



実験報告書様式(一般利用課題・成果公開利用)

(※本報告書は英語で記述してください。ただし、産業利用課題として採択されている方は日本語で記述していただいても結構です。)

 	承認日 Date of Approval 2015/5/27 承認者 Approver Kaoru Shibata 提出日 Date of Report 2015/5/27
課題番号 Project No. 2014B0157 実験課題名 Title of experiment Direct measurement of spin current created by ultrasound in $Y_3Fe_5O_{12}$ 実験責任者名 Name of principal investigator Shin-ichi Shamoto 所属 Affiliation Japan Atomic Energy Agency	装置責任者 Name of responsible person Kaoru Shibata 装置名 Name of Instrument/(BL No.) DNA(BL-02) 実施日 Date of Experiment 2015/03/13-17

試料、実験方法、利用の結果得られた主なデータ、考察、結論等を、記述して下さい。(適宜、図表添付のこと)
 Please report your samples, experimental method and results, discussion and conclusions. Please add figures and tables for better explanation.

1. 試料 Name of sample(s) and chemical formula, or compositions including physical form. a garnet ferrite single crystal $Y_3Fe_5O_{12}$

2. 実験方法及び結果 (実験がうまくいかなかった場合、その理由を記述してください。) Experimental method and results. If you failed to conduct experiment as planned, please describe reasons. Ultrasound wave was applied to a ferrimagnetic single crystal of Yttrium iron garnet $Y_3Fe_5O_{12}$ along [111] direction at low temperature under magnetic field of two ferromagnets set on the both sides of the YIG crystal, where the magnetic field is about 3 kOe. Spin current may be produced as spin wave excitation by magnetoelastic coupling. Under this non-equilibrium state, population of spin wave may be increased. Therefore, we carried out the neutron scattering at the (2 2 0) magnetic Bragg peak. As a result, it is difficult at present to conclude the existence of induced spin excitation by ultrasound wave, although we observed enhancement of spin excitation at a few energies to some extent. On the other hand, the magnetic Bragg peak at (2 2 0) was enhanced by ultrasound wave as shown in Figs. 1 and 2. This behavior is similar to integrated intensity of Si (3 5 1) reflection measured at synchrotron X-ray facility ID15 of ESRF [1].
--

2. 実験方法及び結果(つづき) Experimental method and results (continued)

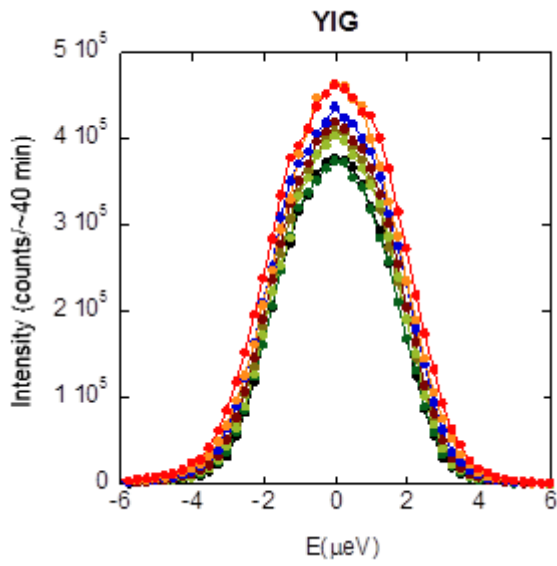


Fig. 1. Constant-Q cut at $Q=(220)$ at various ultrasound wave power.

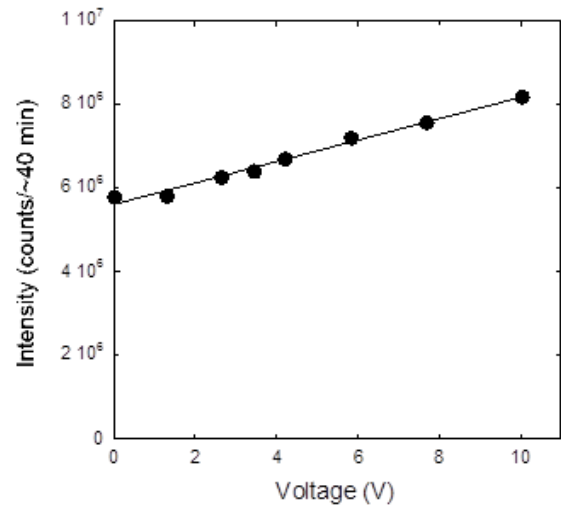


Fig. 2. Integrated intensity of (220) peak depending on ultrasound wave voltage.

Reference

- [1] K.-D. Liss et al., *Acta Cryst.* (1997). A53, 181-186.