ESRF	**Experiment title:** Resonant Magnetic diffraction Experiments from Ferromagnetic Metal/ Pt interfaces	**Experiment number:** SI 303
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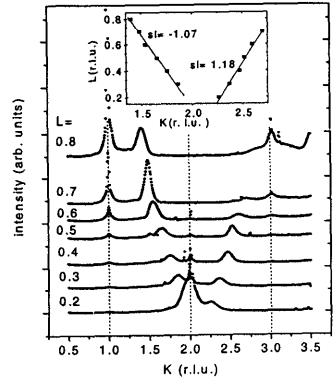
Report:

Abstract:

Deposition of few atomic layers of cobalt on a Pt(ll0) substrate produces three-dimensional cobalt clusters shaped as long triangular prisms with the largest side in contact with the substrate. The induced magnetism of the Pt atoms at the interface displays pronounced in-plane anisotropy, since the easy direction of magnetisation is the one perpendicular to the long dimension of the clusters. Most likely this is a consequence of the alignment of the c axis of the hexagonal cobalt with that direction.
These findings are based on x ray diffraction measurements .

Magnetic ultrathin films are very interesting model systems to study the magnetic properties of low-dimensionally systems. In many practical cases for ultrathin films, (few atomic layers) the magnetic anisotropy is perpendicular to the film plane due to strength of the magnetocrystalline surface anisotropy which dominates the shape anisotropy that lends **to** align the magnetisation in the plane. The magnetocrystalline anisotropy depends on several structural and morphological interface parameters such as the crystalline structure density of defects, strain fields and roughness to mention some important ones. A major research effort is devoted to establishing the role of these variables in the magnetic properties.

In this report we present a new result in the above field of ideas. In few words, we hav observed that small elongated cobalt clusters (approximate dimensions in the surface plar 5x30 nm^2) grown on a Pt(ll0) single crystal substrate, exhibit magnetic anisotropy in tl plane of the substrate. The easy axis is perpendicular to the long dimension of the cluste contrary to what one would expect from the shape anisotropy which tends to align tl magnetisation along the long dimension of the clusters. That behaviour resembles what often found in ultrathin films but in our case the dimensionally of the system is reduced.
The observed in-plane magnetocrystalline anisotropy has been rationalised by investigati the structure and morphology of the cobalt clusters and that of the interface.
These findings are based on x ray diffraction measurements. The atomic structure of tl interface and the morphology of the cobalt clusters have been deriv from "standard"grazing incidence experiments where scattering from the electronic char; is the dominating process. The magnetic properties have been inferred from resona magnetic diffraction measurements.



Diffraction from the cobalt clusters. The peaks that move when L changes indicate that tl clusters have triangular section. The lateral faces are close to the (110) planes of hcp cobal

see back