

Summary

The purpose of this work is the deposition and study of the structural and magnetic properties of magnetic nanostructures with main component Co.

The prepared samples were films like:

- Trilayers Pt/X/Pt where X = SmCo, FeCo.
- Multilayers {Pt/X}_xN where X= SmCo

Magnetic properties of bulk FeCo and SmCo are known for decades. They are ferromagnetic materials with high anisotropy, high coercive field and they are used in high saturation magnetization demanding applications, such as permanent magnets. FeCo and SmCo multilayer films have also been studied for the last ten years. They have shown high perpendicular anisotropy when combined with noble metals. Thus, they are perfect candidates for high density recording data materials or magneto-optical media.

Regarding to the samples prepared for this work, Pt was chosen as buffer layer and also as final layer for chemical protection. Three different types of substrate were used: a) Si (100), b) glass, c) kapton. The films were deposited with e-beam evaporation in ultra high vacuum chamber. The Si deposited films were annealed in a wide range of temperatures in order to evaluate the annealing effect on the structural and magnetic characteristics of the films.

With regard to SmCo films, the samples that were prepared were multilayers and trilayers. The annealing temperatures were 400°C, 450°C, 500°C, 550°C and 700°C. FeCo films were prepared as trilayers and the annealing temperatures were 200°C and 400°C.

In order to study the structural properties, x-ray (XRD) and electron microscopy methods (TEM, SEM and AFM) were used. The magnetic characterization was made with vibrating sample method and magneto-optical Kerr effect.

First of all, a literature search was conducted for every system (SmCo and FeCo). The results of this work were commented and correlations of structure – magnetism features came out.