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Cation Site Occupancy of Fine Magnesium Ferrite Powders Having Enhanced Neel Temperatures AARON OEHLSCHLAEGER, MARTIN SNOW, STEVEN OLIVER, Gilford High School, Gilford NH 03249, VINCENT HARRIS, C.N. CHINNASAMY, H. KAILEEN, S.D. YOON, A. YANG, C. VITTORIA, S. MUKERJEE, Northeastern University, Boston MA 02115, M.D. SCHULZ, E.E. CARPENTER, Virginia Commonwealth University, Richmond VA — Magnesium ferrite powders having mean diameters of from 4 nm to 50 nm were produced by a modified coprecipitation method and then measured by structural and magnetic probes. All samples were found as phase-pure $MnFe_2O_4$ through XRD results, with particle size distributions being determined through TEM measurements. High-field SQUID magnetometer measurements found the Neel temperature increased from 300^0C to 380^0C with increasing mean particle size, in comparison to the Neel temperature of bulk $MnFe_2O_4$ of 300^0C. Since the magnetization behavior of spinel ferrites is sensitive to the magnetic interactions between iron cations occupying octahedral and tetrahedral sites in the spinel structure, it is anticipated that the cation distribution may be affected by the reaction kinetics involved in particle formation. To test this, extended x-ray absorption fine structure (EXAFS) measurements were taken on the powders and representative bulk samples. This poster will show that the EXAFS data does show a distinct difference in site occupancy between the powder and bulk samples, although the trend between samples may not be as distinct.

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