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 MLF Experimental Report	提出日 Date of Report 2013/07/05
課題番号 Project No. 2012A0073 実験課題名 Title of experiment Structure of hydrous albite (NaAlSi ₃ O ₈) glass 実験責任者名 Name of principal investigator Akihiro Yamada 所属 Affiliation Geodynamics Research Center, Ehime Univ.	装置責任者 Name of responsible person Prof. Otomo Toshiya 装置名 Name of Instrument/(BL No.) BL21 (NOVA) 実施日 Date of Experiment 2012/10/24-10/26

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.

<p>1. 試料 Name of sample(s) and chemical formula, or compositions including physical form.</p> <p>Hydrous silicate glasses with the composition in feldspar group (Ab: NaAlSi₃O₈ and Or: KAlSi₃O₈ plus D₂O) have been prepared with high-pressure melting (~3 GPa, 1000-1400°C). Water was added as liquid water (D₂O) when the powder sample was encapsulated in Pt container with weighting, just before high-pressure experiment. The water content of each samples are 7.5 wt% (Ab) and 6.7 wt% (Or), respectively. Water in the sample has been checked by Raman spectroscopy (i.e., H₂O or D₂O). Ab glass contained almost 100% D₂O, while water component in Or glass included a few percent of H₂O. Anhydrous glasses are made by quenching in the air (Ab) or water (Or), after the samples were melted in 1-atm furnace. Finally, <400-mg samples were prepared.</p>
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<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。)</p> <p>Experimental method and results. If you failed to conduct experiment as planned, please describe reasons.</p> <p>Samples were encapsulated tubing made of Ni-V alloy with 6-mm diameter. The blank cell and silica glass were also measured within the beamtime for the background correction and checking the condition of diffractometer. We had several troubles in the measurements due to software bug, by which the data collection was stopped and data could not be recovered. However, since the problem has been improved during the beamtime soon, it did not affect the data collection so much. First, the preliminary measurements were performed (20 minutes) for each sample to estimate exposure time to complete the data collection with enough Signal/Noise. For the anhydrous samples, the exposure time was set 2 hours. For hydrous Ab glass 4-hours measurement was performed, while we took longer time (6 hours) for the hydrous Or due to the H₂O contamination, which occurs noisy background. Measurements were carried out with all banks.</p>

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

So far, structure factor, $S(Q)$, of anhydrous Ab glass has been derived (Figure 1), which was taken only with 90-degree bank. The oscillation in the $S(Q)$ can be clearly observed at least up to 40 \AA^{-1} . In actual, we could take diffraction up to 70 \AA^{-1} . The oscillation higher than 30 \AA^{-1} is similar to one of the silica glass. Whereas, lower-Q data shows minor difference, which from the alumina and sodium component in the glass. For the data on the other samples including hydrous glass, data treatments are being performed. The data collections have been successfully done. We will be able to present all the data in very near future.

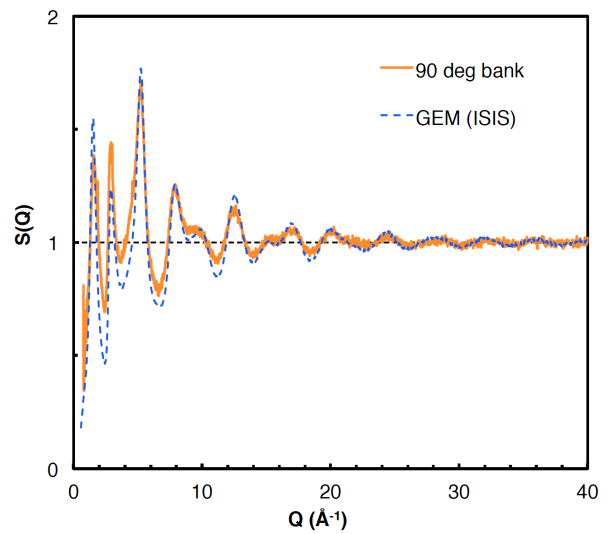


Figure 1. Structure factor, $S(Q)$, for dry $\text{NaAlSi}_3\text{O}_8$ glass (solid line) taken at NOVA with 90-degree bank detector and silica glass (dashed line) taken at ISIS.