Magneto-Optical Properties of Bi-YIG Nanoparticles and its Hybridized Material Dispersed in a Plastic

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Since bismuth yttrium iron garnet (Bi-YIG) has a large Faraday rotation in visible wavelength, the Bi-YIG could be the most attractive material for magneto-optical devices [1]. Ultrasonic irradiation in liquid can produce cavitation [2]. The cavitation leads to hot-spot and microjet impacts on materials which result in activating reaction, particle size reduction, surface cleaning, and so on.
In this study, we were Bi-substituted YIG ($Bi_{1.8}Y_{1.2}Fe_5O_{12}$) nanoparticles by coprecipitation with ultrasonic irradiation and examined the magneto-optical properties of the dispersed particles in a plastic hybridized material.
With calcination at 650℃, the particles were identified as a garnet phase by X-ray diffraction. The particle size was below 20nm and the saturation magnetization was 17 emu/g. The particles were dispersed in a plastic followed by a heat polymerization process under 70℃, 5 hour. And then the specimen was investigated for magneto-optical properties, which can demonstrate a valuable Faraday rotation.

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References

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