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Anomalous Magnetic Particle Distribution in Annealed Granular CuCo Thin Films JIAN-QING WANG, NAM H. KIM, JARDON PECK — A SQUID magnetometer was used to measure ZFC and FC c-T data to study the microstructure of annealed granular Cu₈₀Co₂₀ thin films. The films of thicknesses ranging from 40 nm to 1 μm with 20% vol. Co were magnetron sputtered at base pressure < 1.5 × 10⁻⁷ torr. The annealing was done at various temperatures up to 400°C in a tube furnace with a reducing gas flow. As-deposits showed the standard single-peak c-T curve with an average size of 3.0 nm in dia. for the Co nanoparticles as calculated by Curie-Weiss analysis. Langevin fitting to magnetization at elevated temperature of 300 K also provided the same particle size. As annealing temperature increased, the first peak occurring around 40K decreased in height while the second, occurring around 300 K, grew. These anomalous features, observed over a wide range of thickness (40-200 nm), appeared to result from microstructural evolution, namely an increase in large particle population at the expense of smaller particles. It is likely that the film contains a mixture of small particles and larger particles that are induced by annealing, which gives rise to the double peak structure.

Prefer Oral Session
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Jian-Qing Wang
jqwang@binghamton.edu
Binghamton University

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