



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。 )

 <b>Experimental Report</b> 	承認日 Date of Approval 2014/8/29 承認者 Approver Ryoichi KAJIMOTO 提出日 Date of Report 2014/8/29
課題番号 Project No. 2014A0155 実験課題名 Title of experiment Determination of equilibrium isotope fractionation factor by neutron inelastic scattering 実験責任者名 Name of principal investigator Asami Sano 所属 Affiliation Japan Atomic Energy Agency	装置責任者 Name of Instrument scientist Ryoichi Kajimoto 装置名 Name of Instrument/(BL No.) BL01 実施日 Date of Experiment 2014. Apr. 02 – 2014. Apr. 7

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.
<p>Graphite (C) 5 g, powder                  Diamond (C) 2 g, powder                  Iron (Fe) 10 g, powder                  Cementite (Fe<sub>3</sub>C) 10 g, powder</p>

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>This study aims to develop a new technique to calculate the reduced isotope partition function ratio (<math>\beta</math>-factor) of minerals from phonon density of states (PDOS) obtained by inelastic neutron scattering (INS) experiment.</p>

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

Inelastic neutron scattering measurements were performed at BL01 at ambient temperature. The powder samples were packed in aluminum foils. The exposure times ranged from 2.5 to 12 hours. The data was corrected with two sets of multi-Ei modes with incident beam energies of 151, 55, 28, and 17 meV, and 253, 73.7, 34.6 and 20 meV. Measurements of empty sample container and vanadium rod were also performed.

Fig 1 shows energy profiles of iron obtained with  $E_i = 73.7$  meV. To get the 1-phonon density of state, corrections are necessary such as contributions of multiple scattering and multi-phonon scattering and the data analysis is in progress.

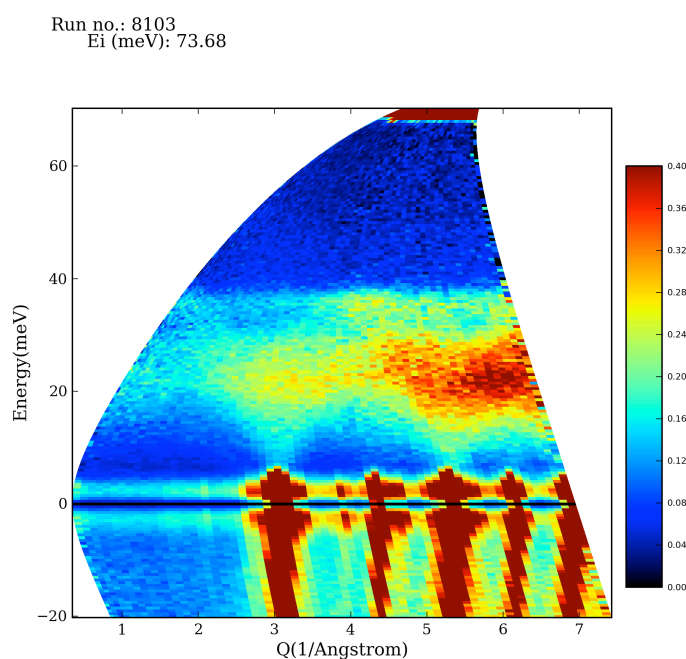


Fig. 1 Excitation spectra of powder sample of Fe using  $E_i = 73.7$  meV.