（ ※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 2011/06/29
課題番号 Project No. 2010B0037 実験課題名 Title of experiment Strain Measurements of Geological Material under uniaxial compression 実験責任者名 Name of principal investigator Jun Abe 所属 Affiliation Japan Atomic Energy Agency	装置責任者 Name of responsible person Kazuya Aizawa & Stefanus Harjo 装置名 Name of Instrument/（BL No.） BL-19 実施日 Date of Experiment 2010/12/17

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.

Cylindrical rock samples (Berea sandstone, Novaculite, Mikawa silica rock) : 14.6 mm diameter and 40 mm length

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.

A tensile testing which has been already installed in BL−19 can compress samples up to 2 ton. For the strain measurements of rock samples under uniaxial compression, cylindrical rock specimens are set in the tensile testing machine of BL−19 (fig. 1). These rock samples were compressed approximately by 80 MPa. The strain values were measured by both strain gauge and the change of the lattice parameter.

fig. 1. Photo of the experimental assembly, with the rock sample positioned at 45° to the incident beam.

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

Fig. 2 shows result for Novaculite. Macroscopic stress–strain response (blue line), and the strains in the *a* and *c* lattice parameters of quartz are shown. Discrepancy was found in values obtained by strain gauge and lattice spacing. This discrepancy are attributed to the pore involved in rock specimens. These data are analyzed now. Commonly, the stress and strain measurements of rocks under uniaxilal compression have been made mainly by the macroscopic technique using a strain gauge. However, we have successfully conducted measurements of the microscopic strain in geological material using neutron diffraction. Strain in rock sample under uniaxial compression provides us a lot of information related to the mechanical behavior of rock materials. Understanding of the mechanical behavior of rock materials is essential for engineering application of underground environment such as the geological isolation of high-level nuclear waste.

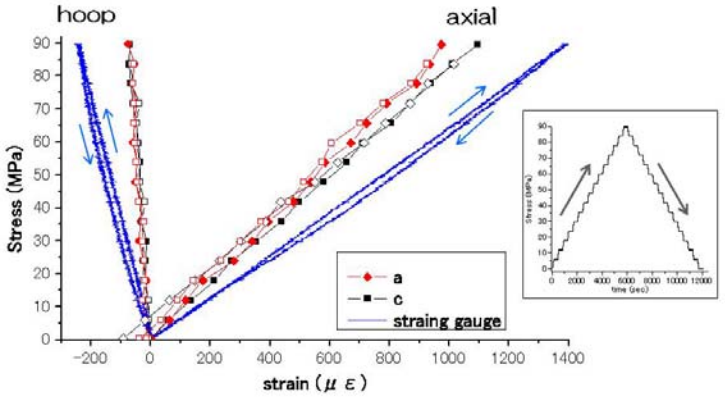

fig. 2. Stress-strain curves for Novaculite, and strain in a and c lattice parameters. The inset shows the novaculite loading sequence.