

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。)

	承認日 Date of Approval 2014/10/2 承認者 Approver Kaoru Shibata 提出日 Date of Report 2014/10/2
課題番号 Project No. 2014A0156 実験課題名 Title of experiment Dynamics of an ionic liquid C16mimPF <sub>6</sub> in SmA liquid crystal and liquid phases 実験責任者名 Name of principal investigator Osamu Yamamuro 所属 Affiliation ISSP, University of Tokyo	装置責任者 Name of Instrument scientist Kaoru Shibata 装置名 Name of Instrument/(BL No.) DNA / (BL02) 実施日 Date of Experiment 2014/6/5 ~ 2014/6/11

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.
1. 1-hexadecyl-3-methylimidazolium hexafluorophosphate, C <sub>20</sub> H <sub>39</sub> F <sub>6</sub> N <sub>2</sub> P, solid 2. deuterated 1-hexadecyl-3-methylimidazolium hexafluorophosphate, C <sub>20</sub> D <sub>39</sub> F <sub>6</sub> N <sub>2</sub> P, solid 3. 1-tetradecyl-3-methylimidazolium tetrafluoroborate, C <sub>18</sub> H <sub>33</sub> BF <sub>4</sub> N <sub>2</sub> , solid

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>The aim of this experiment is to investigate the change of the dynamics in the phase transitions of ionic liquids. We have performed the neutron quasi-elastic scattering measurements of alkyl-methylimidazolium ionic liquids C<sub>16</sub>minPF<sub>6</sub>, C<sub>14</sub>minBF<sub>4</sub> and deuterated C<sub>16</sub>min PF<sub>6</sub> which have crystalline (C), liquid-crystalline (LC) and liquid (L) phases. The samples were contained in a double-cylinder cell made of aluminum. Two energy resolution modes (3.5meV, 13meV) were used to investigate a wide time range (10 ps to 1 ns).</p> <p>Figure 1 shows the results of elastic scans (fixed window scans) of C<sub>16</sub>minPF<sub>6</sub> in the two resolutions. The intensity data with <math>Q &gt; 1 \text{ \AA}^{-1}</math> are summed up. An inter-crystalline transition at 283 K and a LC-L transition at 348 K exhibit large decrease of elastic intensity corresponding to the increase in the mobility of the alkyl-chains. On the other hand, no change in elastic intensity appeared on a liquid crystal to liquid transition at 397 K. This suggests that the dynamic in LC and L phases are quite similar to each other. Further analysis on the quasi-elastic spectra is now in progress to investigate more detailed features of the phase transitions..</p>

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

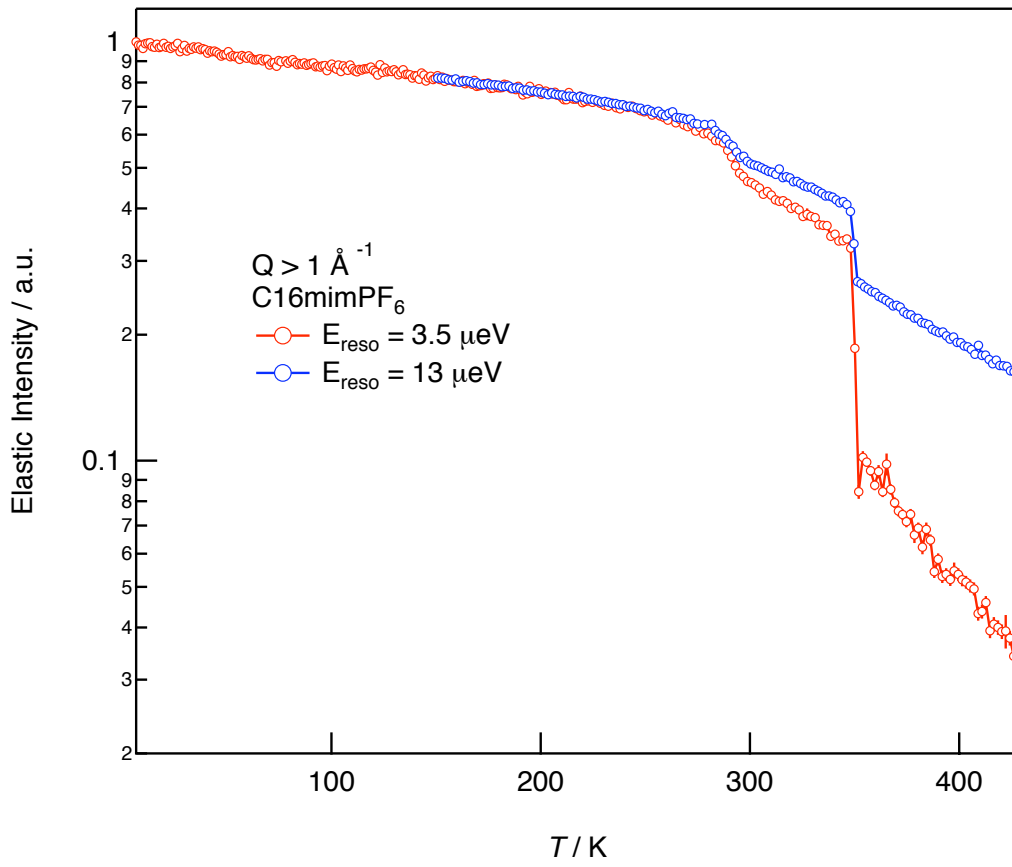


Figure 1. Elastic scans (fixed window scans) of C16minPF<sub>6</sub> in two resolution modes.