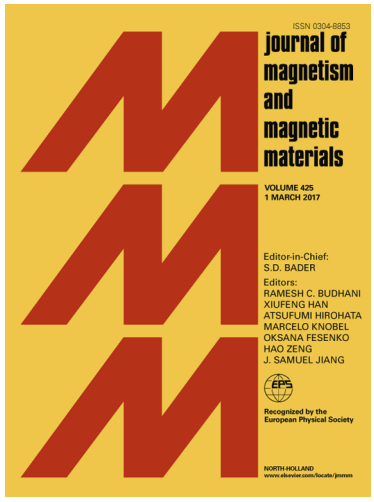

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ABSTRACT

The thickness dependent magneto-optical Faraday rotation in Co ferromagnetic thin films and perforated periodic Co nano-hole arrays were investigated. It was observed that the optical response and Faraday rotation of Co nano-hole arrays were strongly dependent on the thickness of the film, and the Faraday rotation reached the maximum amplitude at an optimal thickness value of 30 nm to 50 nm, which contrasted with the Co thin films where the Faraday rotation increased with the film thickness. In addition, the Faraday rotation spectra of Co nano-hole arrays showed a weak resonantly enhanced peak at the anti-resonance modes (or Wood's anomalies) on the transmission spectra, which correspond to the enhanced local electric field at the film and surrounding medium interfaces. All experimental results were confirmed by the finite-difference time domain calculations.

Keywords: Magneto-optical effect, surface plasmon resonance, Faraday effect, subwavelength structures.

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