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。)

CROSS TOKAI **Experimental Report** J-PARC	承認日 Date of Approval 承認者 Approver 提出日 Date of Report
課題番号 Project No. 2015A0075 実験課題名 Title of experiment Quasi-elastic neutron scattering study of new thermoelectric $AgCrSe_2$ through its superionic transition 実験責任者名 Name of principal investigator Bing LI 所属 Affiliation JAEA	装置責任者 Name of Instrument scientist Kaoru Shibata 装置名 Name of Instrument/(BL No.) BL02 DNA 実施日 Date of Experiment 16/02/28 09:00 ～ 16/03/04 21:00

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.

Silver Chromium Selenide

$AgCrSe_2$

Soilid powder

7.899 grams

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 inelastic neutron scattering measurements were carried out on powder sample of $AgCrSe_2$ contained in an aluminum can at temperatures: 5, 60, 300, 433, 443, and 493 K. The incident neutron energy is around 2 meV. The accessible energy transfer is from −0.04 to 0.1 meV while the momentum transfer is from 0.1 to 1.8 $Å^{-1}$. To exactly subtract the background contribution from container, an empty aluminum can was also measured at 60, 300, 443, and 493 K under same conditions. The standard vanadium sample was also measured for resolution function that will be used for quasi-elastic scattering analysis.

The obtained raw data was reduced in the Utsusemi. After subtracting the background and performing the absorption correction, the dynamic structure function S(Q,E) was finally produced. All S(Q,E) were visualized in the Utsusemi as well. Shown below are the typical S(Q,E) data. At 5 K, the magnetic excitation can be seen at Q~0.5 $Å^{-1}$, which is related to the first magnetic Bragg peak. Likewise, the very weak intensity is also visible around 1.4 $Å^{-1}$. According to our magnon simulation by using published magnetic structure with propagation vector (0.038, 0.038, 3/2), there might be a gap at Q~0.9 $Å^{-1}$. Above T_N ~ 55 K, these excitations became fluctuating. However, a striking difference is the intensity at very low Q, which is thermally populated. The quasi-elastic contribution is too wide to obtain well-defined temperature and Q dependence.

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

To completely understand the observed features, an inelastic measurement with much higher incident energy and wider Q–E space is really needed.