ESRF	**Experiment title:** ***DAFS on ordered alloys FePt and CoPt epitaxially grown on Pt***	**Experiment number**: ***02-02-102***
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Report:

The DAFS experiments consisted in following the diffracted intensity of the [100] superstructure and [200] fundamental peaks when varying the photon energy across the platinum L_{III}-edge. The measurements were performed with the incident beam polarization perpendicular to and in the plane of diffraction. In a model where both ordered and disordered phases coexist, the [001] DAFS gives access to the local structure in the ordered domains. On the other hand, the combination of the [001] and [002] DAFS allows the study of the short range order in the disordered phase.

An analysis very similar to EXAFS's gives access to the number and distance of Co and Pt atoms in the first shells of the platinum in and out of the growth plane. The results for the CoPt alloy are very promising (figure 1,2,3 and table 1) and militate in favour of a model consisting in a mixture of an ordered phase (order parameter 0.8) and a disordered one.

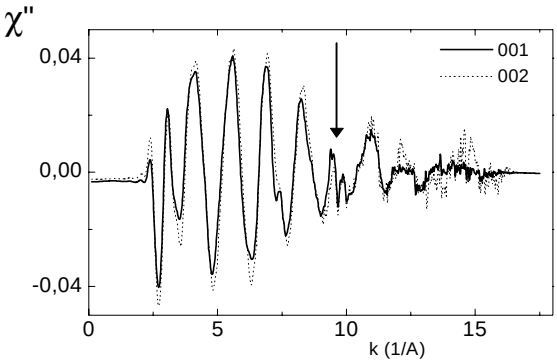

Fig 1: Experimental DAFS spectra at the two reflection peaks showing their qualitative difference.

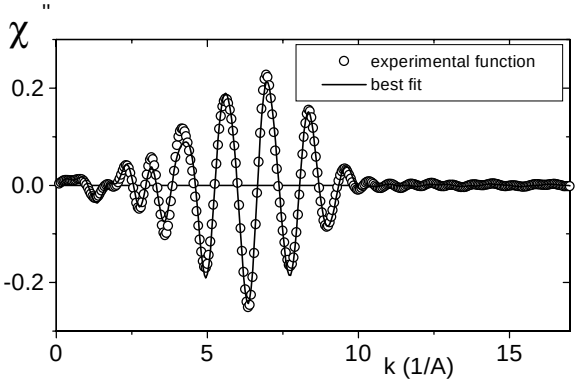

*Fig 2: The k*χ(k) spectra of [001] réflexion peak, out of plane polarization, and the best-fit curve.*

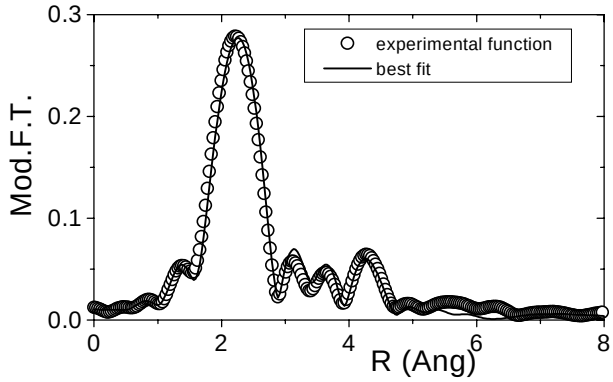

*Fig 3: The Fourier transform of the k*χ(k) spectra of [002] reflection peak, out of plane polarization, and the best-fit curve.*

Atomic pairs	d (Å)	N_j	$\sigma_j^2 \times 10^{-2}$	Order parameter
PtCo *in plane*	3.8 ± 0.02	0.6 ± 0.3	0.79 ± 0.09	0.8
PtPt *in plane*	3.8 ± 0.02	3.4 ± 0.3	0.47 ± 0.17	
PtCo *out of plane*	3.71 ± 0.04	6.8 ± 0.85	0.79 ± 0.09	
PtPt *out of plane*	3.71 ± 0.04	1.2 ± 0.85	0.47 ± 0.17	

Table 1: Structural parameters of the ordered phase deduced from modeling the filtered DAFS signal of [001] and [002] reflection peaks, in-plane and out of plane polarization (using FEFFIT)

Unfortunately, the spectra could not be satisfactorily analyzed up to now due to the large number of unknowns (the error bars on the fit parameters are very large). In addition, we observed an arte-fact around 11.95 keV (arrow on figure 1a) corresponding to the Au L_{III}-edge (to prevent from oxidation, the CoPt sample was covered by a 5 nm thick Au cap), this is also a problem for a precise analysis of the data.