

High-field magnetization process in novel TbFeCo/YFeCo magnetostrictive spring magnet type multilayers

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Abstract: Magnetization process of conventional and discontinuous magnetostrictive spring magnet type multilayers (CMSMM and DMSMM, respectively) is investigated by means of magnetization, magnetostriction and magnetic force microscopy for sputtered $\text{Tb}_{0.4}(\text{Fe}_{0.55}\text{Co}_{0.45})_{0.6}/\text{Y}_x\text{Fe}_{1-x}$ and $\text{Tb}_{0.4}(\text{Fe}_{0.55}\text{Co}_{0.45})_{0.6}/\text{Y}_x(\text{Fe}_{0.7}\text{Co}_{0.3})_{1-x}$ (denoted as Terfecohan/ $\text{Y}_x\text{Fe}_{1-x}$ and Terfecohan/ $\text{Y}_x(\text{Fe},\text{Co})_{1-x}$, respectively) multilayers with a variable Y-content $0 \leq x \leq 0.2$. Various magnetic behaviour such as in-plane magnetic anisotropy, out-of-plane magnetic anisotropy, field-induced transition and exchange bias phenomenon are observed. Optimization of large magnetostriction and large magnetostrictive susceptibility are discussed in terms of the magnetization reversal, exchange coupling between sandwiched amorphous TbFeCo and nanostructured YFeCo-layers. © 2005 Elsevier B.V. All rights reserved.

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