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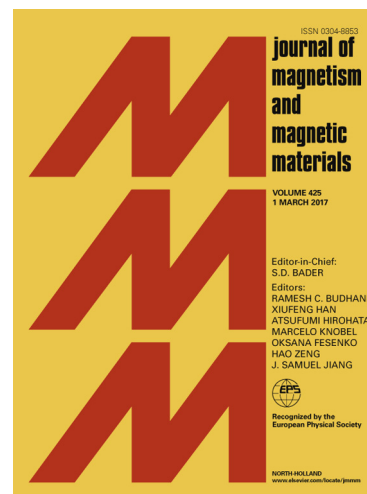
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# Micrometer thick soft magnetic films with magnetic moments restricted strictly in plane by negative magnetocrystalline anisotropy

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## Abstract

Stripe domains or any other type domain structures with part of their magnetic moments deviating from the film plane, which usually occur above a certain film thickness, are known problems that limit their potential applications for soft magnetic thin films (SMTFs). In this work, we report the growth of micrometer thick c-axis oriented hcp-Co<sub>84</sub>Ir<sub>16</sub> SMTFs with their magnetic moments restricted strictly in plane by negative magnetocrystalline anisotropy. Extensive characterizations have been performed on these films, which show that they exhibit very good soft magnetic properties even for our micrometer thick films. Moreover, the anisotropy properties and high-frequency properties were thoroughly investigated and our results show very promising properties of these SMTFs for future applications.

Keywords: negative magnetocrystalline anisotropy, magnetic moments, perpendicular anisotropy, high-frequency properties

## 1. Introduction

In recent years, study of soft magnetic thin films (SMTFs) has become one of the hot topics in the field of magnetism because of their potential applications in high-frequency fields, such as miniature inductors, micro-transformers and noise suppressors [1-3]. In high-frequency applications, there are two basic demands for the SMTFs, which include small switching field and high permeability before the cut-off frequency. In order to reach these requirements, the magnetic materials must have both high saturation magnetization  $M_s$  and low coercivity  $H_c$ .

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