

Supplementary Information

Crystalline and magnetic properties of CoO nanoparticles locally investigated by using radioactive indium tracer

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1 SYNTHESIS AND ANNEALING

FIG. S1 shows a summary of the synthesis, annealing and characterization of CoO nanoparticles. Samples S1 and S2 are two parts of the same synthesis process. S1 was characterized by XRD, TEM, and magnetization measurements just after the synthesis. S2 PAC measurements were taken on S2 sample to locally characterize the CoO nanoparticles just after the synthesis at low temperatures (from 10 K to 300 K).

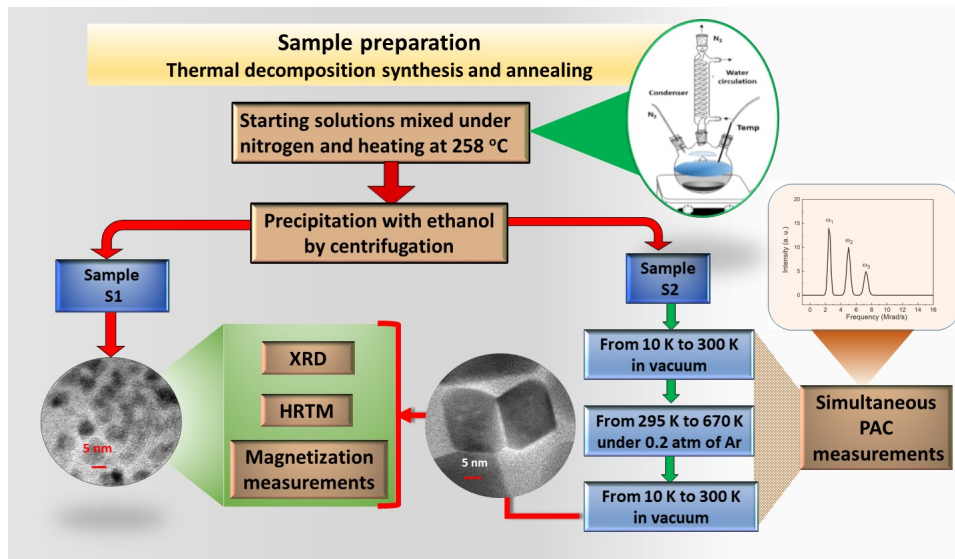


Figure 1: Scheme displaying the steps of the samples preparation and characterization by XRD, TEM and magnetization measurements of S1 and S2 as well as the measurements by PAC during the steps of the annealing of S2.

2 X-RAY DIFFRACTION MEASUREMENTS.

Samples S1 and S2 had their crystalline structure checked by X-ray diffraction measurements which were carried out in a Philips X'Pert PRO PW 3040/00 diffractometer in the Engineering College of São Paulo University. The 2θ angle ranges from 10° to 100° with steps of 0.05° taken during 400 s. Results are displayed in Fig. 2.

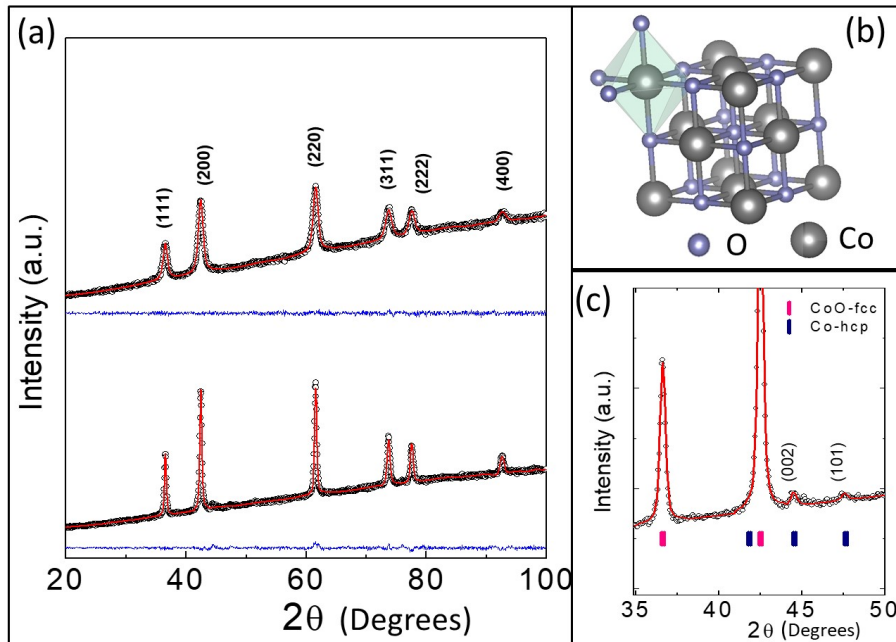


Figure 2: (a) XRD results for S1 sample (top) and S2 sample (bottom). (b) Crystalline structure of CoO where large spheres represent Co atoms and small spheres represent oxygen atoms. c) XRD pattern for S2 sample showing two extra peaks, (002) and (101), ascribed to hcp Co.

3 PERTURBED ANGULAR CORRELATION.

PAC results for sample S2 at 10 k as well as the TEM image of this sample is displayed in Fig. S3 below.

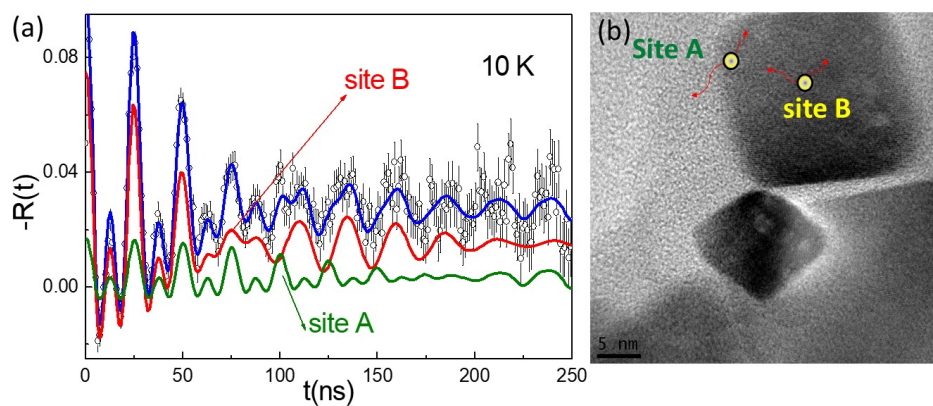


Figure 3: a) Spin rotation spectrum measured at 10 K for sample S2 after annealing. The continuous lines represent the fit of theoretical function to experimental data. b) TEM image of S2 sample with a representation of the localization of ^{111}Cd probe nuclei near surface called site A and into nanocrystal called site B.