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X-Ray Characterization of Electrodeposited Alloy Thin Films[1]

NICHOLAS WOZNIAK, DANIEL MCNEEL, ALYSSA FREY[2], JENNIFER HAMPTON, Hope College — Particle-Induced X-ray Emission (PIXE) was used to measure the composition of electrodeposited NiFe and NiFeCu thin films. The thin films were deposited on gold-plated silicon wafers, and PIXE spectra were analyzed to obtain the Ni, Fe, Cu, and Au content in each sample. By comparing the Ni, Fe, and Cu content in a sample to the Au content in the same sample, the relative amounts of deposited material between samples could be measured. The effect of the deposition solution, deposition parameters and duration of deposition was explored. The results were compared to those measured with Energy Dispersive Spectroscopy. The results show that PIXE can measure the total deposited metal in a sample over at least four orders of magnitude with similar fractional uncertainties. The technique is also sensitive enough to observe the variations in alloy composition due to sample non-uniformity or variations in deposition parameters.

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