

Correlation between Liquid Crystalline and Gelation Properties with Ionic Liquid Gels Formed by Fluorine-Containing Phenyl Benzoate Derivatives That Exhibits Liquid Crystallinity

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In our previous work, it was found that some low molecular weight compounds containing perfluoroalkyl group at terminal position showed smectic A (SmA) phase in bulk state and gelled several organic and/or ionic liquid.¹⁾ While correlation between liquid crystallinity and gelation mechanism were not elucidated.

In this study, a famous ionic liquid; [BMIM][TFSA] was gelled by phenyl benzoate derivatives containing perfluoroalkyl group (Figure 1) and evaluated liquid crystallinity of gels by polarized microscope (POM) observation and differential scanning calorimetry (DSC).

Compound **1** showed SmA phase, however the gels showed fibrous aggregates formed by self-assembly phenomena observed by POM and scanning electron microscope. On the other hands, compound **2** showed SmA phase in bulk state and 5wt% [BMIM][TFSA] gel also showed optically anisotropic textures at room temperature (Figure 2).

In addition, it was confirmed that 5wt% [BMIM][TFSA] gel formed by compound **2** was highly dispersion stability.

In this presentation, the correlation between liquid crystalline and gelation properties will be considered by spectroscopic analysis and molecular dynamics (MD) simulation.

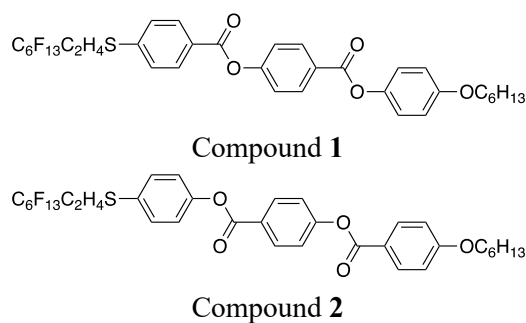


Figure 1. Chemical structures of compounds **1** and **2**.

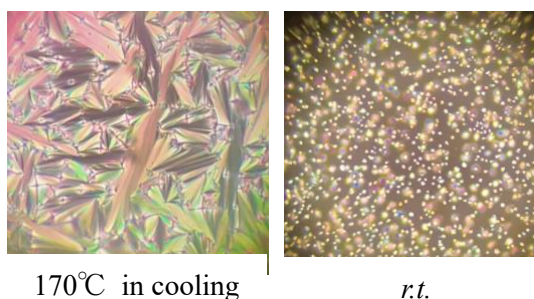


Figure 2. POM images of compound **2** in bulk state (left) and 5wt% [BMIM][TFSA] gel formed by compound **2** (right).

1) Yuki Morita *et al.*, *Mol. Cryst. Liq. Cryst.* **2005**, 435, 813.