

Preparation of hybrid coating film between magneto-optical and hologram layers

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INTRODUCTION Bismuth substituted yttrium iron garnet (Bi-YIG) is the most excellent magneto-optical material because it exhibits huge Faraday rotation [1,2]. We have been studying the preparation process and applications of Bi-YIG nanoparticles and their coating films [3,4]. In this study we will propose a hybrid material of magneto-optical coating layer and hologram sheet film.

EXPERIMENTS AND RESULTS $\text{Bi}_{1.8}\text{Y}_{1.2}\text{Fe}_5\text{O}_{12}$ particle was prepared by coprecipitation and annealing processes [3]. The nanoparticles were mixed with a cyclohexanone and a dispersant. Then the mixtures were milled by planetary milling machine with 48 h. The magnetic fluids of Bi-YIG nanoparticles were coated by a rod coater on a plastic film which has preformative hologram images. The magneto-optical hologram (MO-hologram) film were obtained (Fig.1). Fig.2 shows the magneto-optical contrast observed with the MO-hologram film. The MO-hologram film is a flexible and low cost magneto-optical material. We will be present film form magneto-optical materials on the conference.

References

- [1] P. Hansen and J.-P. Krümme, *Thin Solid Films*, **114**, pp.69-107, (1984).
- [2] D. Shen, T. Du, Y. Zhou, M. Zhang, B. Cheng and W. Zhang, *J. Magn. Magn. Mater.*, **135**, pp. 241-250, (1994)
- [3] T. Hirano, T. Namikawa and Y. Yamazaki, *Denki Kagaku*, **64**, pp. 307-310, (1996)
- [4] Y. Yamazaki, T. Namikawa, T. Hirano and K. Yoshida, *JOURNAL DE PHYSIQUE IV*, C1-543-544, (1997)

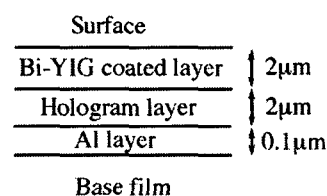


Fig.1. Stack of magneto-optical hologram sheet.

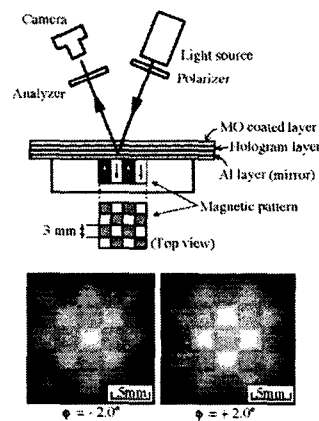


Fig.2 Schematic diagram of the optical configuration used for the observation of magneto-optical contrasts; ϕ : offset angle of analyzer.