Abstract Submitted
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Local Structures and Magnetic Properties of Co-doped Y2O3 Nanocrystals[1] YUN-LIANG SOO, C.S. WANG, S.L. CHANG, National Tsing Hua University, P.P. CHU, National Central University, J.F. LEE, National Synchrotron Radiation Research Center — Local environments surrounding Co and Y atoms in Co-doped nanocrystalline Y2O3 powders were investigated by using extended x-ray absorption fine structure (EXAFS) technique. Thermal annealing at different temperatures was employed to control the particle size from 5nm to 134nm. Superconducting quantum interference device (SQUID) measurements revealed that these materials are ferromagnetic with various Curie temperatures and saturation magnetization. As the annealing temperature increases, saturation magnetization increases with decreasing coordination number of the nearest O shell around Co impurity atoms. However, the coordination number of O shell around Y atoms remains the same. From our experimental data, we propose that Co atoms in the Y2O3 nanocrystal host migrate from interstitial locations inside the nanoparticle to the particle surface, where more O vacancies are present. The indirect exchange interaction of the bound magnetic polaron model is therefore increased leading to enhanced ferromagnetim in the annealed samples.

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