

Supporting Information

From Figure S1, the **IL** exhibits characteristic absorptions near 1257 cm^{-1} (C-F stretching mode), 1160 cm^{-1} (symmetric SO_2 stretching mode) and 640 cm^{-1} (SO bending mode) at room temperature (RT). Evident changes of the IR spectra are not found when the **IL** was heated to $250\text{ }^{\circ}\text{C}$ for 1 h. Furthermore, as shown in Figure S2, the TGA thermogram performed under an N_2 atmosphere with a heating rate of $15\text{ }^{\circ}\text{C}/\text{min}$ clearly indicates the thermal stability of **IL** below $300\text{ }^{\circ}\text{C}$.

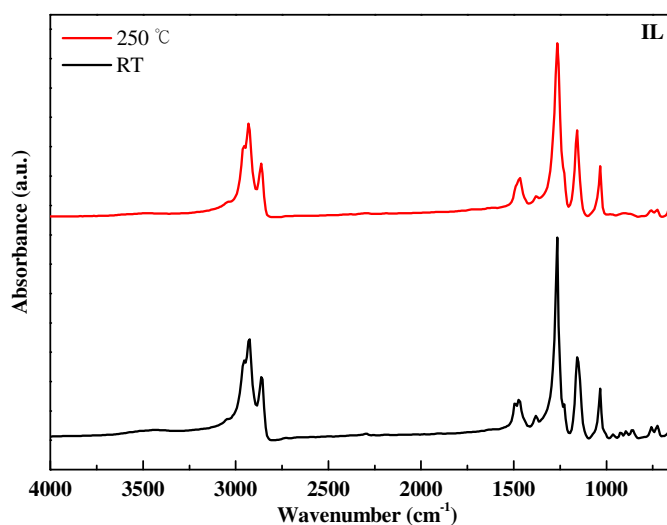


Figure S1. IR absorption spectra of **IL** at room temperature and $250\text{ }^{\circ}\text{C}$.

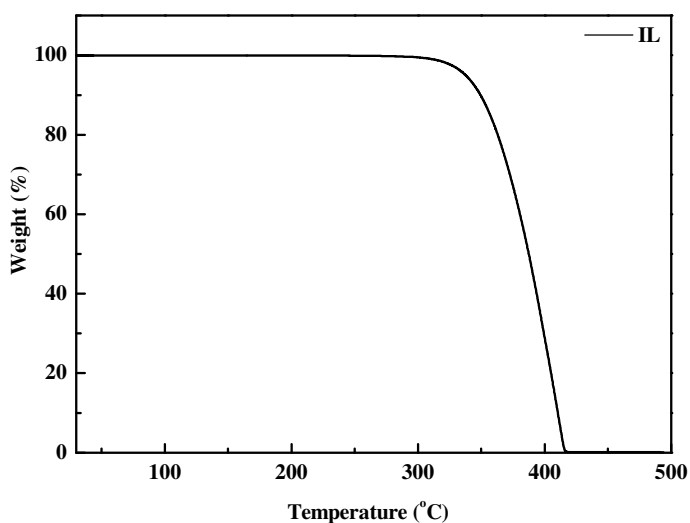


Figure S2. TGA curve of **IL** measured under an N_2 atmosphere.

The **IL** can be easily removed by methanol. The as-synthesized polymers were carefully washed by ethyl ether and methanol before the elemental analysis. Thus, it is reasonable to believe that the probability of the presence of the residual **IL** in the polymers is very low (Figure S3).

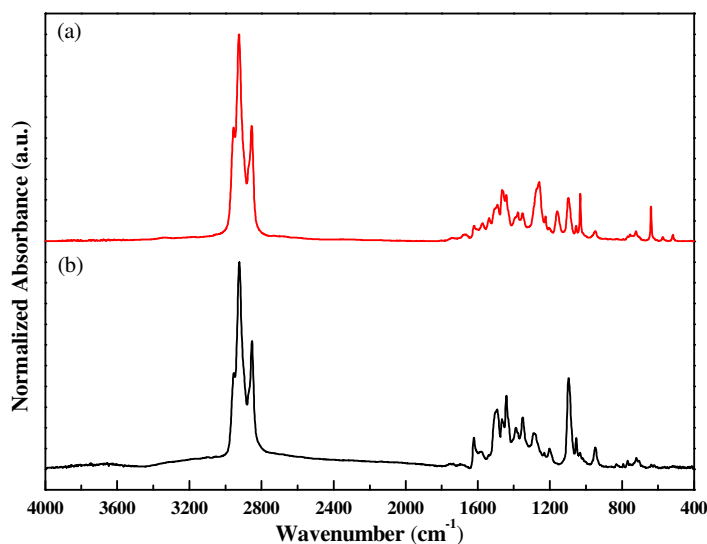


Figure S3. IR absorption spectra of **SQI₅** before (a) and after (b) **IL** removing processes.

The use of **IL** in the synthesis makes **SQI_x** polymers possible to cast continuous free-standing films with a large area ($> 1 \times 1 \text{ cm}^2$). The **SQI_{0.1}** film is much tougher and can be slightly folded as displayed in Figure S4.

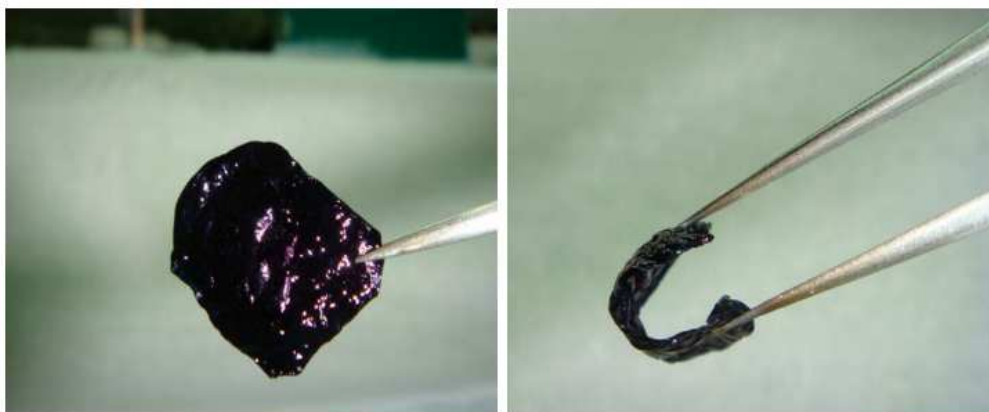


Figure S4. Photographs of flexible **SQI_{0.1}** film.

To improve the solubility of **SQ**, we ultrasonically break the powders and then measure the absorption spectra after filtrating (filter paper: pore size = 3 μm).

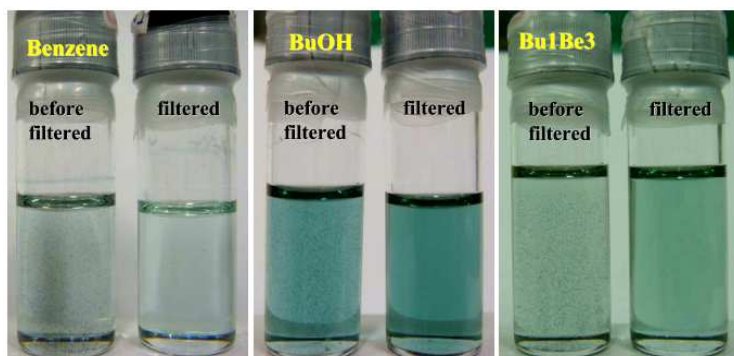


Figure S5. Photographs of **SQI_{0.01}** before and after filtrating in various organic solvents. ‘Bu1Be3’ denotes a mixed solvent of BuOH/Benzene (1:3).

Table S1. The solubility of **SQ**, **SQI_{0.01}** and **SQI₅** in BuOH and Benzene.

	SQ	SQI_{0.01}	SQI₅
BuOH	0.00033	0.00043	0.00050
Benzene	0.00047	0.00035	0.00042

*The unit of solubility is (g/ml).

The estimated concentration of the as-synthesized **SQI_{0.01} in the preparation solution of BuOH: Benzene (1:3) is ~0.05 g/ml.