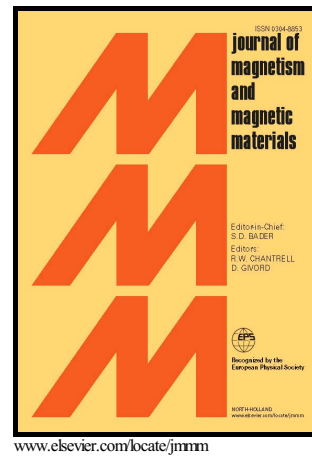


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Double Permeability Peaks in $\text{Ce}_9\text{Fe}_{91}$ Films with in-plane uniaxial anisotropy

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Abstract

$\text{Ce}_9\text{Fe}_{91}$ films were fabricated at different temperature by Rf magnetron sputtering. The static and dynamic magnetic properties of these films have been investigated in details. The results reveal that the two films prepared at 293K and 623K with the critical film thickness exhibit weak stripe domains and a small perpendicular anisotropy, and their correlated dynamic permeability spectra show one resonance peak, implying the coherent precession of magnetization at such critical thickness. However, the film prepared at 523K possesses an in-plane uniaxial anisotropy and lower coercive field. And the permeability spectrum displays two peaks, which can be ascribed to the coexistence of the rotatable anisotropy and in-plane uniaxial anisotropy.

Keywords: Soft magnetic materials; Magnetic films; High-frequency applications

I. Introduction

Soft magnetic thin films with high frequency characteristics used in magnetic components, such as inductive devices and magnetic heads, have attracted more and more attention because of the increasing demand for improvement and miniaturization of electromagnetic devices [1–3]. Research on fabrication and magnetic properties of Fe, Co, Ni and their based nanocrystalline films have been carried out [4-9] for many years due to their outstanding soft magnetic properties which includes high permeability, low coercivity and high saturation magnetization. Recently, Rare-earth element doped nanocrystalline 3d-transition metal films have shown very large in-plane uniaxial

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