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Competition between Thermoinduced Magnetization and Uncompensated Spins GREGORY BROWN, MARKUS EISENBACH, G. M. STOCKS, Oak Ridge National Lab — Thermoinduced magnetization (TiM) is the ferromagnetic response predicted for nanoparticles of normally antiferromagnetic materials. Unambiguous experimental observation of this phenomenon is complicated by the effects of the particle size-distribution within a sample and the uncompensated magnetic moments within a nanoparticle. Monte Carlo calculations of nanoparticles with odd numbers of spins have been employed to resolve the competition between TiM and uncompensated spins. The magnitude of the ferromagnetic response, $\langle |M|^2 \rangle$, is easily resolved into the two phenomena. Analysis for the response along the direction of crystalline anisotropy, $\langle M_z^2 \rangle$, is complicated by the temperature-dependent relaxation of individual spins away from the anisotropy axis. These results indicate that TiM may be confirmable in nanoparticles with uncompensated spins. However, quantitative estimates of the temperature- and anisotropy-dependence of TiM are significantly affected by uncompensated moments.

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