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。)

MLF Experimental Report	提出日Date of Report
課題番号 Project No.	装置責任者 Name of responsible person
2016A0059	K. Oikawa
実験課題名 Title of experiment	装置名Name of Instrument/(BL No.)
Feasibility test of micro-PIC detector for neutron reflection	BL10
imaging	実施日Date of Experiment
実験責任者名 Name of principal investigator	December 17-21 (total 3.5 days)
Kenji Sakurai	
所属 Affiliation	
National Institute for Materials Science	

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 patterned layered thin film (coated by Ni and Ti on Si wafer)

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 present work follows a series of previous research (2015A0011, 2014B0002, 2014A0002 and 2013A0227, all of them done at BL17) aiming at extending the conventional neutron reflectivity to give spatial resolution necessary for visualizing the buried inhomogeneous interfaces of layered thin films. In the present experiment,

we moved to BL10 to use high-resolution 2D detector, micro-PIC detector, while our previous research used the combination of the coded mask and ³He detector. For the experiment at BL10, we brought our lab's reflectometer and installed in front of the micro-PIC detector as schematically shown in Figure 1. As the experiment was for the first time, we spent time and efforts to establish the detailed protocol and scheme of the experiment. Figure 2 shows an example of the obtained neutron reflection Image.

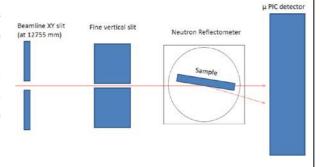
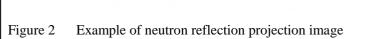


Figure 1 Schematic layout of neutron reflectivity imaging

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

Even in the first preliminary tests, we were able to obtain 36 reflection projections from the patterned sample, which we already tested in May 2016 at BL17. Some clearly reconstructed images were successfully obtained. From the next beamtime, we will do neutron reflectivity and neutron reflectivity imaging experiments in a routine way. On the other hand, the image data taken by micro-PIC detector require some subsequent processing by the detector specialist. Therefore later we will do some quantitative comparison with our previous data, and clarify the advantages of the use of micro-PIC detector. We expect that the spatial resolution can become at least 2-3 times better. In the 2016B beamtime, we will get further results.



The right thin line image is from the thin film sample, while the left thick one is direct beam.