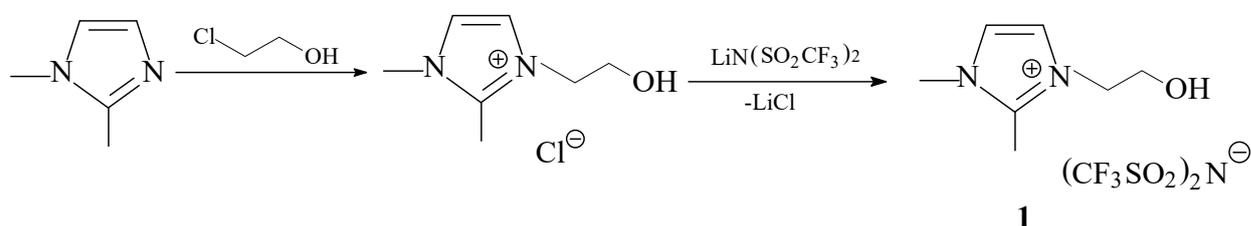


## Hydroxyl-containing ionic liquids as heat-transfer agents

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### 1,2-Dimethyl-3-(2-hydroxyethyl)imidazolium bis(trifluoromethylsulfonyl)imide (1)



Scheme S1

### Synthesis procedure

1,2-Dimethylimidazole (9.61 g, 0.1 mol), 2-chloroethanol (8.05 g, 0.1 mol) and acetonitrile (10 ml) were mixed, stirred for 48 h at 80°C in argon atmosphere and cooled to room temperature. Then the solution of bis(trifluoromethylsulfonyl)imide lithium (31.58 g, 0.11 mol) in acetonitrile (20 ml) was added and stirred for 30 min. After that, the solvent was removed by pumping *in vacuo*, the suspension was washed with water to remove lithium salts and dried *in vacuo* at 100°C for 10 h.

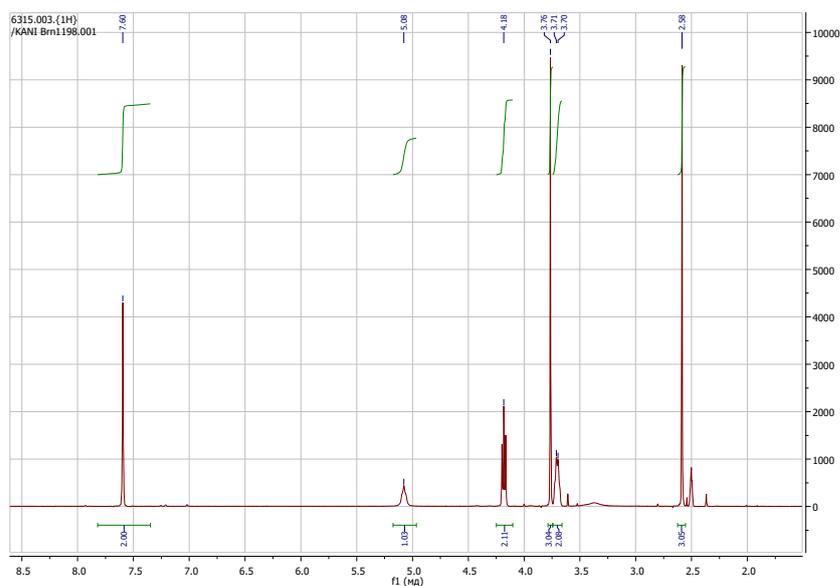
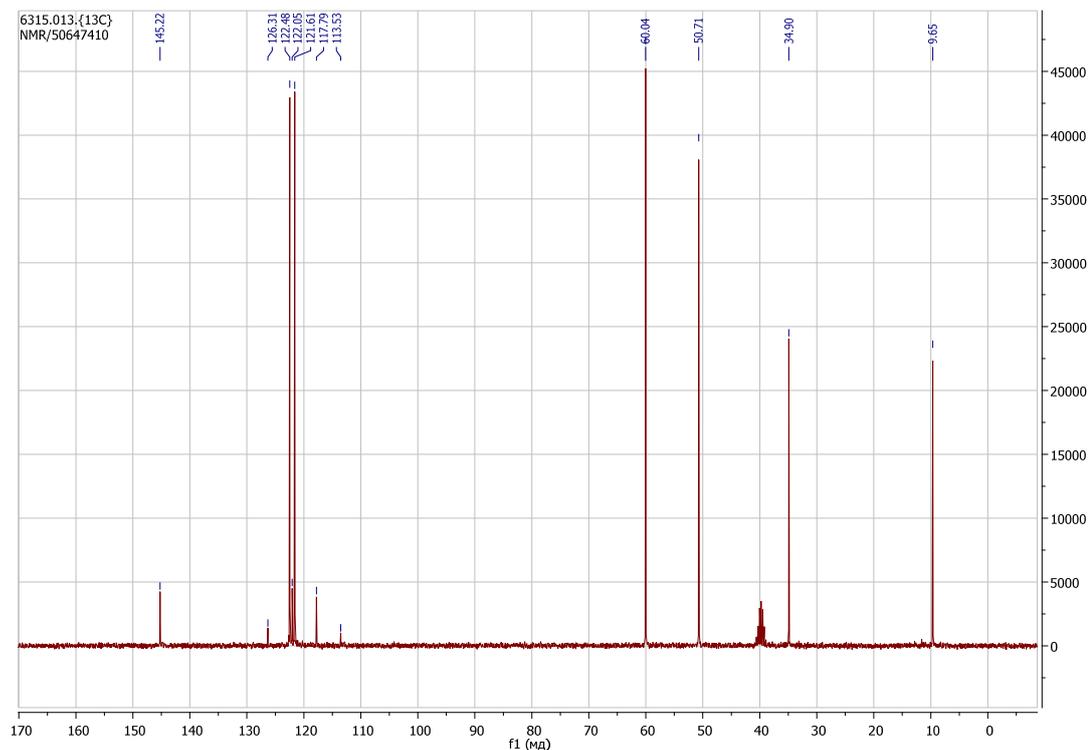
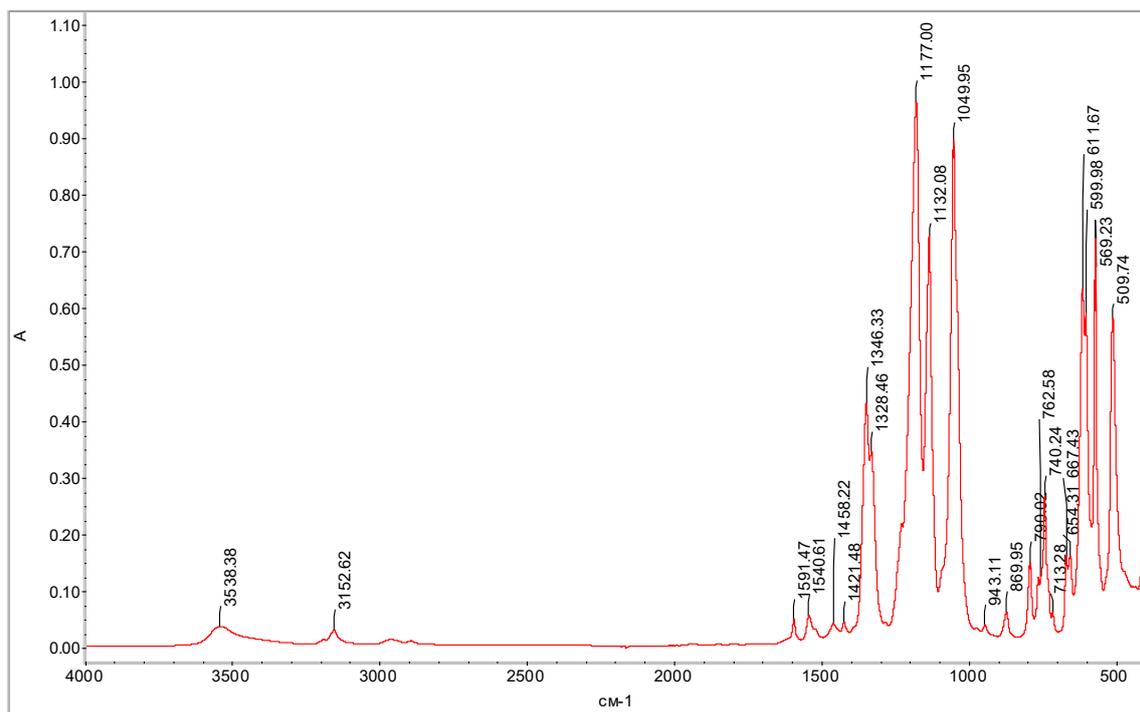


Figure S1  $^1\text{H}$  NMR spectrum of IL **1** (DMSO- $d_6$ , 300.13 MHz).



**Figure S2**  $^{13}\text{C}$  NMR spectrum of IL 1 (DMSO- $d_6$ , 75.47 MHz).



**Figure S3** FTIR spectrum of IL 1.

^exo

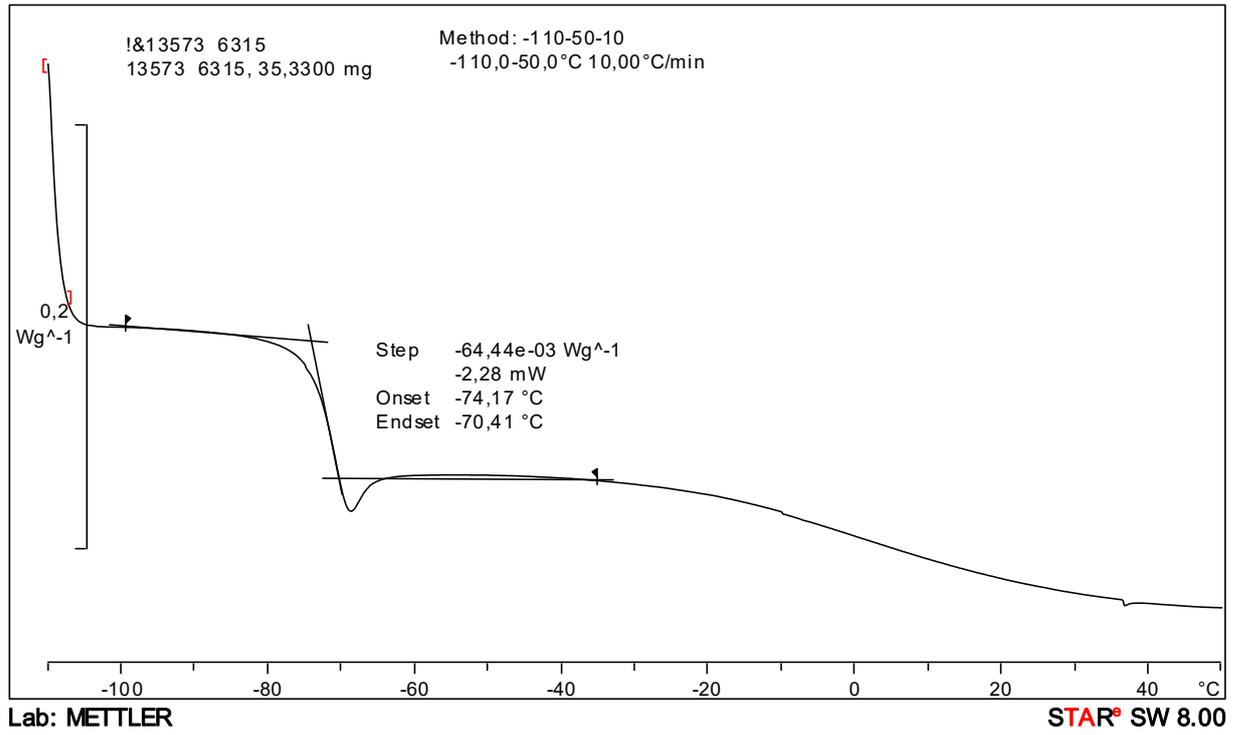
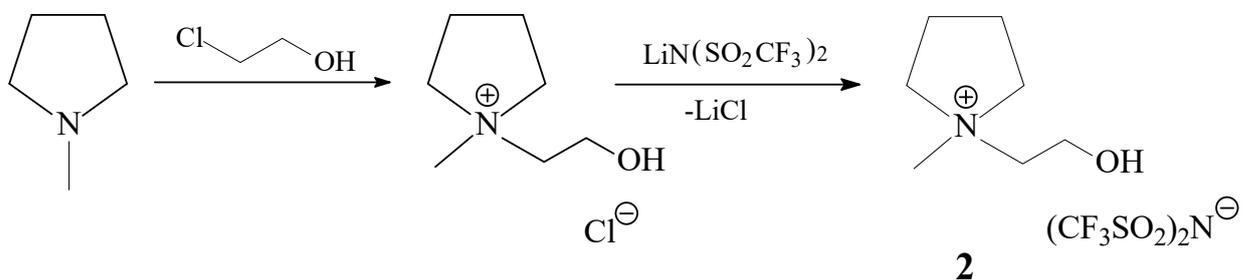


Figure S4 DSC thermogram for IL 1.

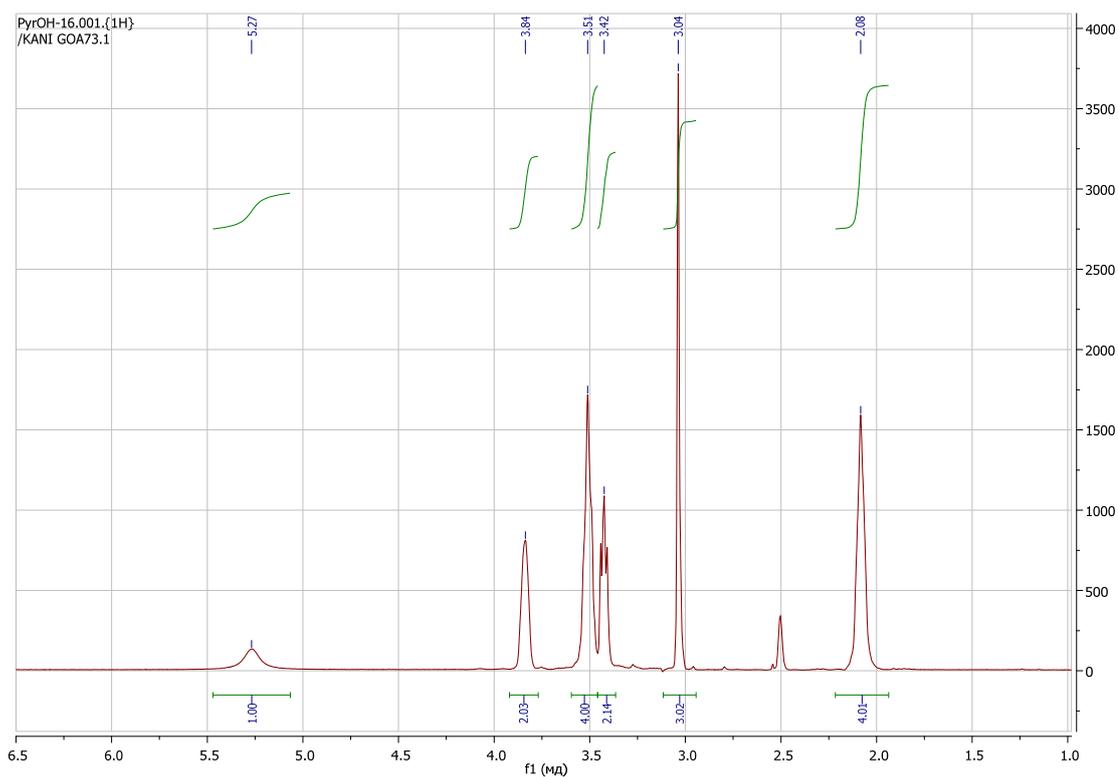
**N-Methyl-N-(2-hydroxyethyl)pyrrolidinium bis(trifluoromethylsulfonyl)imide (2)**



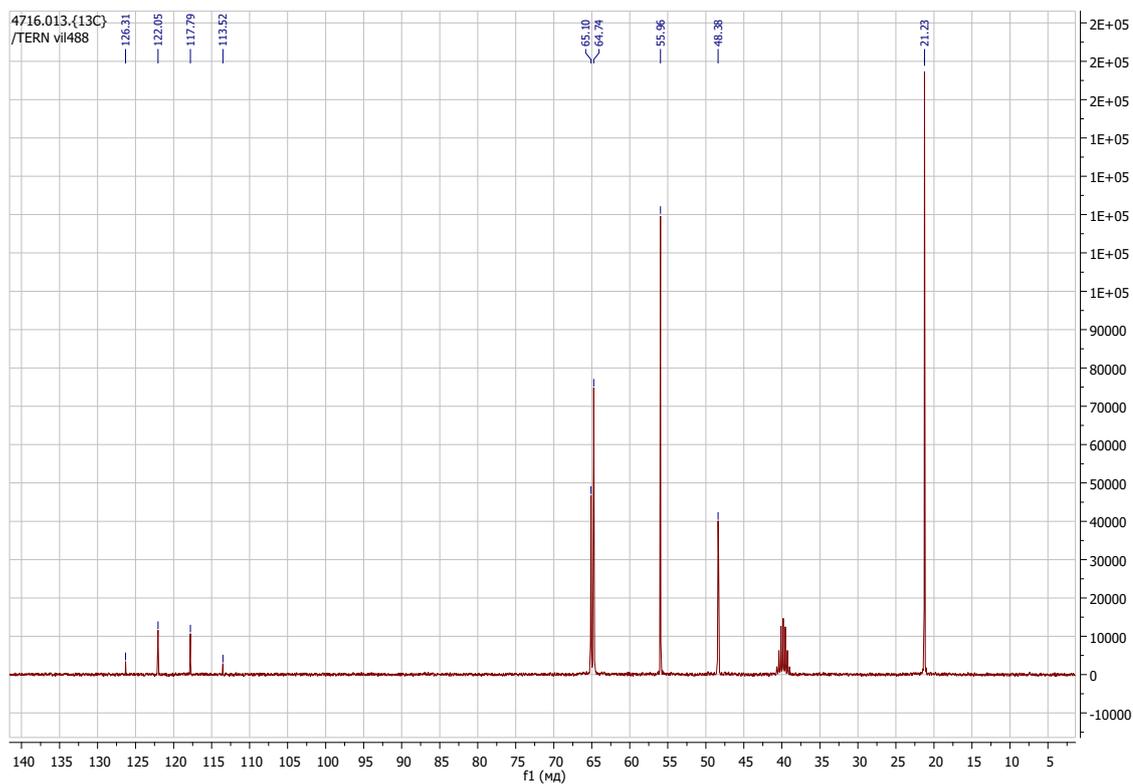
**Scheme S2**

**Synthesis procedure**

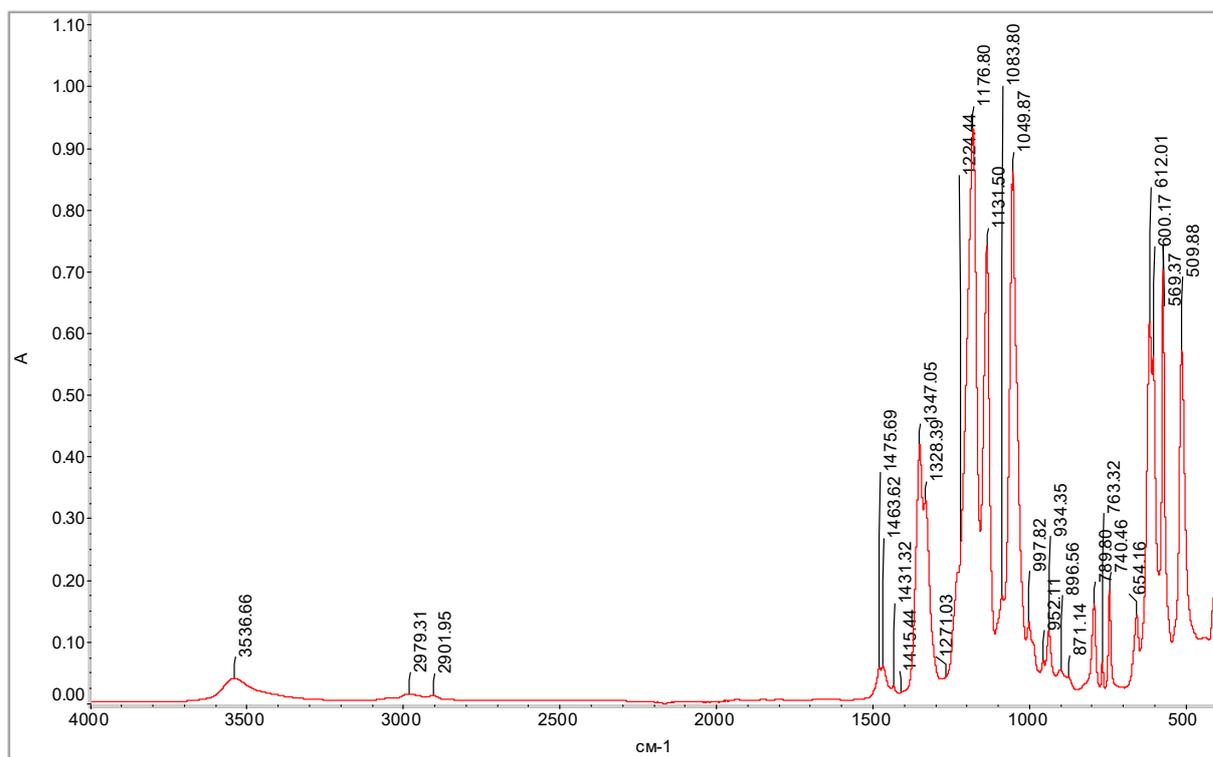
IL **2** was synthesized analogously to the synthesis procedure of IL **1**.



**Figure S5** <sup>1</sup>H NMR spectrum of IL **2** (DMSO-*d*<sub>6</sub>, 300.13 MHz).



**Figure S6**  $^{13}\text{C}$  NMR spectrum of IL 2 (DMSO- $d_6$ , 75.47 MHz).



**Figure S7** FTIR spectrum of IL 2.

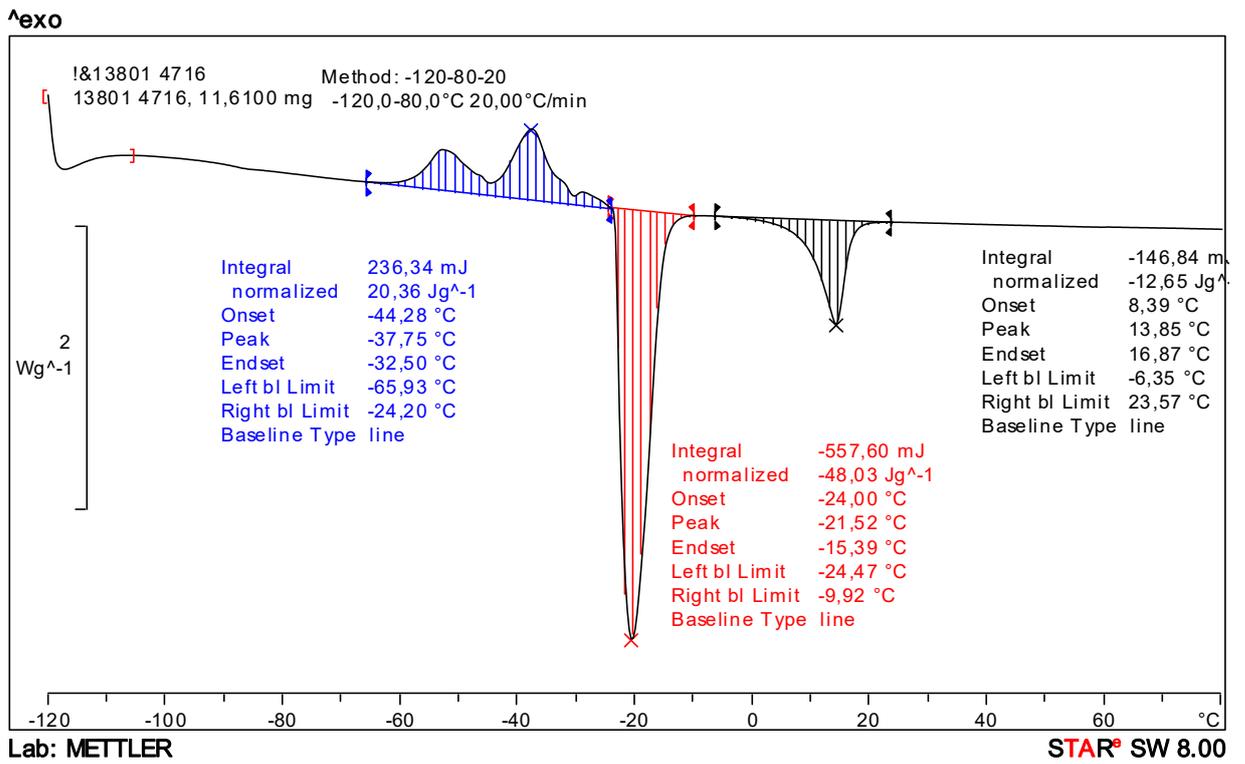
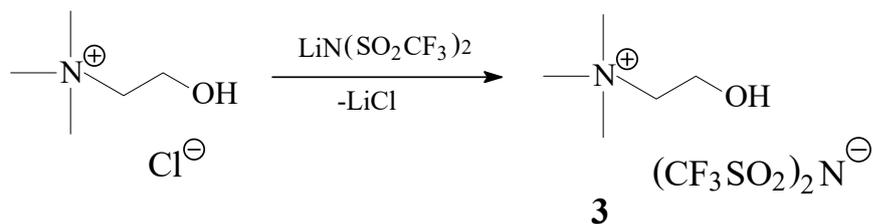


Figure S8 DSC thermogram of IL 2.

### Trimethyl-(2-hydroxyethyl)ammonium bis(trifluoromethylsulfonyl)imide (3)



Scheme S3

#### Synthesis procedure

Bis(trifluoromethylsulfonyl)imide lithium (31.6 g, 0.11 mol) dissolved in water (50 ml) was added to the solution of choline chloride (14 g, 0.1 mol) in water (20 ml). After stirring for 30 min, the upper aqueous layer was decanted and the bottom layer was washed with water to remove lithium salts and dried *in vacuo* at 100 °C for 10 h.

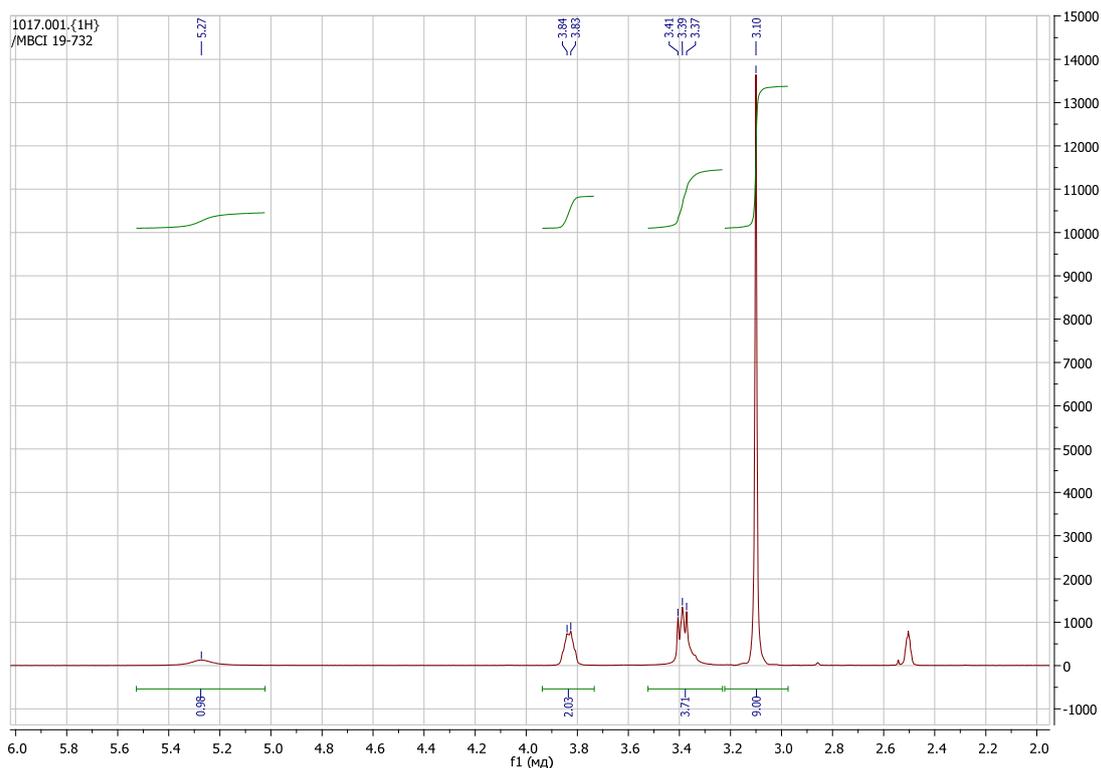
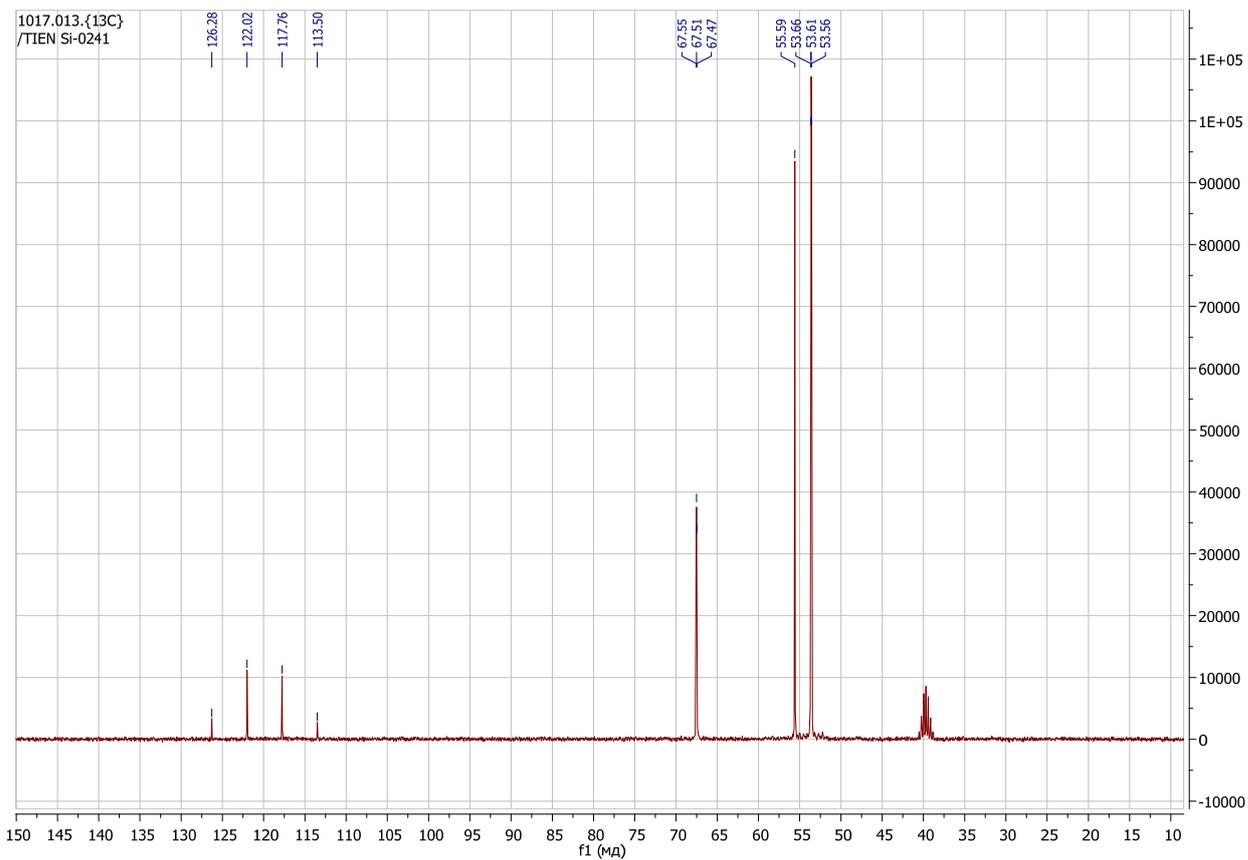
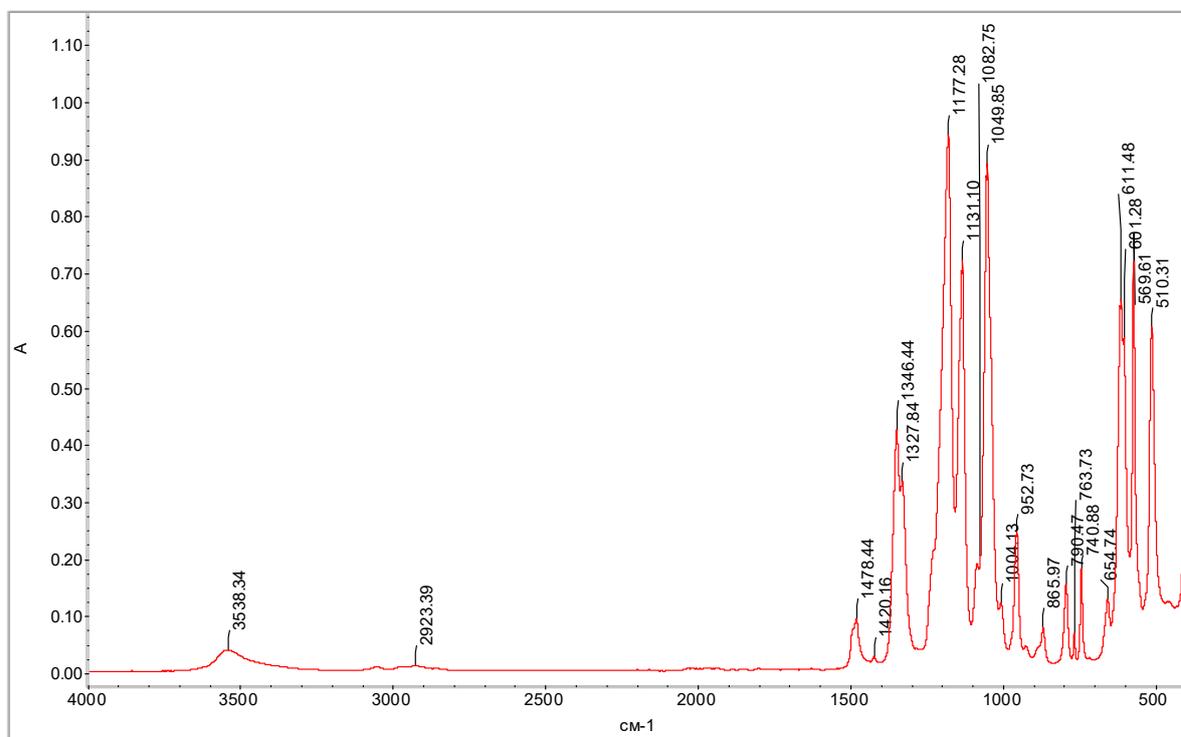


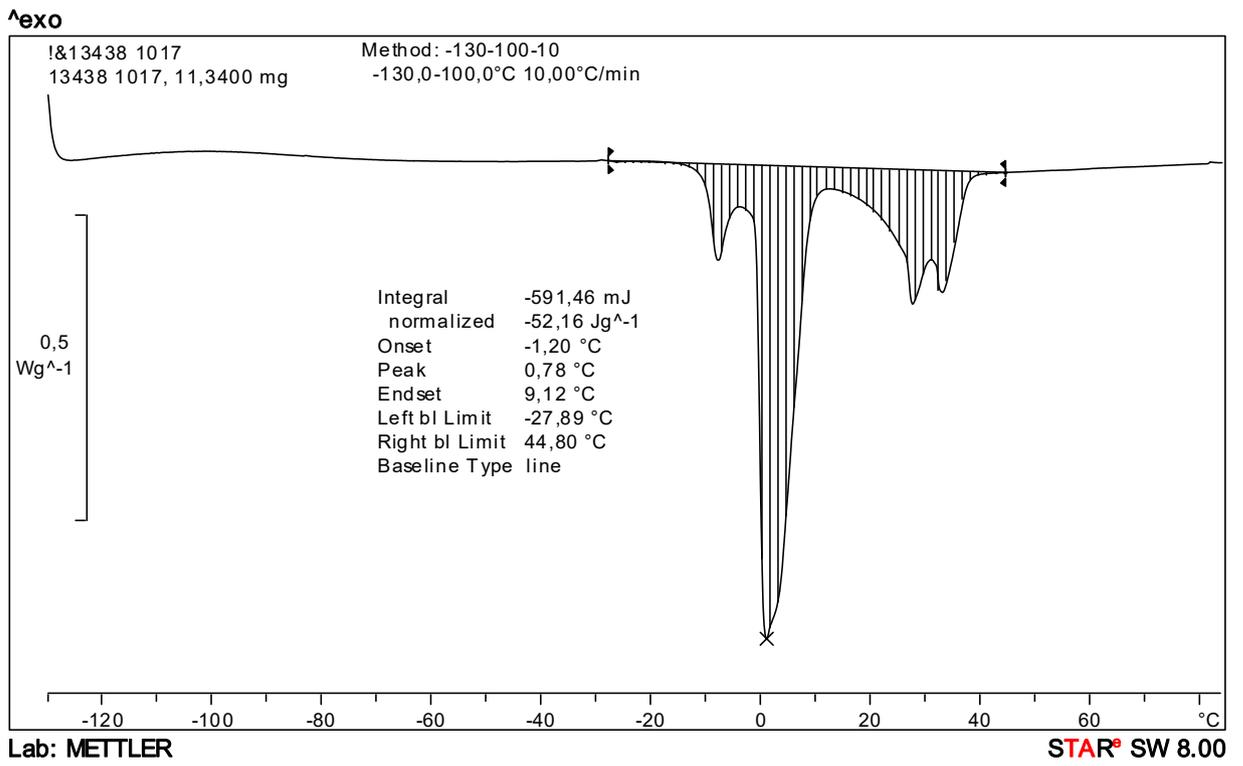
Figure S9  $^1\text{H}$  NMR spectrum of IL 3 (DMSO- $d_6$ , 300.13 MHz).



**Figure S10**  $^{13}\text{C}$  NMR spectrum of IL 3 (DMSO- $d_6$ , 75.47 MHz).

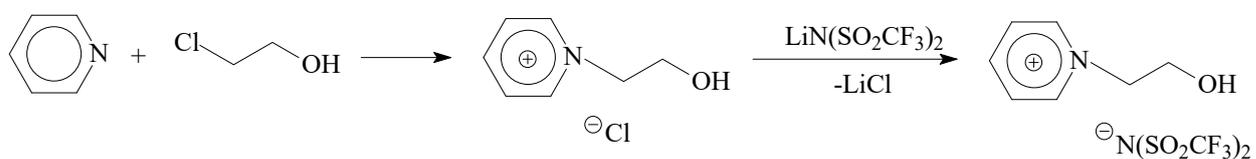


**Figure S11** FTIR spectrum of IL 3.



**Figure S12** DSC thermogram of IL 3.

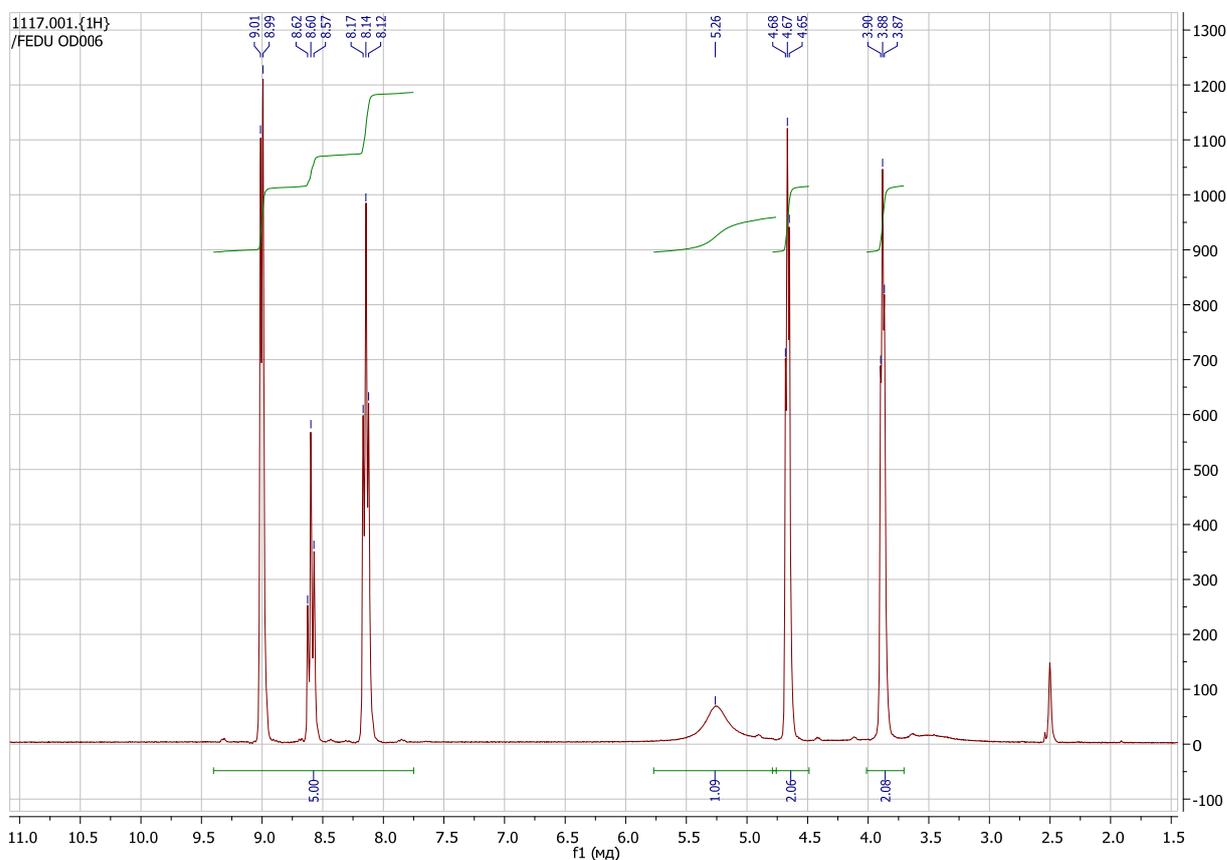
### ***N*-(2-Hydroxyethyl)pyridinium bis(trifluoromethylsulfonyl)imide (**4**)**



**Scheme S4**

### Synthesis procedure

IL **4** was synthesized analogously to the synthesis procedure of IL **1**.



**Figure S13**  $^1\text{H}$  NMR spectrum of IL **4** (DMSO- $d_6$ , 300.13 MHz).

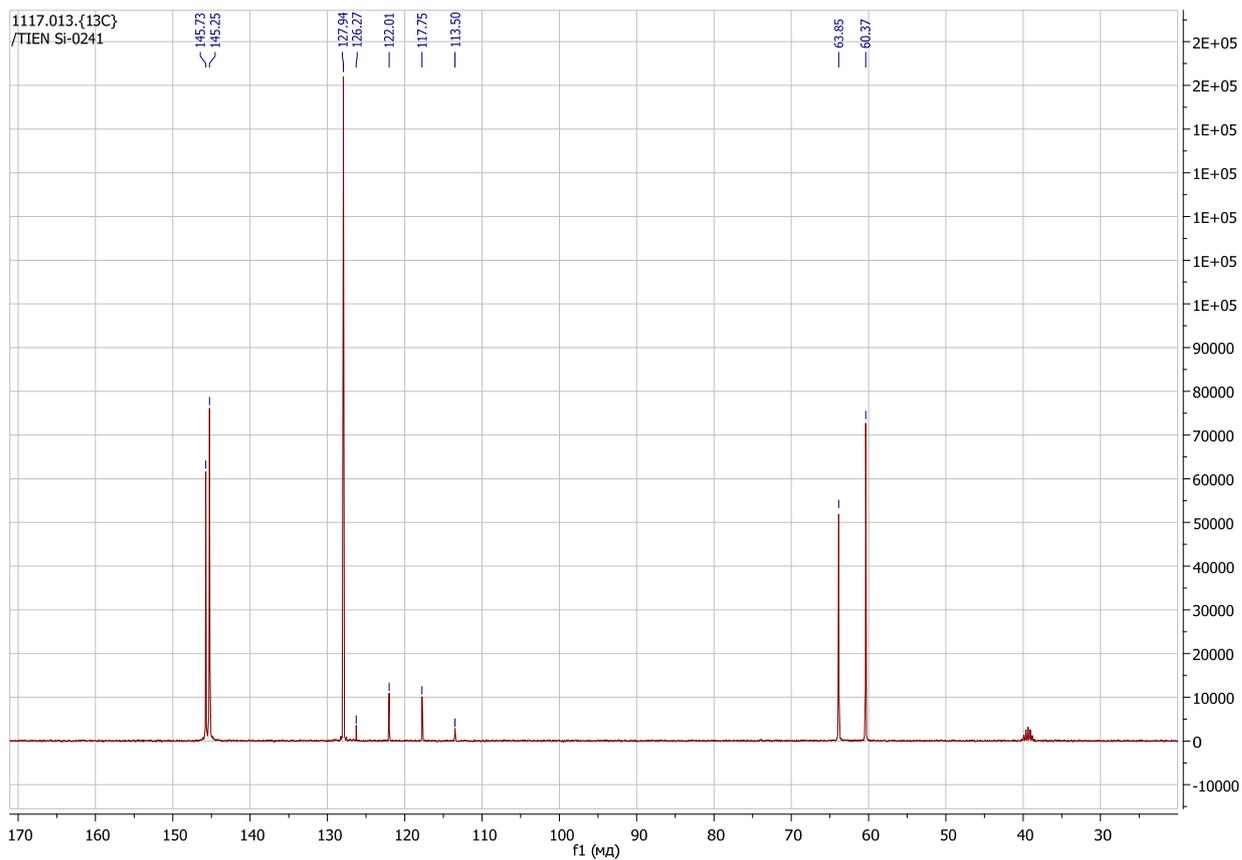


Figure S14  $^{13}\text{C}$  NMR spectrum of IL 4 (DMSO- $d_6$ , 75.47 MHz).

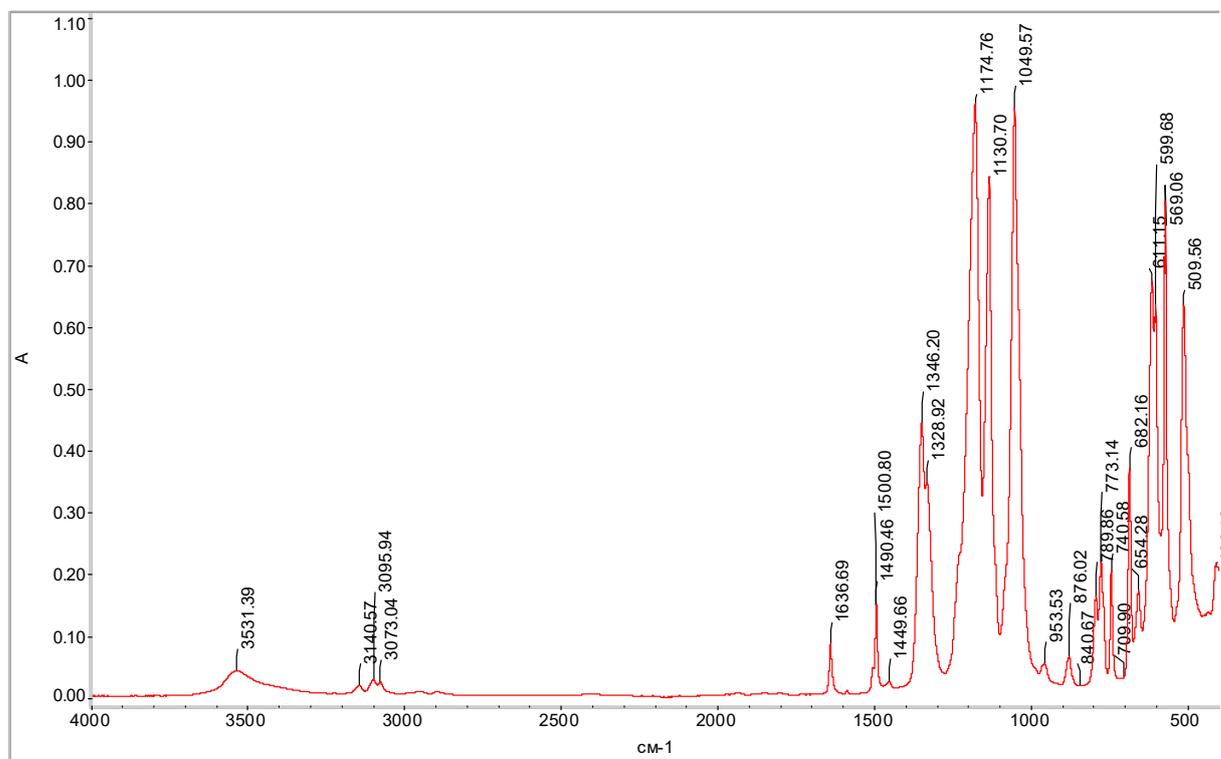
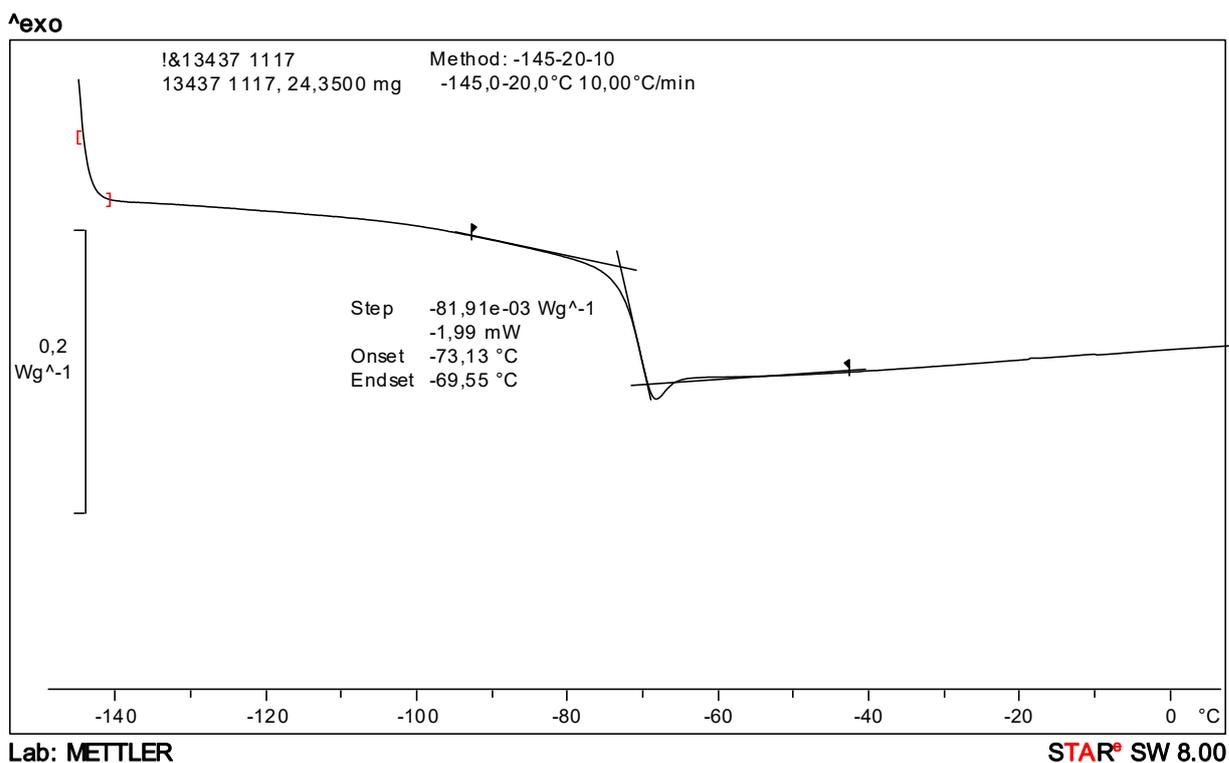


Figure S15 FTIR spectrum of IL 4.



**Figure S16** DSC thermogram of IL 4.

The Vogel–Tamman–Fulcher equation:

$$\ln v = \frac{a}{T - T_0} + b$$

**Table S1** Constants in Vogel–Tamman–Fulcher equation describing dependence of viscosity vs. temperature for ILs 1-4.

Ionic liquid	Constant value		
	a	-b	T <sub>0</sub>
<b>1</b>	579	1.388	204
<b>2</b>	850	2.05	161
<b>3</b>	854	2.00	162
<b>4</b>	632	1.72	191