

 MLF Experimental Report	提出日 Date of Report Dec. 9 th 2010
課題番号 Project No. 2010A0017 実験課題名 Title of experiment R&D of a time-spatial-focusing crystal-analyzer for neutron inelastic spectrometers 実験責任者名 Name of principal investigator Nobuaki Takahashi 所属 Affiliation J-PARC Center, JAEA	装置責任者 Name of responsible person Kazuya Aizawa 装置名 Name of Instrument/(BL No.) BL19 実施日 Date of Experiment Nov. 19, 2010 (24h)

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.

The aim of this project is to verify focusing performances of an alignment concept which we have reported recently. Then, the objective of the experiment was an analyzer unit which had been fabricated under the concept. The analyzer unit was made of an Al block and 5 pieces of $12 \times 12 \times t2 \text{ mm}^3$ sized PG(002) crystals were mounted on the block (see right photo), off course they were aligned satisfying the focusing condition theoretically.



We used vanadium rod, which had been amounted in the container box of the BL19, for sample, in order to

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.

[Setups] 4Qc super mirror focusing neutron guide was used for incident beam optics. The phase delay value of the band chopper of ~ 8000 micro-sec was used to select the 2nd frame measuring condition of the BL19. The obtainable wavelength band was from 4A to 8A, in that case. At the sample position vanadium rod was used to obtain incoherent scattering from the sample position. The center of the PG(002) analyzer unit was set 800 mm away from the sample position. The scattering angle of its center was 90 degrees in the horizontal plane and +10 degrees in the vertical plane. Each crystals were designed to obtain Bragg angle of 80 degrees. The d-spacing of the PG(002) is 3.355A and neutrons which wavelength of 6.61A should be reflected by the analyzer.



Two-dimensional TOF scintillation detector was installed at 600 mm away from the center of the analyzer unit, with keeping the reflection angle of the crystals. The reflected neutrons which wavelength of 6.61A were expected to reach the detector at 69.2ms. (see right photos)

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

[Experiments] Two data sets were obtained. One was the condition with analyzer-unit and the other was the condition without the analyzer-unit (background).

[Results] Extremely small amounts of neutron events were detected on the detector not only background condition but also with analyzer-unit condition. They were less than 0.1 cps per $15 \times 15 \text{ cm}^2$ detection area.

Obtained two-dimensional event-recorded binary data were converted into two-dimensional histogram data using personal PCs. Intensities were normalized using number of the T0 events. The Background data was subtracted from the main data (with analyzer-unit). The two-dimensional histogram data was binned every 10 ms. (see figs) But we cannot verify obvious intensity gain at about $t=61 \text{ ms}$.

