43210, JI-CHENG ZHAO, Department of Materials Science and Engineering, Ohio State University Columbus, OH 43210 — A Scanning Hall Probe Microscope with a submicron scale Hall probe (HP) was used for high efficiency measurements of magnetic properties of a Co-Fe diffusion couples. This Co-Fe couple is an assembly of two metal blocks, which were placed in intimate contact and then exposed to high temperature to allow thermal interdiffusion to create solid-solution with a composition varying gradually from pure Fe to pure Co. The change in the magnetic field in the vicinity of this variable composition Fe-Co alloy with the width of approximately 400 microns was measured continuously as the HP was scanned across the interdiffusion region. Using a simple model we then determined the corresponding saturation magnetizations of Co-Fe alloy. The values of the saturation magnetization were found to be in good agreement with the known values for pure Fe and Co. The composition variation along the scan line was measured independently using Energy Dispersive X-ray Spectroscopy (EDS). Similar measurements were performed for the Fe-Ni and Co-Ni interfaces. This study demonstrates that Scanning Hall microscopy can be used for high efficiency and high accuracy measurements of saturation magnetization in variable composition alloys.

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