

実験報告書様式(一般利用課題・成果公開利用)

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 Experimental Report 	承認日 Date of Approval 2014/08/12 承認者 Approver Masavasu Takeda 提出日 Date of Report 2014/08/11
課題番号 Project No. 2014A0067 実験課題名 Title of experiment Depth profile of the magnetic structure around the Fe/BaTiO ₃ ferromagnetic-ferroelectric interface and its changes induced by electric polarization 実験責任者名 Name of principal investigator Kenta Amemiya 所属 Affiliation High Energy Accelerator Research Organization	装置責任者 Name of Instrument scientist Masayasu Takeda 装置名 Name of Instrument/(BL No.) SHARAKU/BL17 実施日 Date of Experiment 2014/6/7 10:00 – 2014/6/11 9:00 2014/6/11 21:00 – 2014/6/13 22:00

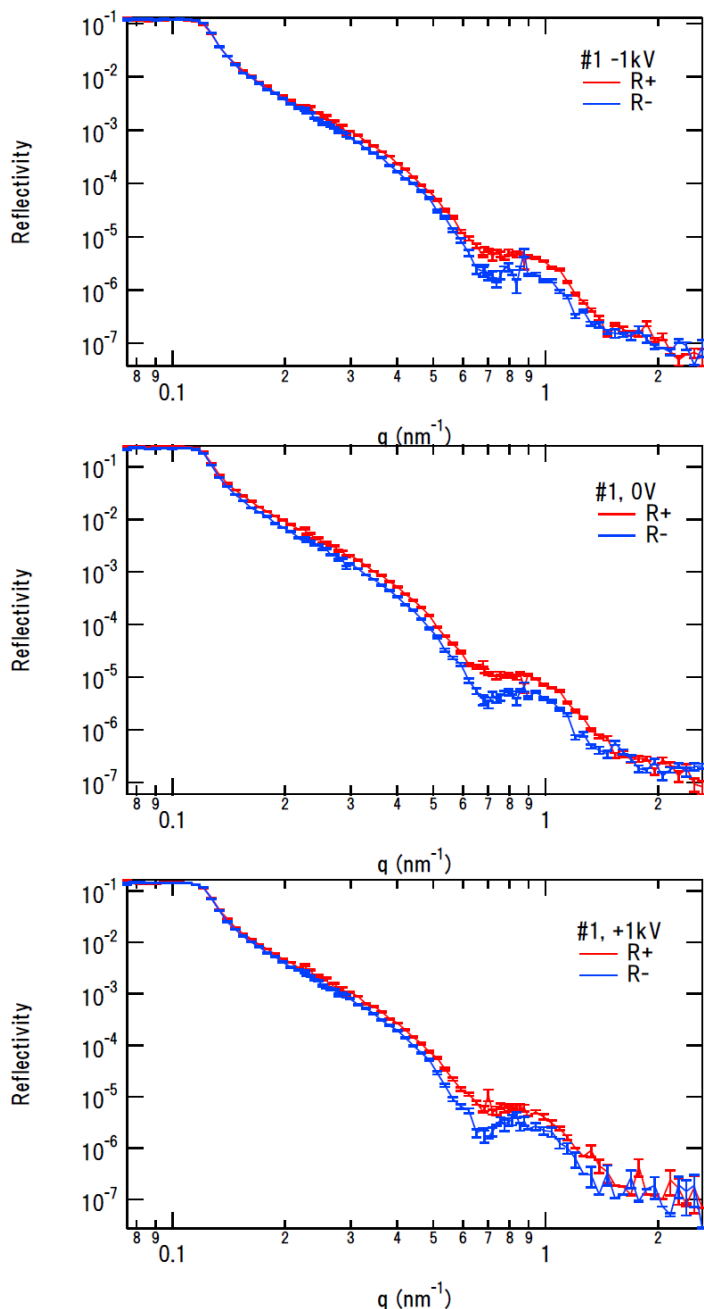
試料、実験方法、利用の結果得られた主なデータ、考察、結論等を、記述して下さい。(適宜、図表添付のこと)
 Please report your samples, experimental method and results, discussion and conclusions. Please add figures and tables for better explanation.

1. 試料 Name of sample(s) and chemical formula, or compositions including physical form.
Au/Fe/BaTiO ₃ (001) thin films

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.
<p>The polarized neutron reflectivity (PNR) data were taken at room temperature by adopting the incidence angles of 0.3, 0.9, and 2.7 deg. No spin analyzer was used.</p> <p>The film configurations were chosen to be Au(10 nm)/Fe(2.5 and 8 nm)/BaTiO₃(001). The samples were magnetized along the in-plane direction of the film by a 500 Oe magnetic field, which is enough large to achieve the magnetic saturation. The voltages of +1, 0, and -1 kV were applied during the PNR measurements between the film and the bottom of the BaTiO₃ substrate in order to control the electric polarization in BaTiO₃.</p>

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

Preliminary PNR data for Au/Fe(2.5 nm)/BaTiO₃(100) are shown below. A clear difference is recognized between opposite polarizations of the incident neutron beam. Moreover, some changes are seen depending on the applied voltages, which suggests changes in magnetic depth profile in the Fe film induced by the electric polarization switching of the BaTiO₃(100) substrate.



The detailed analysis of the PNR data is now underway, and by combining with the X-ray magnetic circular dichroism data, the applied-voltage dependence of the magnetic structure of Fe around the interface to the BaTiO₃ substrate will be revealed.