ABSTRACT

Dissertation: 80 pages, 30 figures, 3 tables, 54 literature sources.

The dissertation work was carried out within the framework of Leonard Eiler's programme project of DAAD foundation (German Academic Exchange Service) on ID 57198300 grant.

Objective: the investigation of structural and magnetic properties changes of thin FePd-Ag films after heat treatment.

To achieve this objective following tasks of research were set:

- overview of current literature on the subject and identifying promising directions for research.
- to study the influence of physical and technical parameters of heat treatment on the regularities of structural and phase states formation and magnetic properties of thin FePd/Ag films.
- to investigate the influence of additional Ag layer on structural and phase composition changes and magnetic properties of thin FePd/Ag films heat treatment.

Objects of research: processes of structure and phase composition formation of FePd/Ag nanoscale film compositions after heat treatment.

Subjects of research: FePd/Ag nanoscale film compositions after deposition and heat treatment.

Methods of research: magnetron sputtering, heat treatment, X-ray phase analysis, atomic-force microscopy, SQUID magnetometry.

The dissertation work has the following ***scientific novelty:***

1. It is found out the influence of physical and technological parameters of heat treatment on structure, phase composition formation and magnetic properties of FePd/Ag film compositions and shown that longitudinal annealings in vacuum at 650 °C leads to chemically ordered $L1_0$-FePd phase formation which determines magnetically hard properties of material, while complex heat treatment doesn't lead to intensification of phase transformations.
2. It is found out that the introduction of additional Ag (0,3 nm) layer to FePd alloy films leads to a better tetragonality degree of Fe and Pd atoms placement in the

structure of investigated film compositions after longitudinal annealings in vacuum at 650 °C.

Practical importance: the results have practical use for the development of new nanoscale materials promising for use as magnetic media with ultra-high density.

NANOSCALE FILM CONPOSITIONS; COERCIVITY; MAGNETOCRYSTALLINE ANISOTROPY; $L1_0$-FePd; CHEMICALLY ORDERED PHASE