

# Influence of top Ag layer on ordered $L1_0$ FePt phase formation in thin Ag(0; 7,5 nm)/Fe<sub>50</sub>Pt<sub>50</sub>(15 nm) films on SiO<sub>2</sub>/Si(001) substrates

R.A. Shkarban,<sup>1</sup> M.N. Shamis,<sup>1</sup> and Iu.N.Makogon<sup>1</sup>

<sup>1</sup>*National Technical University of Ukraine  
«Igor Sikorsky Kyiv Polytechnic Institute»,  
03056, Prospect Peremogy 37, Kyiv, Ukraine*

The promising material for use in magnetic recording with high density is films based on  $L1_0$  FePt phase due to large magnetocrystalline anisotropy ( $7 \times 10^6$  J/m<sup>3</sup>).

The effect of an additional top Ag layer with low surface energy on diffusion processes of  $L1_0$  FePt phase formation and its structural and magnetic properties in Ag (0; 7,5 nm)/Fe<sub>50</sub>Pt<sub>50</sub>(15 nm) films on SiO<sub>2</sub>(100 nm)/Si(001) substrates were studied. It was established, that in as-deposited films disordered A1 FePt phase was formed. In Fe<sub>50</sub>Pt<sub>50</sub> (15 nm) film the ordered  $L1_0$  FePt phase was formed after annealing at temperature of 700°C. This process is accompanied by sharp coercivity increase. With increasing of annealing temperature the coercivity also rises.

It was found, that the initial compressive stresses in films affect on ordered  $L1_0$  FePt phase formation. Compressive stress reduction caused by additional top Ag layer lead to increase of A1 FePt →  $L1_0$  FePt phase transformation temperature to 800°C, which is 100°C higher than in Fe<sub>50</sub>Pt<sub>50</sub> film. The texture in the [001] direction, which is perpendicular to the substrate, increases. The compressive stress relaxation occurs with  $L1_0$  FePt phase formation in films.