ESRF	**Experiment title:** Thermal expansion in Co-Fe Prussian blue analogues.	**Experiment number**: HE-3100
Beamline: BM01a	**Date of experiment**: from: 28/10/2009 to: 01/12/2009	**Date of report**: 02/08/2012
Shifts: 9	**Local contact(s)**: Dmitry Chernyshov	*Received at ESRF:*

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The diffraction data related to the influence of zeolitic water on the thermal expansion of two cobalt hexacyanoferrate systems, namely $Co^{II}_3[Fe^{III}(CN)_6]_2.14H_2O$ and $Rb_2Co^{III}_4[Fe^{II}(CN)_6]_{3.3}.10H_2O$, are still under investigation.

Part of the measurements recorded during this session have been published in J. Phys. Chem. C.

Influence of Protected Annealing on the Magnetic Properties of γ-Fe_2O_3 Nanoparticles

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ABSTRACT: It is usually considered that nanoparticles synthesized by low-temperature routes present structural disorder, from extended defects to local rearrangements (e.g., vacancy ordering or inversion in spinel ferrites), that may severely impact their magnetic properties. In the present work, we have investigated the influence of post-synthesis thermal treatments on 7-nm-sized γ-Fe_2O_3 nanoparticles prepared by room temperature coprecipitation of ferric and ferrous salts in alkaline medium, followed by the dispersion of the preformed particles in a sol-gel silica binder. Such protected annealing in a refractory matrix prevents coalescence and growth, thus preserving the mean size and size distribution of the pristine particles. Structural characterizations show that heat treatments up to 1000 °C turned the raw grains into well crystallized particles without transformation into hematite. This strategy thus allows accounting for the influence of structural rearrangements on magnetic properties at fixed particle size. For such 7 nm particles, post-synthesis heat treatments were found to mainly influence the shell of misaligned spins at the surface.

Full reference in J. Phys. Chem. C 116 (2012) 16311-16318.