

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。)

 Experimental Report 	承認日 Date of Approval 2015/06/09 承認者 Approver Takanori Hattori 提出日 Date of Report 2015/06/09
課題番号 Project No. 2014B0187 実験課題名 Title of experiment Making less disordered ice Ic through expanded high density amorphous ice 実験責任者名 Name of principal investigator Kazuki Komatsu 所属 Affiliation Graduate School of Science, The Univ. of Tokyo	装置責任者 Name of Instrument scientist Takanori Hattori 装置名 Name of Instrument/(BL No.) PLANET 実施日 Date of Experiment 2014/12/16-2014/12/21

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. D2O + Pb (0.0329 g)

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 sample liquid was loaded into a pair of TiZr encapsulating gasket and sealed in the p-T variable system (The Mito system). Ice Ih was formed when the sample was cooled to 100 K and amorphise under compression up to 1.5 GPa, yielding to form unrelaxed high density amorphous ice (uHDA). The uHDA was transformed to VHDA with increasing temperature to 160 K and turn back to HDA but its expanded form (eHDA) at ambient pressure and at 135 K. Further transformation to low density amorphous ice (LDA) was observed when temperature was increased to 145 K at ambient pressure. In total, we observe all four kind of amorphous forms of ice in the experiment p-T pathway (Figure 1.). After the observation of LDA, temperature was increased up to 165 K and the sample is crystallised to ice Ic, finally measured neutron diffraction pattern of ice Ic at 85 K in order to prevent further transformation to ice Ih. The obtained diffraction pattern (Figure 2) shows substantial amount of stacking disorder, which is inferred from the diffuse scattering under the Bragg peak. The pattern, however, does not show any significant peak from ice Ih, showing no long-range order for ice Ih. We are going to carry out more precise analysis for the obtained patterns to characterize amorphous phases and ice Ic.
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2. 実験方法及び結果(つづき) Experimental method and results (continued)

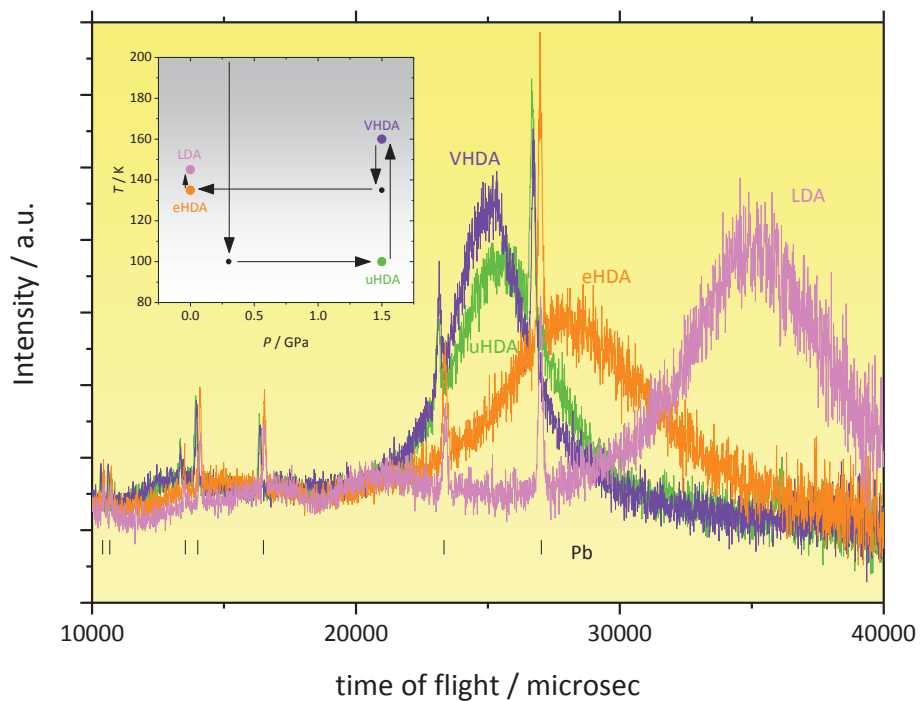


Fig. 1. Scattering intensities of various amorphous ices (uHDA, VHDA, eHDA and LDA) appeared in the P-T pathway shown in the inset.

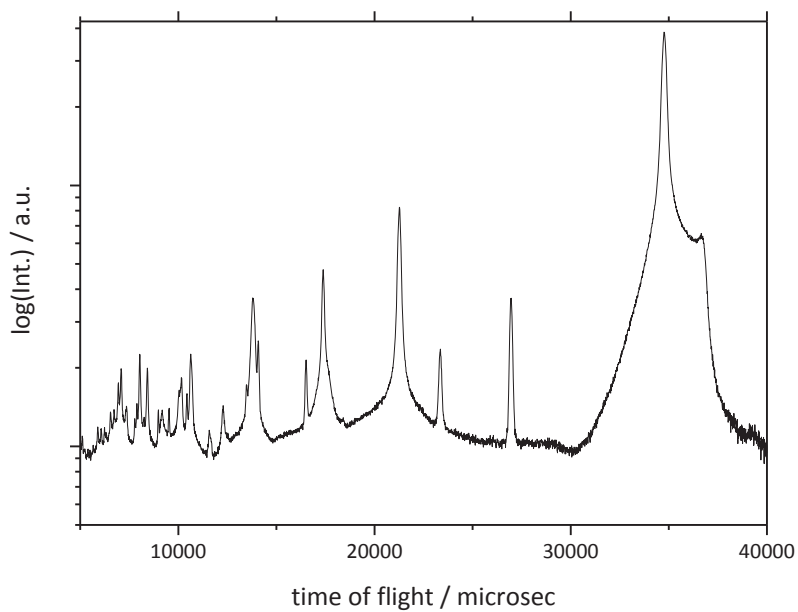


Fig. 2. Neutron diffraction pattern of ice Ic with lead pressure marker.