Combining large magnetostriction and large magnetostrictive susceptibility in TbFeCo/Y_xFe_{1-x} exchange-spring-type multilayers

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Abstract: The fabrication of magnetostrictive exchange-spring multilayers, in which the nanostructure was formed in the YFe softlayers by controlling the Y concentration was described. The method was applied to sputtered {Tb($Fe_{0.55}Co_{0.45}$)1.5?(Y^xFe1-x^0} multilayers. It was found that the TbFeCo layers were in the amorphous state in the as-deposited samples while the microstructure of the Y_xFe_{1-x} layers was not the same. A crystalline state was also observed in pure Fe layers, while body-centered-cubic-Fe nanocrystals were found to coexist within an YFe amorphous matrix in $Y_{0.1}Fe_{0.9}$ layers.

Index Keywords: Amorphous materials; High resolution electron microscopy; Magnetic couplings; Magnetostriction; Magnetron sputtering; Microactuators; Microsensors; Multilayers; Sputter deposition; Terbium compounds; Transition metal alloys; Giant magnetostriction; Magnetocrystalline anisotropy; Magnetostrictive susceptibility; Rare-earth magnetism; Magnetic susceptibility

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