Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting informaiton

A transparent, tough self-healing hydrogel based on dual physically and chemically triple crosslinked network

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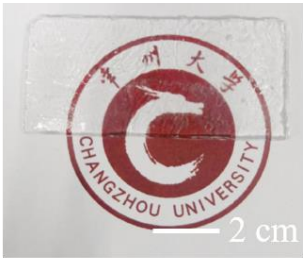

Fig. S1 The transparent film of PVA/B TN hydrogel.

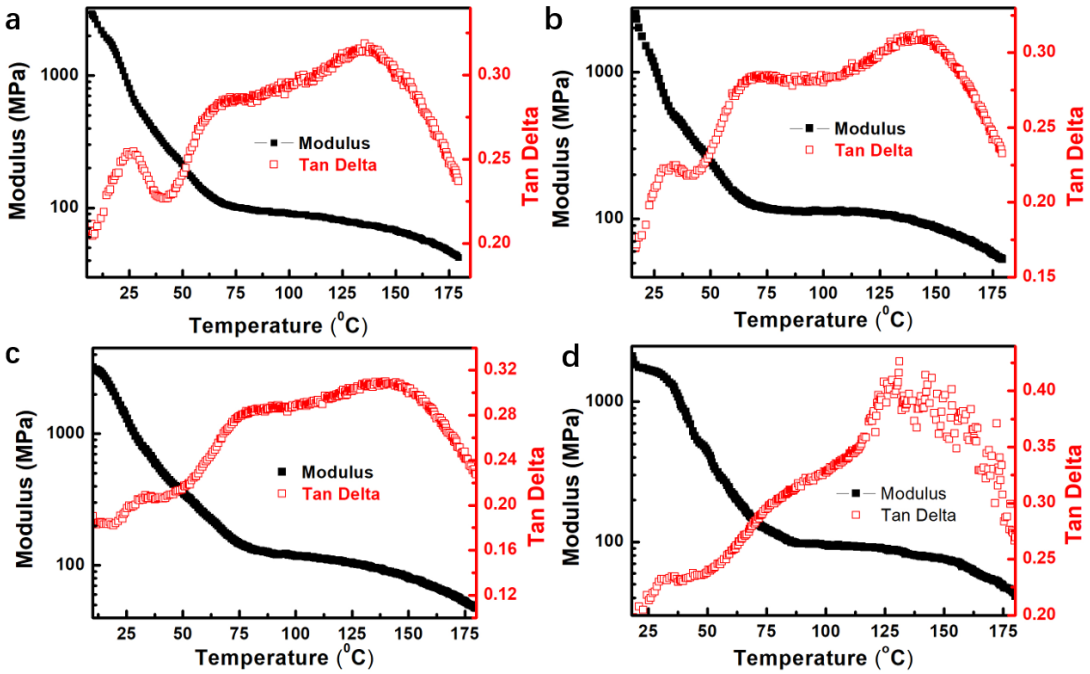

Fig. S2 Temperature dependence of modulus and tan delta for different freeze-thaw cycles hydrogels. (a) 0 cycle, (b) 1 cycle, (c) 2 cycles (d) 3 cycles. All hydrogels were freeze-dried for 24h to the DMA measurement.

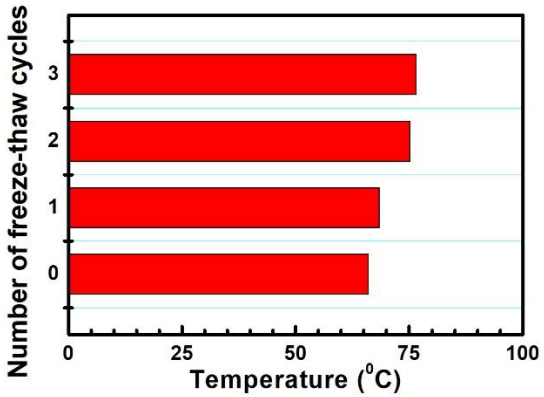

Fig. S3 The glass-transition temperature (Tg) of different freeze-thaw cycles hydrogels

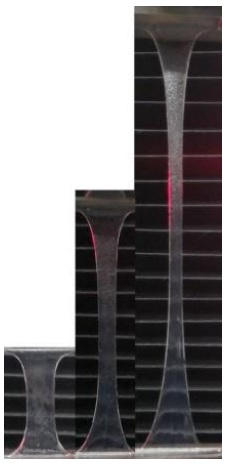

Fig. S4 The tensile strain-stress test was performed on the hydrogel samples.

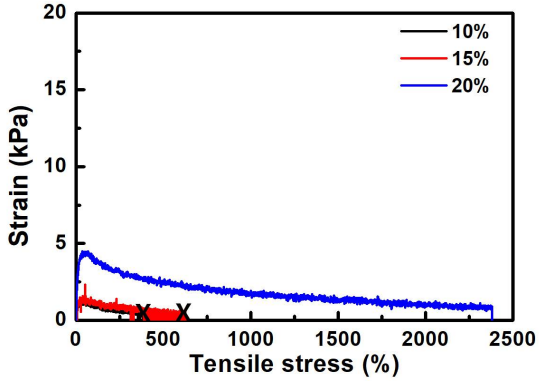

Fig. S5 Tensile stress–strain curves for different PVA mass concentration without freezing/thawing cycles. The “x”in the figure represents unfracture, which was difficult to accurately measure the magnitude of the stress and strain at low mass concentrations (10wt% and 15wt%).

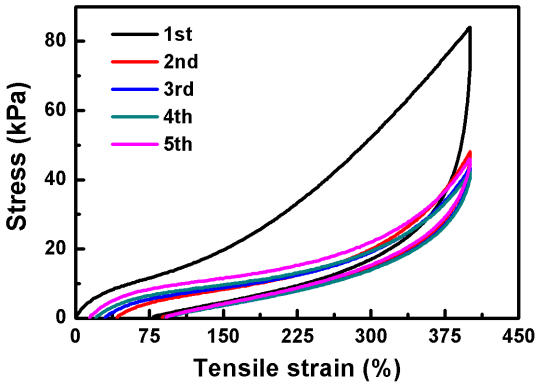

Fig. S6 The PVA/B TN hydrogel cyclic tensile loading-unloading curves for five successive stretching to 400% strain.

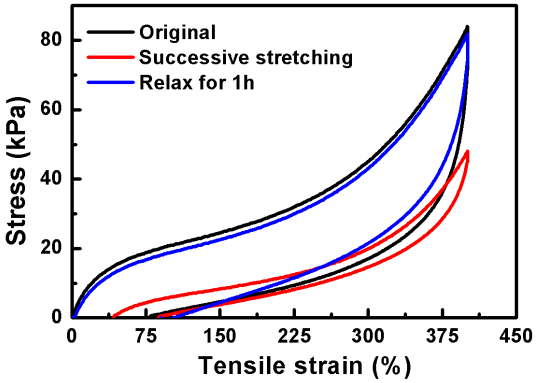

Fig. S7 Cyclic tensile loading-unloading curves at 400% strain with different resting times.

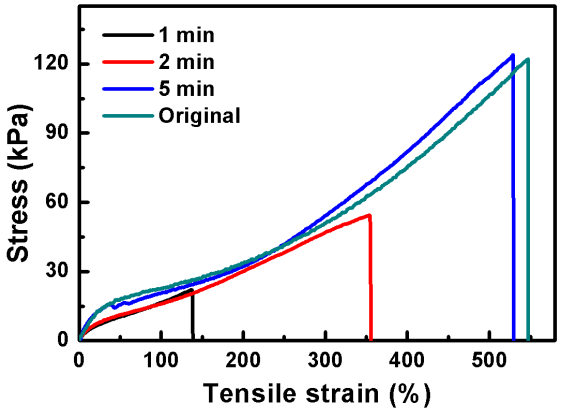

Fig. S8 Tensile stress-strain curves of hydrogels with 20wt% PVA mass concentration after three freeze-thaw cycles at different healing times.

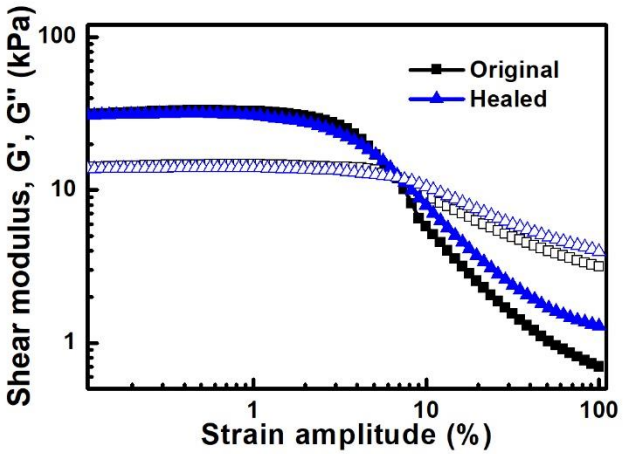

Fig S9. G′ and G″ for the original and healed 3 freeze-thaw cycles hydrogels measured as a function of oscillatory strain amplitude, γ_0 (ω = 6.28 rad s^{-1}).

Table S2 A review on transparent, tough and self-healing hydrogels (RT: room temperature, -: No figures were given)

Ref.	Ingredient	transparent	Stretchability/ tough	Healing conditions	healing efficiencies	Year
1	PAA/Fe^{3+}	-	650%	RT/6h	99%	2013
2	Catechol/ Mg^{2+},Zn^{2+}	-	5 MPa	RT/24h	80%	2016
3	PVA-PAM	92%	200 kPa	-	-	2018
4	PDMAEA -Q/PAA	90%	4 MPa	RT/48h	-	2019
5	PAM/carra geenan	-	950%	85°C/30min	-	2019
	PVA/B	82%	528%/123kPa	RT/5min	98.5%	This work

References:

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