Composition of electrodeposited FePt alloys
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Numerous studies have been carried out to develop electrodeposited CoPt films [1-3], but little attention has been devoted to FePt, which is known to have a greater magnetization and anisotropy than CoPt [4]. Here, we report the effects of $NaSO_4$ concentration and overpotential on the composition of FePt films. We have developed a bath for electrodepositing FePt alloys that is shown on table 1. Films were potentiostaticaly electrodeposited on 5 mm x 5 mm polycrystalline Cu substrates one side of which was coated with varnish. Substrates were cleaned in 0.1 mol/l H_2SO_4. Fresh solutions were vigorously stirred in open atmosphere thoughtout the deposition and graphite as used as counter eletrode. X-ray diffraction shows a combination of amorphous and bcc-Fe depending on the deposition potential. More negative potentials lead to a greater amount of bcc-Fe (Fig. 1). EDX analysis was used to characterize the composition of the films (Fig. 2). Compositional measurements suggest that $NaSO_4$ inhibits Fe deposition, leading to Pt rich deposits. Small amounts (~0.5 atm%) of Na and Cl found in most of the films came from the $NaSO_4$ and H_2PtCl_6 in the solutions. The effect of stirring was also investigated and it has been found that no stirring leads to Fe-rich deposits. After annealing the electrodeposited at 400-500 ºC it is possible to develop fully crystalline FePt with coercivity > 0.3 T.

Table 1

Chemical	Concentration (mol/l)
$FeSO_4$	0.1
$NaSO_4$	0.1 to 1
H_2PtCl_6	0.001
Ph (H_2SO_4 or HCl)	3
Temperature	20 ºC

[1] G. Zangari, P. Bucher, N. Lecis, P.L. Cavallotti, L. Callegaro and E. Puppin, J. Magn. Magn. Mater, 157(1996) 256
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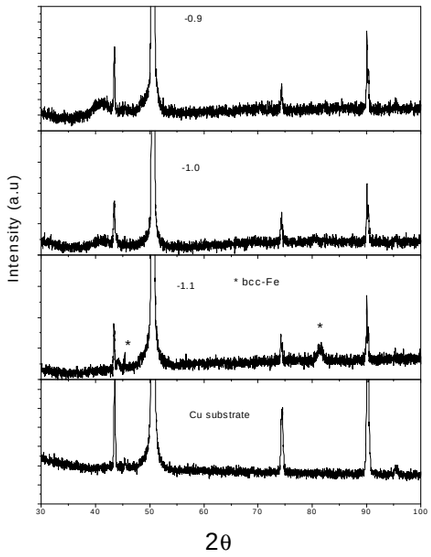

Fig. 1. X-ray of the films as a function of the potential for samples plated from 0.1 mol/l $NaSO_4$ bath.

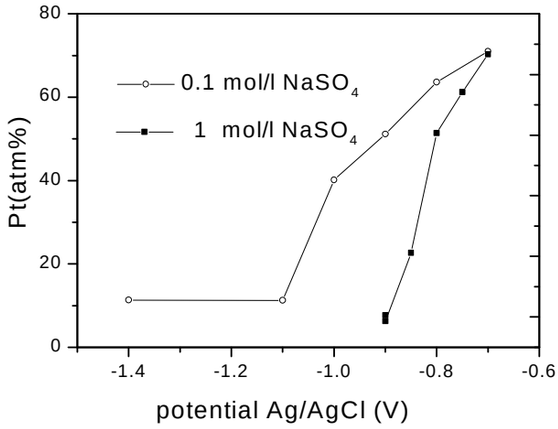

Fig. 2. Compostion as a function of potential