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Pair Distribution Function (PDF) analysis of Barium Hexaferrite (BaFe12O19) nanocrystals BINOD PAUDEL, New Mexico State University, KATHARINE L. PAGE, DANIEL P. OLDS, Oak Ridge National Laboratory, EDWIN FOHTUNG, New Mexico State University, Los Alamos National Laboratory — Complex Ferroic Oxides such as Barium Hexaferrite is a multiferroic that can be driven far from equilibrium by external perturbations such heat, light, electric and magnetic fields. Four primary ferroic orders namely toroidal, dipole, elastic and magnetic moments can be tuned at the microscopic level and used in the design of novel devices and functional properties. It is critical to study the morphology and structural properties of Barium Hexaferrite nanocrystals to understand the origin of enhanced properties such as a large uniaxial anisotropy with the easy magnetization direction along the c-axis, high dielectric properties etc. Conventional crystallography doesn't accomplish the structure determination of nanocrystals due to the lack of long range ordering and the structural information contained on the local level is not unraveled through this technique even though it gives the average structure. Here, we used the pair distribution function (PDF) technique to investigate the structure on short, medium and long-range order. The analysis of Barium Hexaferrite is done by fitting the PDF data taken at two different temperatures (300K and 315K) with the idealized model PDF for three different r-ranges and the structural changes of the sample between these temperatures are also searched.

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