(※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。)

TOKAI CROSS Experimental Report J-PARC	提出日 Date of Report 2012/05/28
課題番号 Project No. 2011B0055 実験課題名 Title of experiment Observation of induced magnetic moment on Cr in Cr/Gd multilayers 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 responsible person Masayasu Takeda 装置名 Name of Instrument/(BL No.) BL-17 実施日 Date of Experiment Mar. 11, 2012, 10:00 ～ Mar. 18, 2012, 10:00

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.

Al_2O_3 (substrate) / Mo(20 nm) / Cr (2 nm) / [Cr (0.5 nm) / Gd (3 nm)]x15 / Pt (10 nm)

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.

The sample was mounted on the cryostat, which has been installed at BL-17.
At first, the neutron reflectivity was measured at room temperature without external magnetic field,
and then we tried the low-temperature measurement.
The reflectivity measurements were performed at θ = 0.363, 1.160, and 3.715 deg, covering q = 0.01 – 0.34 $Å^{-1}$.

Figure 1 shows neutron reflectivity profile taken at room temperature without external magnetic field.
A reasonable profile is obtained corresponding to the Gd/Cr multilayer.

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

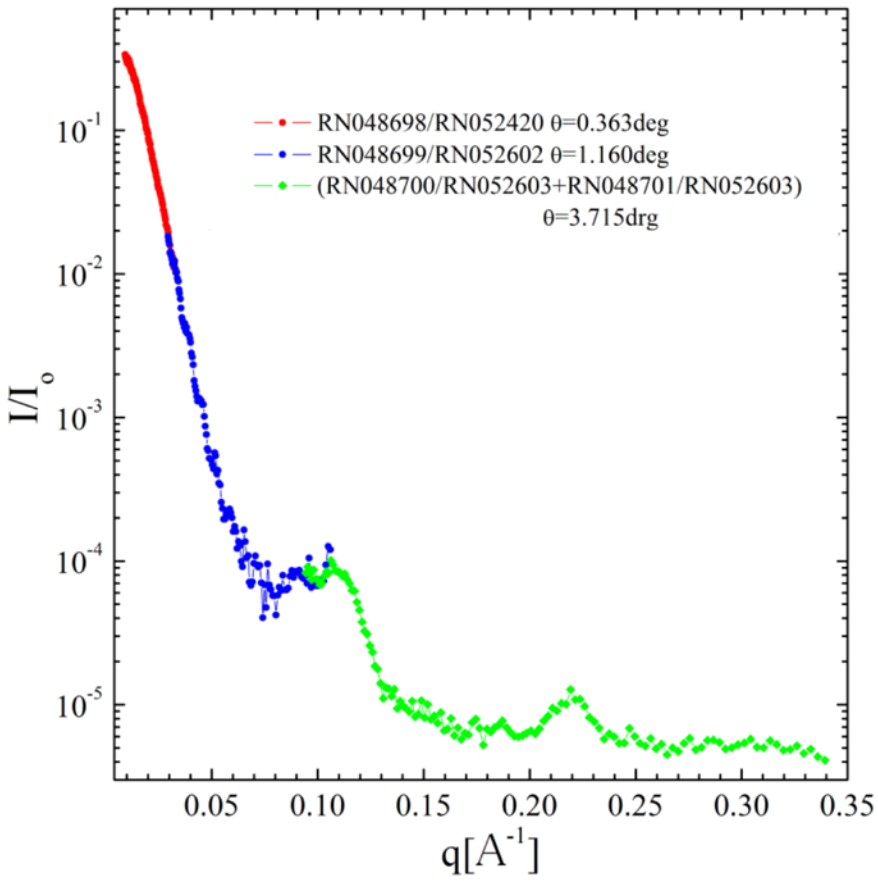

Figure 1: Neutron reflectivity curve of Gd/Cr multilayer taken at room temperature without external magnetic field.

However, upon cooling the sample, the reflectivity profile gradually broadened with decreasing intensity, and disappeared below 150 K. This strange behavior was reproducible and cannot be attributed to irreversible damage on the sample such as cracking. In addition, the shrinkage of the cryostat rod was properly taken into account, by measuring the sample position at each temperature using the transmitted beam.

Although the polarized neutron reflectivity measurement at low temperature (< 50 K) under an external magnetic field (>0.5 T) is essential for the sample, we could not perform such measurement due to the above-mentioned situation. The beamline instrumentation group is now trying to solve the problem, and we expect that the measurement will be possible at the next beamtime.