

Electronic Supplementary Information

An Efficient Synthetic Strategy for High Performance Polysulfone: Ionic Liquid/Zwitterion as Reaction Medium

Jing Wang and Zhengping Liu*

Institute of Polymer Chemistry and Physics, College of Chemistry, BNU Key Lab of Environmentally Friendly and Functional Polymer Materials, Beijing Normal University, Beijing 100875, China

Fax: +86 10 58802075; E-mail: lzp@bnu.edu.cn (Z. Liu).

Table S1. Influence of the reaction medium on polycondensation.

IL ^a		M _w ^b	PDI ^b	Yield	Appearance
Cation	Anion			(%)	
1-isopropylpyrrolidine	PF ₆	8 400	2.92	90.5	Red powder
1-isopropylpyrrolidinium	PF ₆	5 600	3.05	81.2	Black powder

^a General polymerization conditions: equimolar of bisphenol A and DFDPS, a little excess of K₂CO₃, 33.3 wt.% monomer concentration, IL:ZI = 2:1 by weight, dehydrate at 150 °C for 0.5 h, and then 170 °C for 1.5 h. Polymers were washed by hot water without further purification.

^b Weight-average molecular weight (M_w) and polydispersity index (PDI) were measured by GPC calibrated with polystyrene standards.

Measurement of Water Removed Amount

The water removed amount was determined gravimetrically by using molecular sieves. With different dehydration time, toluene and removed water in the Dean-Stark trap were collected in a tube equipped with molecular sieves for 24h. The molecular sieves were dried in an oven for 2 h to evaporate the absorbed toluene naturally and then weighed. In this case excepting the absorbed toluene, the increase of the molecular sieves weight equals the water removed amount. After that, fresh toluene was added continuously into the reaction system for the further dehydration time, then repeated the measurement mentioned above. The water removed amount with different dehydration time was evaluated by this method.

Dissolution Behavior of Recycled IL in Hot Water

Considering the high solubility of monomers, inorganic salt and i-pmim PF₆ in a lot of hot water (100 °C), however, the oligomer residue is hardly insoluble in hot water, we added hot water into recycled i-pmim PF₆ several times and supper clean liquor was removed. As the amount of hot water increased, the content of IL (white solid) assembled at the bottom was decreased significantly. At last no residue was observed in the hot water (Figure S1).

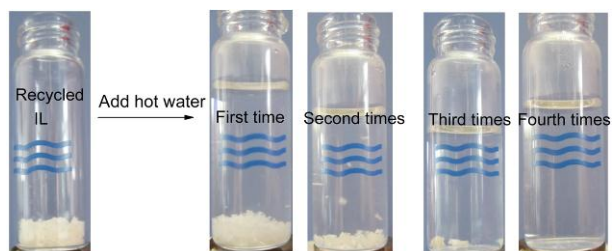


Fig. S1 Photos of the dissolution behavior of recycled IL in hot water.

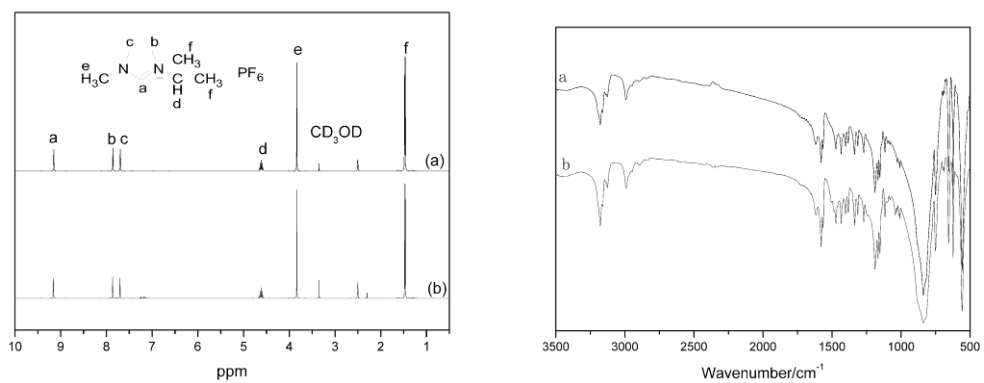


Fig. S2 ¹H NMR (1) and FTIR (2) spectra of i-pmim PF₆ (a) as prepared, (b) after one cycle reaction.