

Magnetic properties of laser-irradiated FePdCu thin alloy films

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The laser annealing is a promising, and fast method for modification of thin films. The set of [Cu/Fe/Pd]_x multilayers was prepared by thermal evaporation. Samples were irradiated using Nd:YAG laser operating at 1064 nm with pulse time of 10 ns and repetition frequency of 10 Hz. Samples were irradiated with 1, 10, 100, and 1000 pulses with energy of 235 mJ/cm² in the atmosphere of flowing nitrogen. XRD measurements showed that even at low number of pulses the multilayer structure was destroyed and L1₀-ordered nanograins were formed. Magnetic measurements showed that the irradiated material is magnetically soft and the easy axis of magnetization is parallel to the surface. With increasing number of pulses the value of saturation magnetization increased, which could be related to the ordering process. It was also found that application of increasing number of pulses led to increase of the Curie temperature, which is another evidence for ordering. The magnetic imaging experiments showed, that the magnetic domains have the average size of about a few microns.