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Examination of Giant Magnetoresistance in Cu-Co Granular Films with Two-Particle Size Distribution JIAN-QING WANG, Binghamton University, NAM KIM, JORDAN PECK — Giant Magnetoresistance (GMR) effect and magnetization curves above the blocking temperature were studied for Cu80Co20 granular thin films. The attempt was to understand the relationship between the GMR effect, magnetization, and the degree of interface contribution to the spin-dependent scattering in a unified scheme. When the magnetization curve is fitted to the Langevin function using an averaged single particle size, the average size of the estimated Co particles is 2.8 nm.1 However, when the magnetization curve is used to fit the GMR curve, there is a lack of agreement between the experimental data and the fitting. The discrepancies were resolved by assuming that there are two size distributions in the Co nano-particle population. Under such assumptions, good fittings can be achieved with the experimental curves for both the GMR and the magnetization, using the same set of parameters. The obtained average particle sizes for the smaller and the larger particles, and their respective populations, are 1.1 nm and 2.7 nm, and 0.35 and 0.65, respectively. The smaller particles are responsible for the high field GMR effect while the large ones are for the low field. The study has revealed that a certain degree of magnetic bulk scattering is present in the spin-dependent scattering in this system. 1. L.M. Malkinski, J.-Q. Wang, et al, Appl. Phys. Lett. 75, 844 (1999).

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