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Memory Effects and Inter-particle Interactions in Co Nanoparticles Embedded in Carbon Matrix PENG LIU, MICHAEL BONDER, GEORGE HADJIPANAYIS, University of Delaware — In this work we have studied the magnetic properties of face-centered-cubic (fcc) Co nanoparticles made by the cluster gun. The zero field-cooled (ZFC) and field-cooled (FC) $M(T)$ curves at different fields show that the blocking temperature is shifted to lower temperature when the applied magnetic field is increased. This behavior could be due to a decreased energy barrier at increased filed or to inter-particle dipole-dipole interactions. M vs H/T data above the blocking temperature show that the latter might be responsible for this behavior. The dynamics of the FC magnetization were also studied. The $M(T)$ curves on FC samples obtained with the magnetic field on and off at different temperatures, show that the sample remembered its thermal history and demonstrated a memory effect at temperatures lower than the blocking temperature. However, this memory effects were not observed in the ZFC samples. The magnetic relaxation with a change at low temperature also shows a memory effect at temperature below the blocking temperature. The $M(T)$ curves at different fields and memory effects indicate that the dynamics of nanoparticles are due to the distribution of particle sizes and inter-particle interactions. Work Supported by NSF GRANT # DMR-0302544.

Michael Bonder
University of Delaware

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