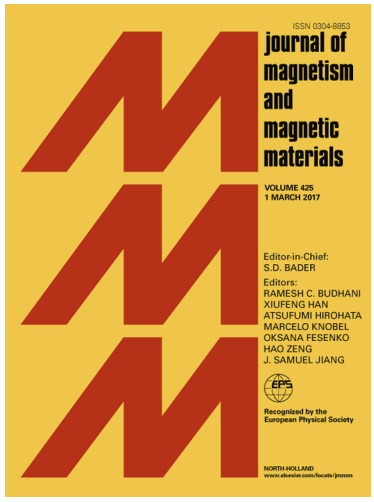

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Evolution of microstructure and magnetic properties of $Fe_{73.5}Si_{13.5}B_9Nb_3Cu_1$ amorphous alloy during ion bombardment process

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Abstract: The evolution of microstructure and magnetic properties of $Fe_{73.5}Si_{13.5}B_9Nb_3Cu_1$ amorphous alloys caused by ion bombardment were investigated by using X-ray diffraction (XRD), transmission electron microscopy (TEM) and magnetic property analysis. Ion bombardment first induced structural relaxation and then crystallization of amorphous alloys, and it produced residual stress and magnetic anisotropy in the crystallized sample. The residual stress was calculated by XRD analysis and the value of magnetic anisotropy constant was estimated by applying the law of approach to saturation. The structural relaxation leads to the improvement of permeability of amorphous alloys. The permeability of the crystallized sample induced by ion-bombardment was lower than that of thermal annealed sample, which can be attributed to residual stress and magnetic anisotropy induced by ion bombardment.

Keywords: amorphous alloy, crystallization, ion bombardment, magnetic anisotropy, magnetic properties, residual stress

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