THE RANDOM MAGNETIC ANISOTROPY IN AMORPHOUS RARE-EARTH 3d METAL ALLOYS

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9.7 cm

Competition between exchange interactions and random magnetic anisotropy (RMA) is involved to explain magnetic properties of amorphous alloys. It is difficult to obtain the magnitude of RMA from the direct experiment. The system of amorphous alloys $Tb_xLu_{(1-x)7}Fe_{93}$ was prepared to determine the value of RMA. In this system RMA is varied by replacing higly anisotropic Tb atoms with Lu, which has neither magnetic moment nor magnetic anisotropy. In Lu_7Fe_{93} magnetic properties are determined only by exchange interactions in the iron sublattice. Deposition of Lu by Tb leads to RMA increasing. From our measurements of magnetization and magnetic susceptibility the shift of temperature to spin-glass like state transition T_{sg} vs Tb concentration was determined. The obtained data shows that in amorphous alloys the value of Tb anisotropy is the same like that in metallic Tb. The increase of RMA significantly rises the T_{sg} temperature. This result seems to be very important because it can possibly allow to create materials with high T_{sg}.

13.4 cm

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