PHASE COMPOSITION AND MAGNETIC PROPERTIES OF NANOPERM THIN FILMS

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9.7 cm

Thin films of composition $Fe_{88-x}(Zr,Nb)_7B_5(Y,Mo)_7$ are the subject of investigations. Samples of different thickness belonging to the range (20 ÷ 150)nm were produced by flash evaporation in ultra high vacuum and subsequent deposition onto a liquid nitrogen cooled substrate. The attention is fixed on the influence of Y and Mo substitution on structure and magnetic properties of the samples. The effect of film thickness is also considered. Conversion electron Mssbauer spectroscopy (CEMS) and magnetooptic Kerr effect (MOKE) were used to derive hyperfine parameters and coercive field, respectively. Almost all investigated films were stated to have two-phase structure with α-Fe nanograins embedded in an amorphous matrix. The relative content of the amorphous regions changes from about 40% to 94% and increases with yttrium concentration. A considerable part of that component has a form of paramagnetic doublet with distributed electric quadrupole interactions. It was found that phase structure of the films is correlated with their magnetic properties.

13.4 cm

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