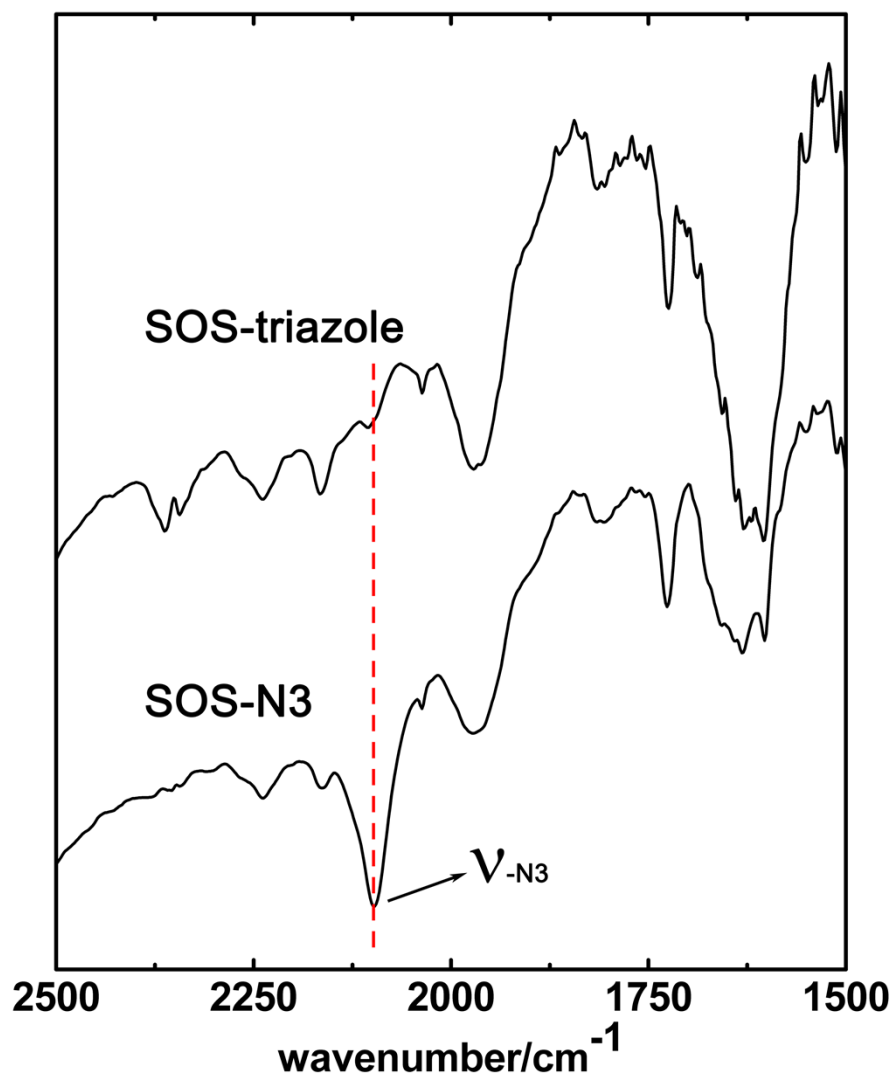
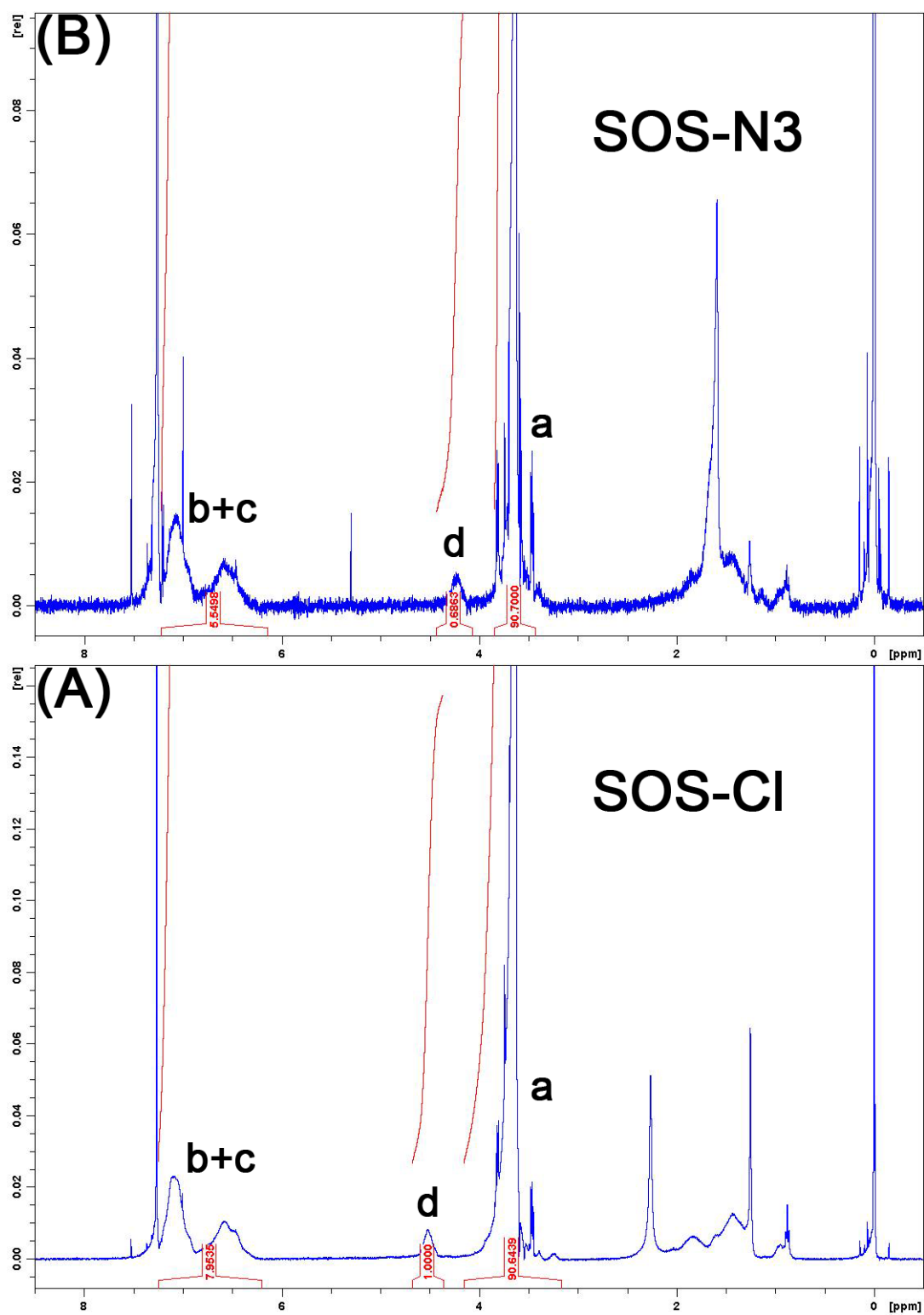


Supporting information for

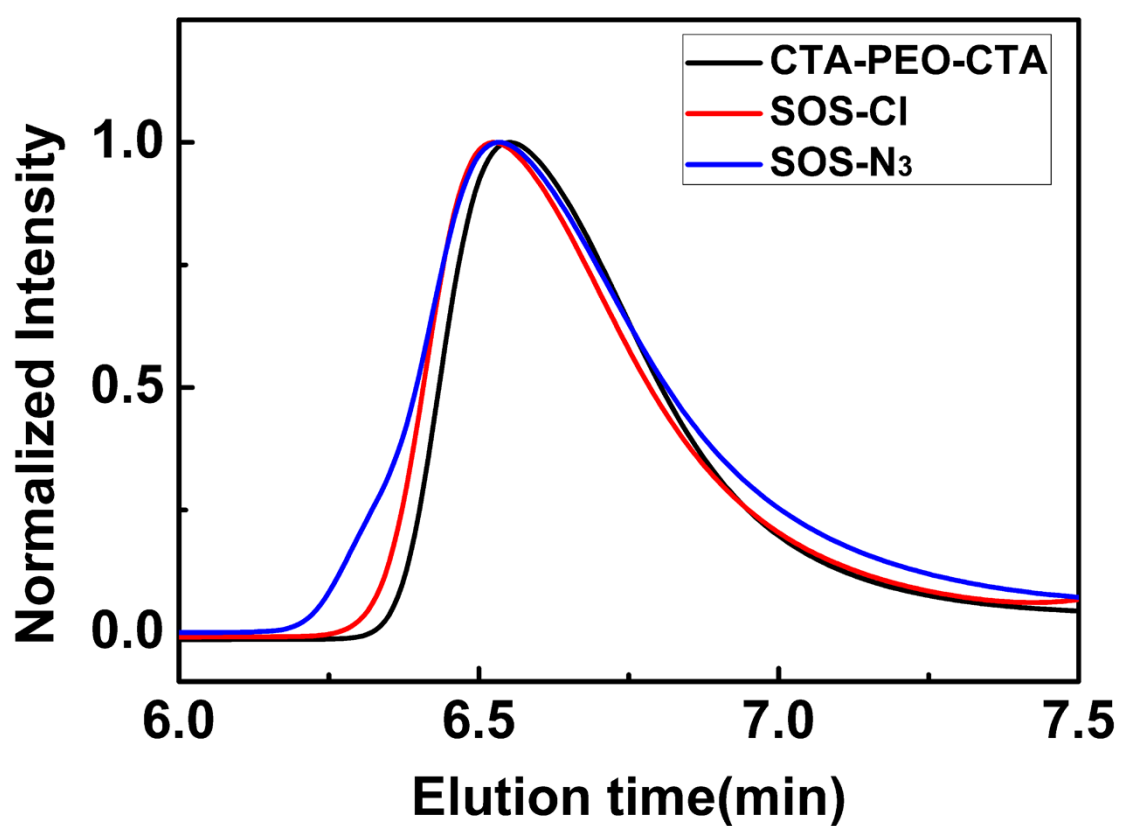
**Reversible high toughness, high conductivity ion gels  
by sequential triblock copolymer self-assembly and  
disulfide bond cross-linking**



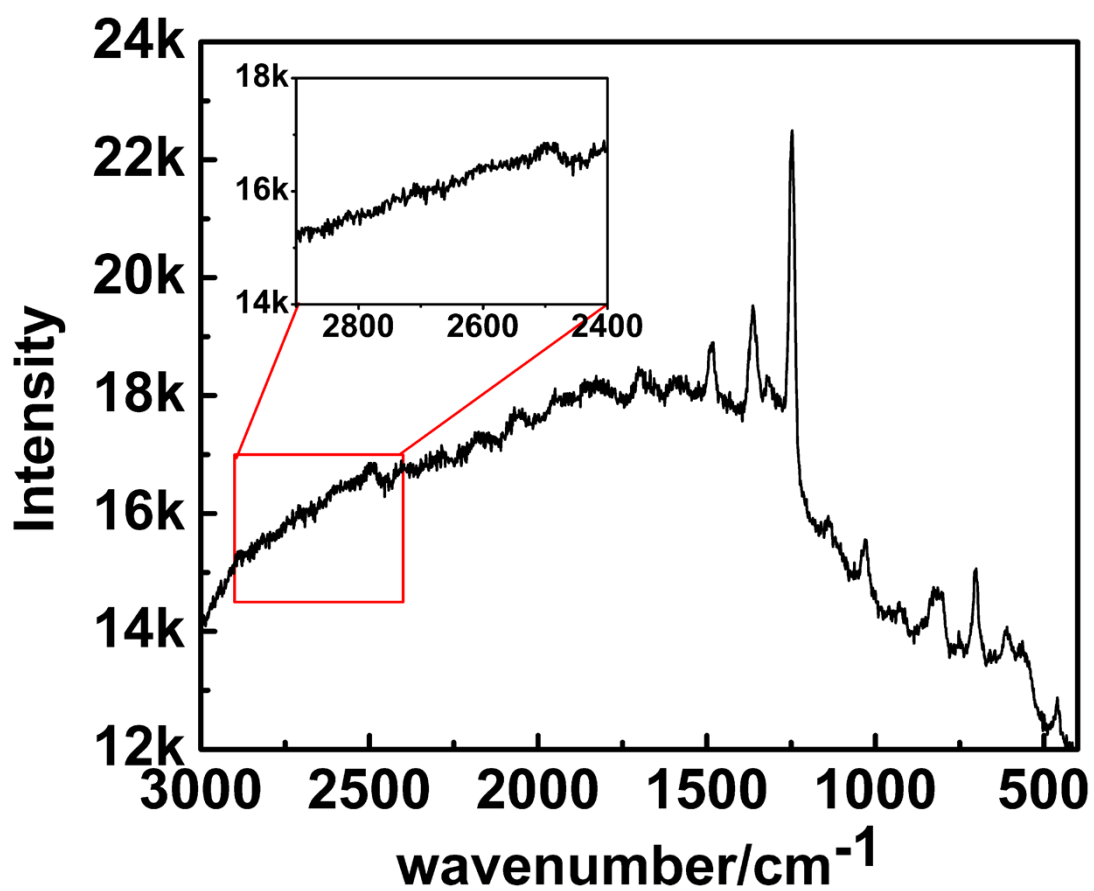
**Fig. S1** FT-IR spectra of SOS-N<sub>3</sub> (low) and SOS-triazole (upper).



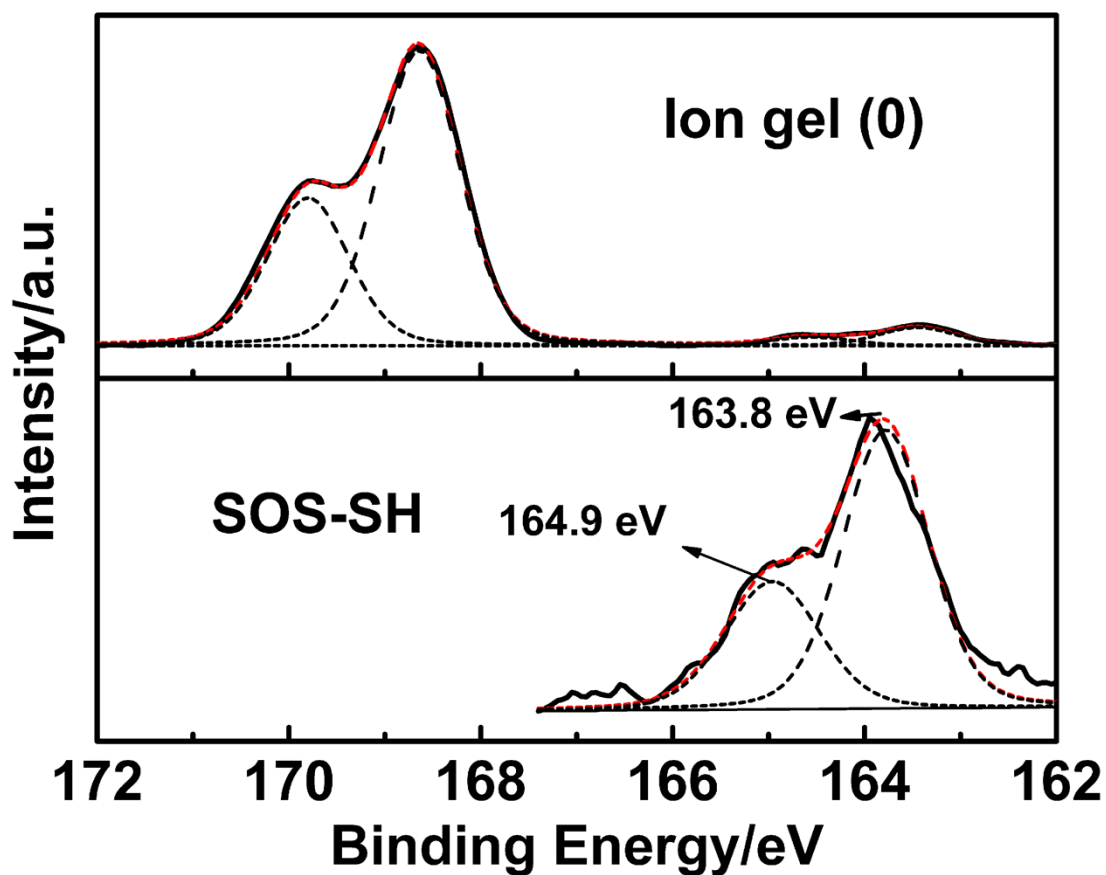
**Fig. S2** Integration of peaks a, b+c and d of  $^1\text{H}$ -NMR spectra of triblock copolymer (A) SOS-Cl and (B) SOS- $\text{N}_3$ .



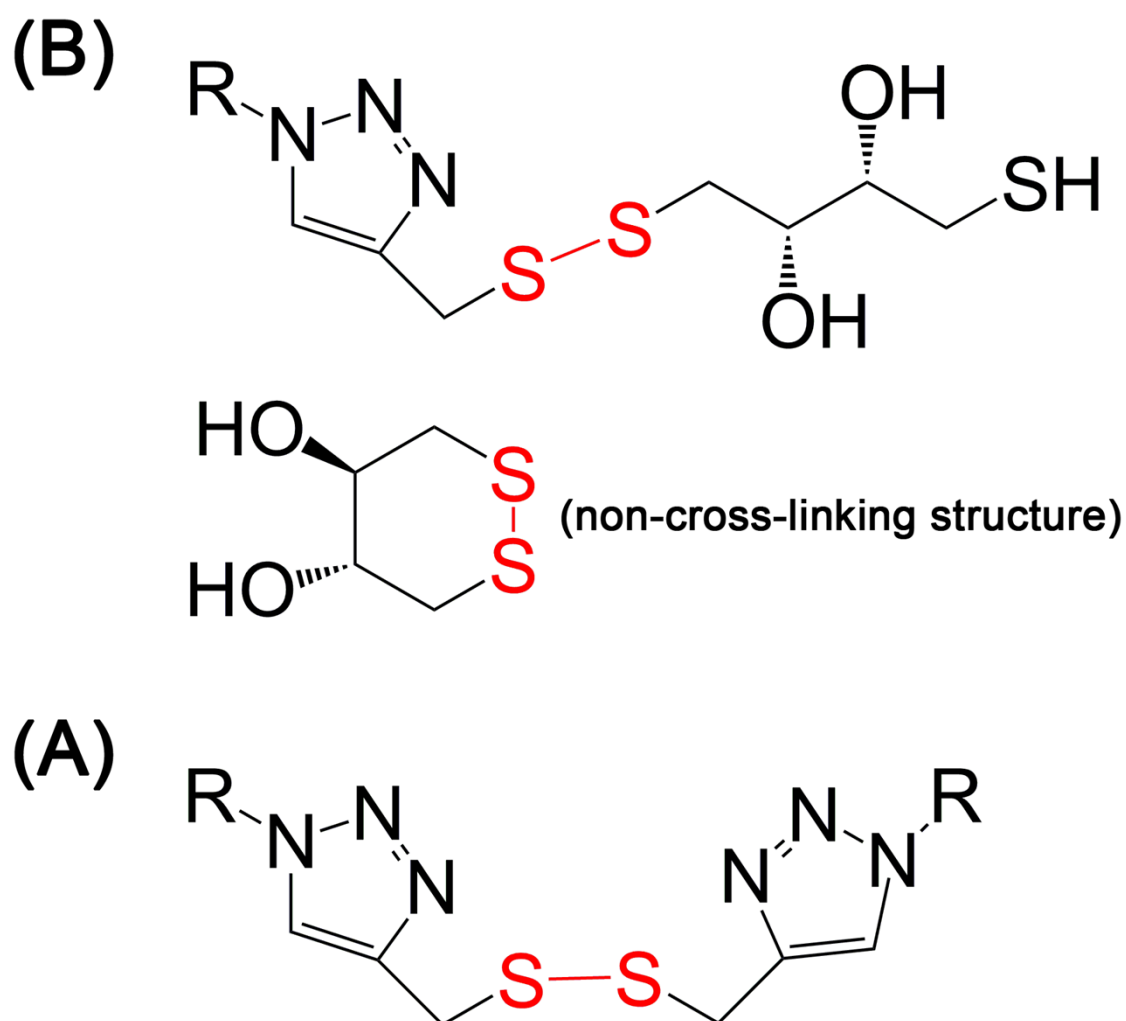
**Fig. S3** Gel permeation chromatography (GPC) traces of CTA-PEO-CTA, SOS-Cl and SOS-N<sub>3</sub>.



**Fig. S4** Raman spectroscopy of triblock copolymer, SOS-SH. The enlarged drawing showed the spectroscopy of the region from 2400-2900  $\text{cm}^{-1}$ . There was no obvious characteristic scattering peak of S-H stretching vibration at about 2600  $\text{cm}^{-1}$ .



**Fig. S5** XPS of S<sub>2p</sub> of SOS-SH and ion gel (0). The experimental data were fitted with a software called XPS peak and the resulting curves are plotted as dotted lines as well. The right spin-orbit doublet were assigned to S<sub>2p</sub> of S-S or S-H.<sup>1</sup> The number 0 in the brackets indicated the times of reduction-oxidation cycle.



**Fig. S6** disulfide bond structure of (A) SOS-SH and ion gel (0) and (B) ion gel (1) and ion gel (2).

	average tensile strength (kPa)	average ultimate elongation
less cross-linking	75.0	5.86
after cross-linking (0)	93.8	5.9
after cross-linking (1)	86.5	5.1
after cross-linking (2)	97.5	5.0

**Table.S1** Results of tensile tests for less cross-linking, after cross-linking (0), after cross-linking (1), and after cross-linking (2) 10wt% SOS-SH ion gel at room temperature. The numbers (0, 1, 2) in the brackets indicated the times of reduction-oxidation cycle.

1. T. Nakanishi, B. Ohtani and K. Uosaki, *The Journal of Physical Chemistry B*, 1998, **102**, 1571-1577.