JOINT CONFERENCES ON ADVANCED MATERIALS

The 10th Conference
on Functional and Nanostructured Materials

# FNMA'13

The 12th Conference
on Intermolecular and Magnetic Interactions in Matter

# IMIM'13

8–12 September 2013
Poros Island, Greece

# ABSTRACT BOOK

# Structural transformations and magnetic properties of amorphous films of Gd-Fe system

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Magnetic properties of films and bulk samples of binary compounds of a Gd-Fe system ($GdFe_2$, $GdFe_5$ and $Gd_2Fe_{17}$) and also the agency of structure formation on magnetic properties were explored. Amorphous films were deposited on teflon substrates by the thermal evaporation method. The temperature of the substrates had two values, 300 and 500 K.The percentage ratio of the polycrystalline phase was incremented with an increase in the substrate temperature or at annealing of films. The thickness of films was measured by an MIO-1 optical interferometer (it was equal to 200 nanometers). A UEMV-100K electronic microscope and a PRON-2 high-temperature attachment were used for structural studies of films. A modernised vibrating magnetometer was used for magnetic studies.

The hysteresis curves for volume and thin-film samples show that these materials belong to the class of magneto-soft compounds. It is necessary to note also significant differences in the nature of hysteresis loops for the volume and thin-film samples of all the compounds of this system. The absolute values of the coercive force for amorphous and polycrystalline films and volume compounds were determined. The coercive force decreases at formation of amorphous films by 2 times in comparison with the volume samples. The formation of a polycrystalline phase in films gives rise to the coercive force increasing by 1.5 times in comparison with the volume samples (polycrystalline films become more magneto-hard). The manner of crystallisation whether in the process of film formation on the warmed-up substrate, or in the process of annealing of amorphous films after their deposition is of no importance for the absolute value of the coercive force. Nevertheless, different structures are formed in such cases as has been shown by previous structural research [1].

**References**

[1] V. Prysyazhnyuk, O. Mykolaychuk, *J. of Non-Cristalline Solids*, 2006, **352**, 4299