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Supporting Information for

**Topologically Enhanced Dual-Network Hydrogels with  
Rapid Recovery for Low-Hysteresis, Self-Adhesive Epidemic  
Electronics**

*Guangyong Zhang<sup>†</sup>, Song Chen<sup>\*, †</sup>, Zefei Peng<sup>†</sup>, Wei Shi<sup>†</sup>, Zelin Liu<sup>†</sup>, Hang Shi<sup>†</sup>,*

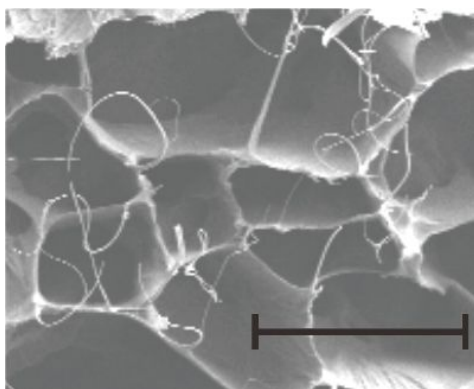
*Kaiying Luo<sup>†</sup>, Ganghui Wei<sup>†</sup>, Hongqiang Mo<sup>‡</sup>, Bin Li<sup>‡</sup>, Lan Liu<sup>\*, †</sup>*

<sup>†</sup>College of Materials Science and Engineering, Key Lab of Guangdong Province for High Property and Functional Macromolecular Materials, South China University of Technology, Guangzhou 510641, China.

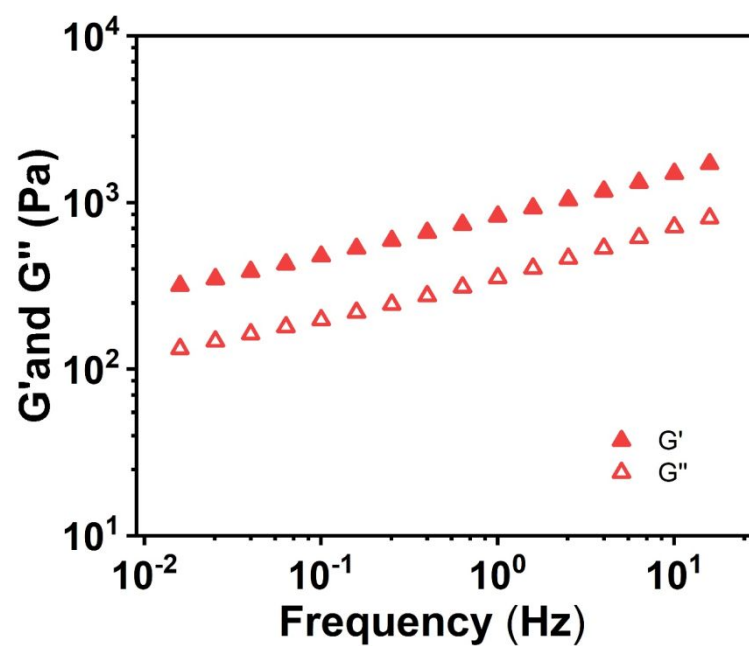
<sup>‡</sup>College of Automation Science and Engineering, South China University of Technology, Guangzhou 510641, China.

\* Corresponding authors.

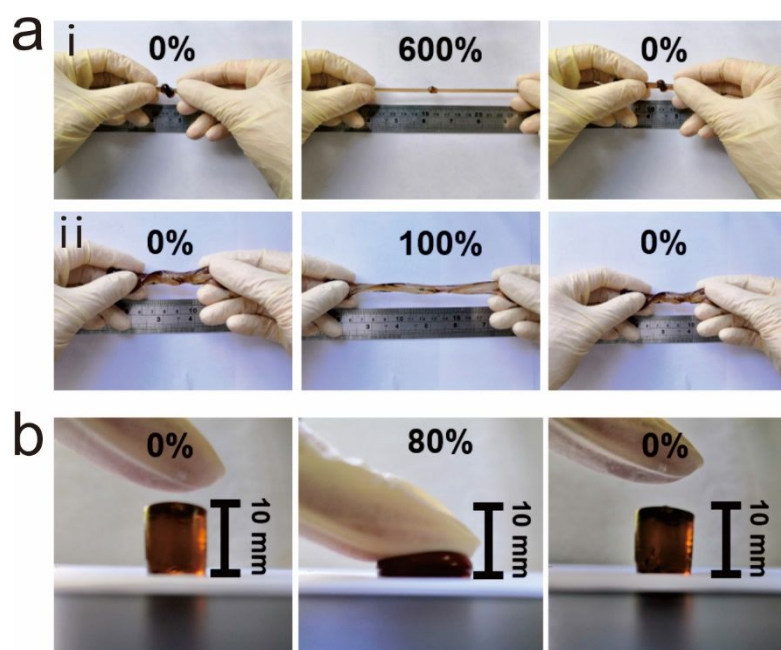
E-mail address: chensong@scut.edu.cn (Song Chen), psliulan@scut.edu.cn (Lan Liu).



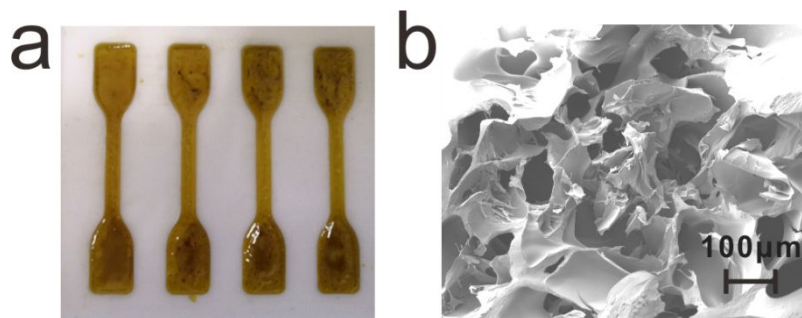
**Figure S1** Enlarged SEM image of PAA hydrogel (0.2 wt% DA/AM). The scale bar is 30  $\mu\text{m}$ .



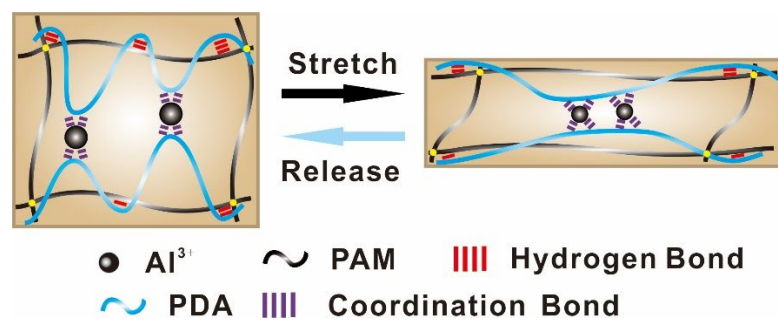
**Figure S2** Frequency dependence of storage modulus ( $G'$ ) and loss modulus ( $G''$ ) for PAM hydrogel after soaking in  $\text{AlCl}_3$  solution.



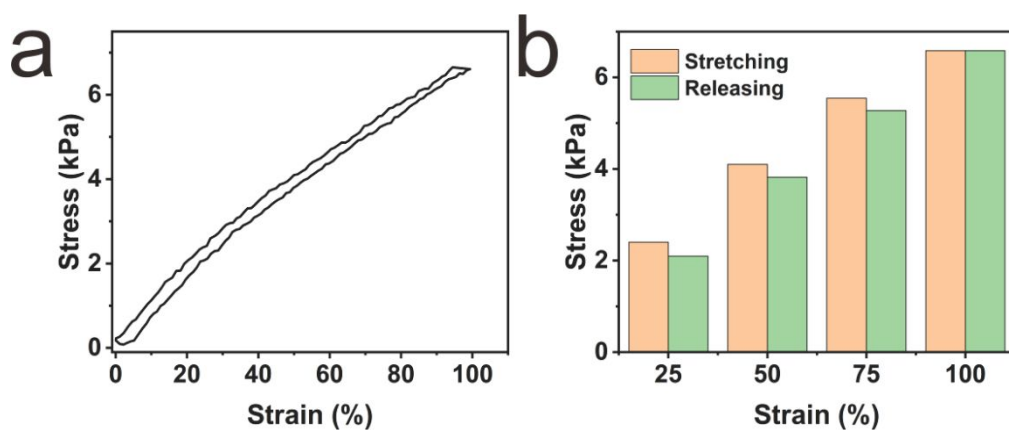
**Figure S3** (a) Digital photograph showing the stretchability of PAa (0.2 wt% DA/AM) when it was knotted ( i ) and twisted ( ii ). (b) Digital photograph showing the compression and resilience ability of the PAa (0.2 wt% DA/AM) hydrogel.



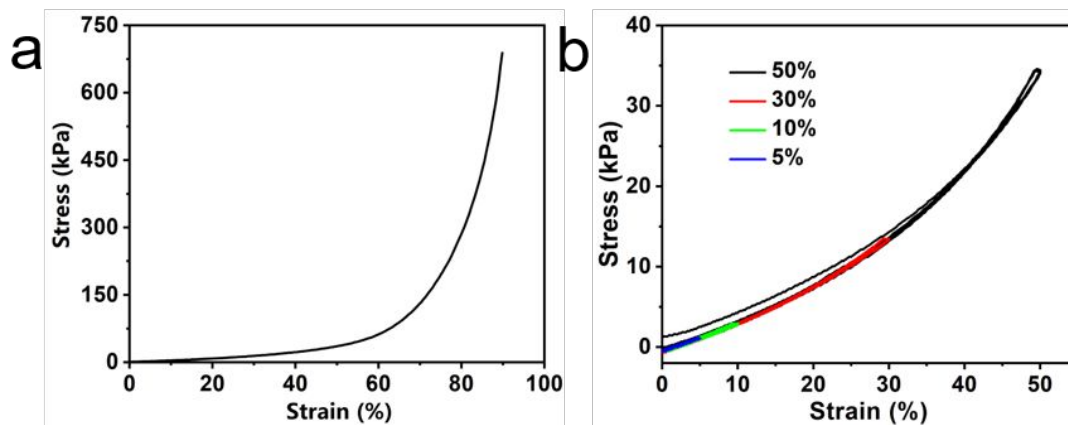
**Figure S4** Digital photograph (a) and SEM image (b) of PAM/PDA hydrogel with DA/AM weight ratio of 0.5%. Agglomeration of PDA is clearly observed in the photograph.



**Figure S5** Schematic illustration for the dual network deformation during the stretching-releasing test.

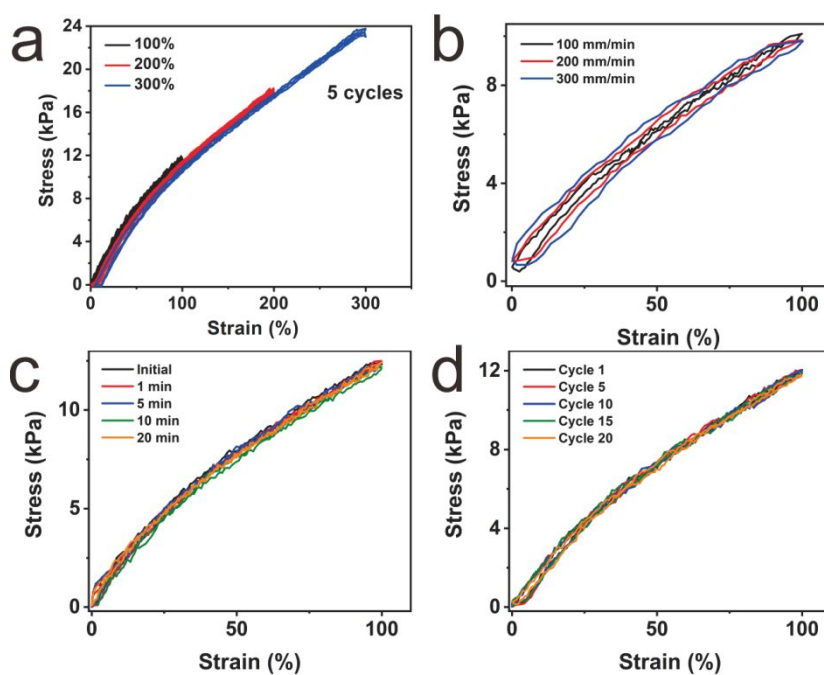


**Figure S6** Single tensile loading-unloading tests of pure PAM hydrogel with tensile strain of 100% (a) and corresponding stress values at certain strain (b).



**Figure S7** (a) Compression stress-strain curves of PAa hydrogel. (b) Loading-unloading stress-strain curves of PAa hydrogel under different compression strain.





**Figure S8** Dynamic properties of PAA hydrogels under different strains (a), testing speeds (b), consecutive test with (c) and without (d) rest time.

**Table S1**

Mechanical properties of the hydrogels

Hydrogel		Fracture Stress (kPa)	Breaking Elongation (%)	Fracture Toughness (kJ/m <sup>3</sup> )
Content	DA/AM weight ratio (%)			
PAM/PDA	0	21.1	628.3	88.7
	0.05	24.7	620.8	97.4
	0.10	27.7	662.5	103.8
	0.20	31.9	636.5	113.4
	0.50	12.6	486.3	40.4
PAa	0.05	52.1	877.0	276.6
	0.10	62.5	1010.4	362.6
	0.20	92.0	1090.8	462.4