Electronic Supplementary Information

Chemical Crosslinked Liquid Crystalline Poly(ionic liquid)s/Halloysite Nanotubes Nanocomposite Ionogels with Superior Ionic Conductivity, High Anisotropic Conductivity and High Modulus

Hao Li, Zhiqiang Feng, Kang Zhao, Zihao Wang, Jiahang Liu, Jie Liu, Hongzan Song

Table S1. Composites of Poly(ionic liquid)s-based naocomposite ionogels.

Samples	Amount of VBIMBF4 in IL (%)	Amount of HNTs in IL (%)	Amount of PEGDA in VBIMBF4 (%)
10%-PIL-Ionogel-1	10	20	5
10%-PIL-Ionogel-2	10	25	5
10%-PIL-Ionogel-3	10	30	5
10%-PIL-Ionogel-4	10	35	5
10%-PIL-Ionogel-5	10	40	5
20%-PIL-Ionogel-1	20	20	5
20%-PIL-Ionogel-2	20	25	5
20%-PIL-Ionogel-3	20	30	5
20%-PIL-Ionogel-4	20	35	5
20%-PIL-Ionogel-5	20	40	5
30%-PIL-Ionogel-1	30	20	5
30%-PIL-Ionogel-2	30	25	5
30%-PIL-Ionogel-3	30	30	5
30%-PIL-Ionogel-4	30	35	5
30%-PIL-Ionogel-5	30	40	5

Table S2. Comparison of mechanical properties of ionogels with different contents of PIL and HNTs.

Samples	Strength (MPa)	Young's Modulus (MPa)	Elongation at break (%)
10%-Ionogel-1	0.2±0.05	1.0±0.1	28.4±0.5
10%-Ionogel-2	0.7±0.2	3.6±0.3	32.6±0.5
10%-Ionogel-3	1.8±0.2	5.1±0.3	39.1±0.6
10%-Ionogel-4	2.9±0.3	8.1±0.3	43.9±0.7
10%-Ionogel-5	3.5±0.3	12.5±0.4	31.2±0.6
20%-Ionogel-1	0.4±0.1	1.4±0.2	23.5±0.5
20%-Ionogel-2	1.1±0.2	4.5±0.3	27.2±0.5
20%-Ionogel-3	1.9±0.2	6.8±0.3	32.7±0.6
20%-Ionogel-4	3.4±0.3	11.5±0.4	38.9±0.6
20%-Ionogel-5	3.7±0.3	18.5±0.4	20.6±0.4
30%-Ionogel-1	0.8±0.1	3.6±0.2	16.8±0.4
30%-Ionogel-2	1.8±0.1	8.7±0.3	20.4±0.4
30%-Ionogel-3	2.7±0.2	12.8±0.3	23.3±0.5
30%-Ionogel-4	4.0±0.2	17.5±0.4	26.7±0.6
30%-Ionogel-5	4.4±0.3	26.7±0.5	21.3±0.5

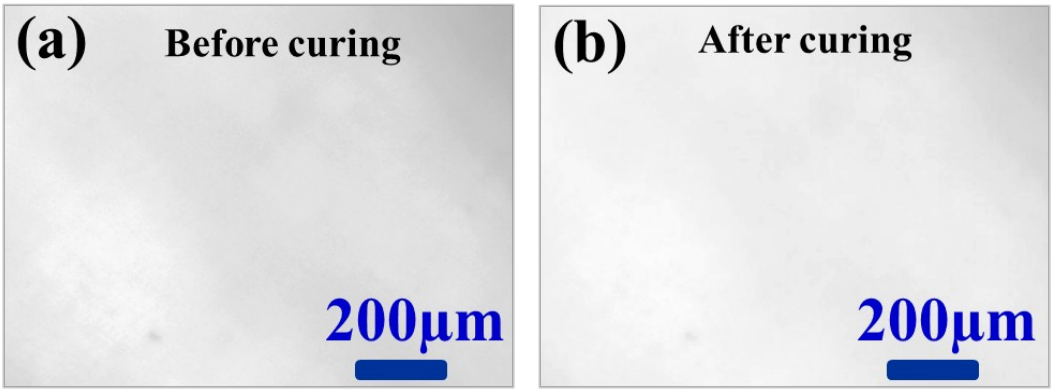

Fig. S1. Polarized optical micrographs for the nanocomposite LC ionogels before and after curing

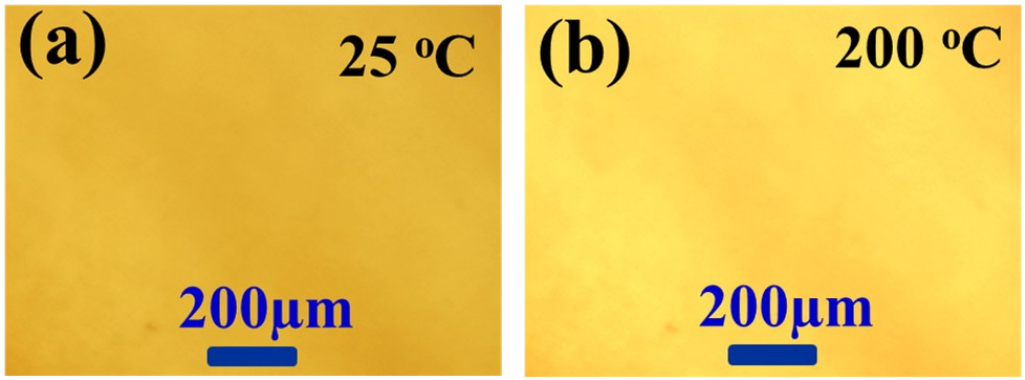

Fig. S2. Selected POM during the heating process for the chemical crosslinked ionogels .

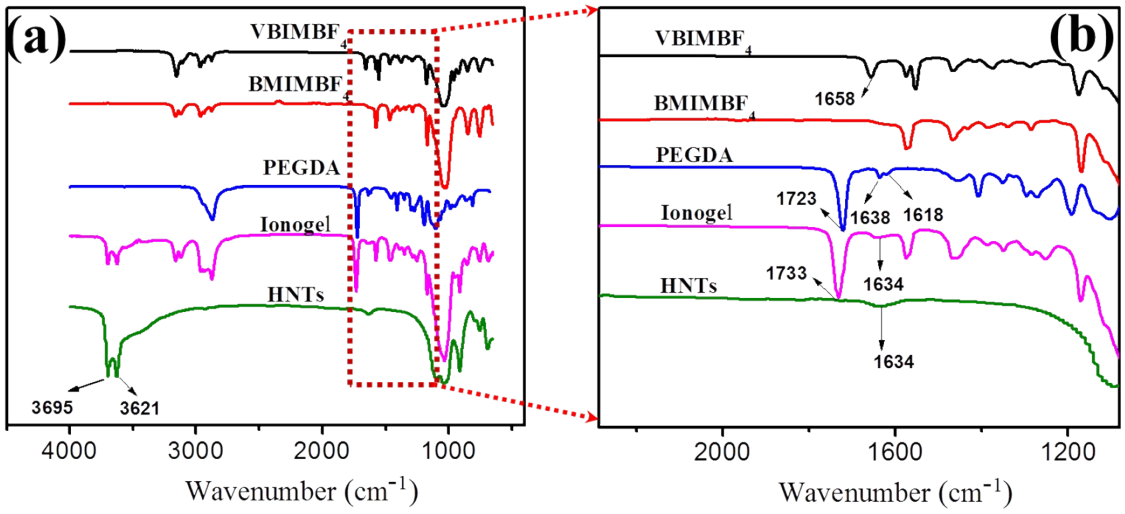

Fig. S3. (a) FTIR patterns of neat HNTs, $VBIMBF_4$, $BMIMBF_4$, PEGDA, and ionogels. (b) The right pattern is the magnified FTIR patterns from 1100 to 2300 cm^{-1}.

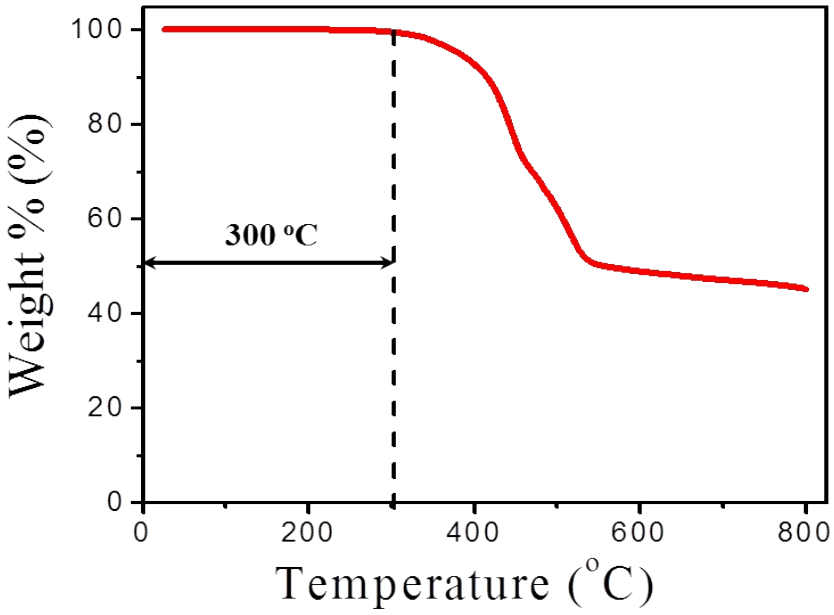

Fig. S4. TGA curves of nanocomposite ionogels.

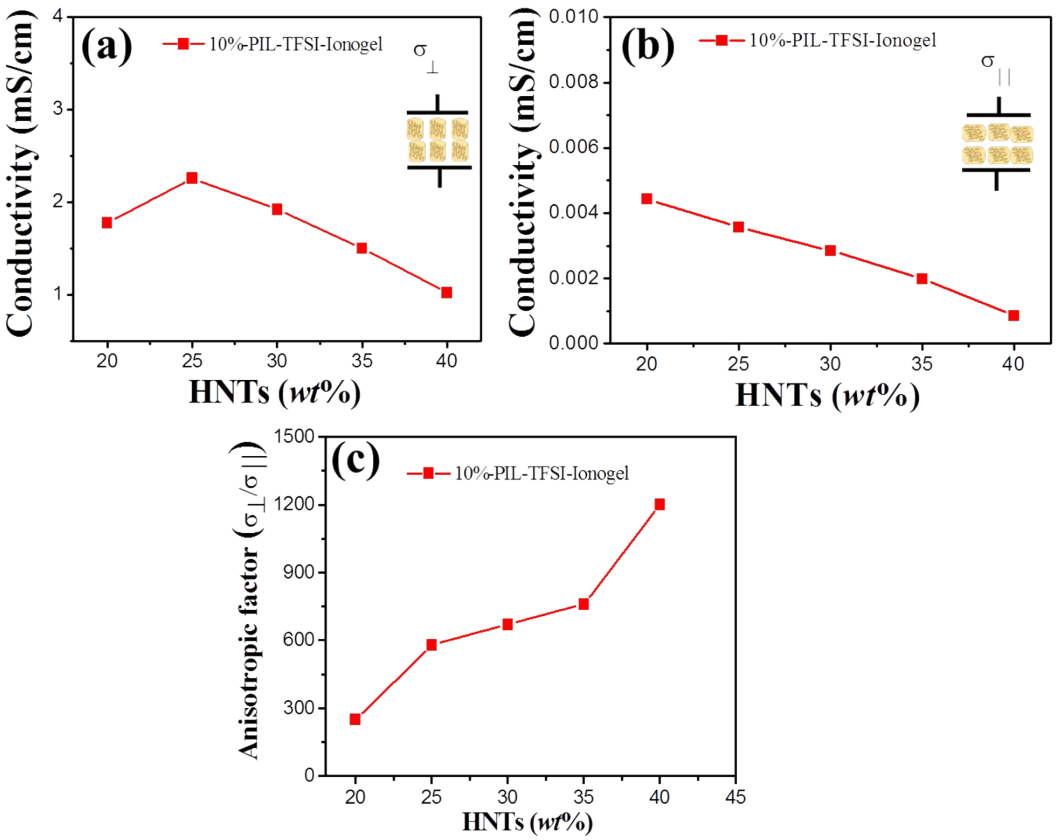

Fig. S5. Ionic conductivity and anisotropic factor of 10%-PIL-TFSI-Ionogel as a function of HNTs at 25 °C.