

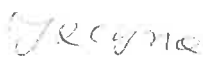
Summary of the doctoral thesis

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Title: „Properties of Pt/Co/Pt layer structures and their modifications under EUV and UV irradiations”

The aim of the thesis is to characterize the structural origin of the magnetization changes in Pt/Co/Pt trilayer systems irradiated with ultrashort EUV and UV pulses. In the studied systems the initial sample magnetization was in-plane. The increase of the out-of-plane magnetization was induced by irradiations using three different radiation sources: laser-plasma sources at IO WAT and PALS institutes and excimer laser at HZDR research center. Samples were irradiated either point-like or quasi-uniform. Structural and morphological changes were studied by means of both microscopic techniques (like phase-contrast microscopy and transmission electron microscopy) and x-ray techniques (like x-ray diffraction, x-ray reflectometry and grazing incidence x-ray fluorescence). The results of the structural characterization were correlated with changes of the out-of-plane magnetization characterized by means of polar magneto-optical Kerr effect. It is shown that the primary structural mechanisms responsible for fluence dependent, threshold-like magnetic changes induced by ultrashort annealing by pulsed irradiations are decrease of strain from compressive to tensile and interatomic diffusion leading to formation of Pt-Co alloy layers.

The thesis consists of 4 parts. In the first the motivation and aim of the thesis are described. The second part is an introduction and is divided in 3 chapters describing (1) state-of-the-art knowledge, (2) sample preparation methods and (3) applied structural and magnetization characterization techniques together with data analysis methods. In the third part structural and magnetic changes in Pt/Co/Pt trilayers after irradiations by three different sources are described. Each of 3 chapters in this part consists of the source description, irradiation protocol, morphology, out-of-plane magnetization and structural characterization of samples and correlations of structural and magnetic properties. In the last, fourth, part the summary of the work is presented and main conclusions are discussed. The thesis is finished with the list of the author publications.


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