

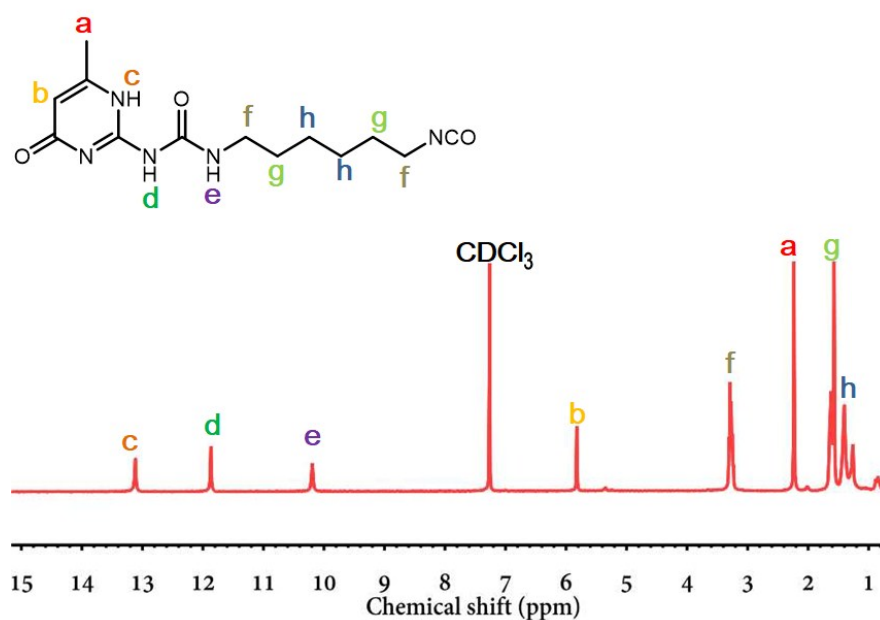
## Self-healing and shape-memory solid polymer electrolytes with high mechanical strength facilitated by a poly(vinyl alcohol) matrix

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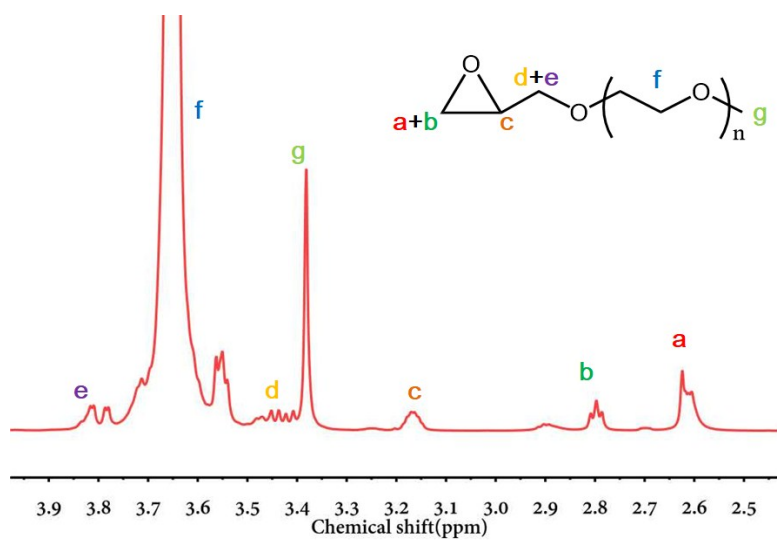
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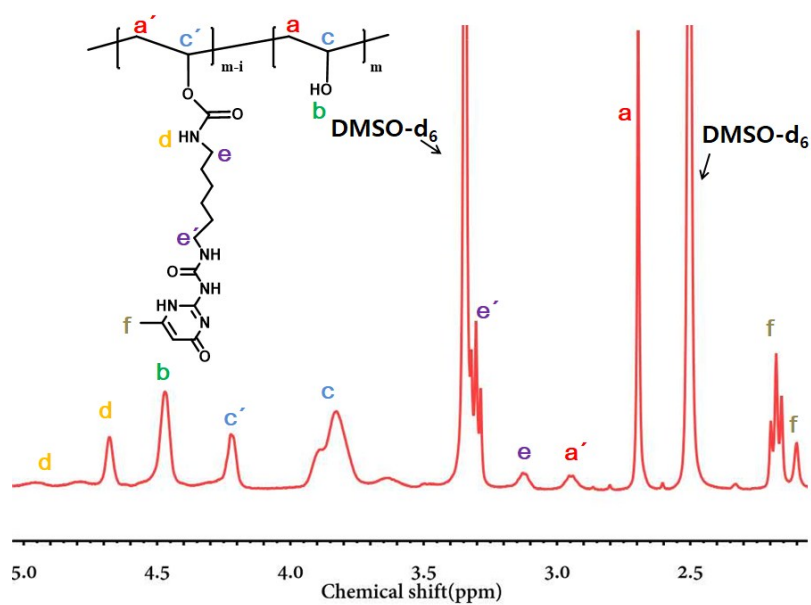
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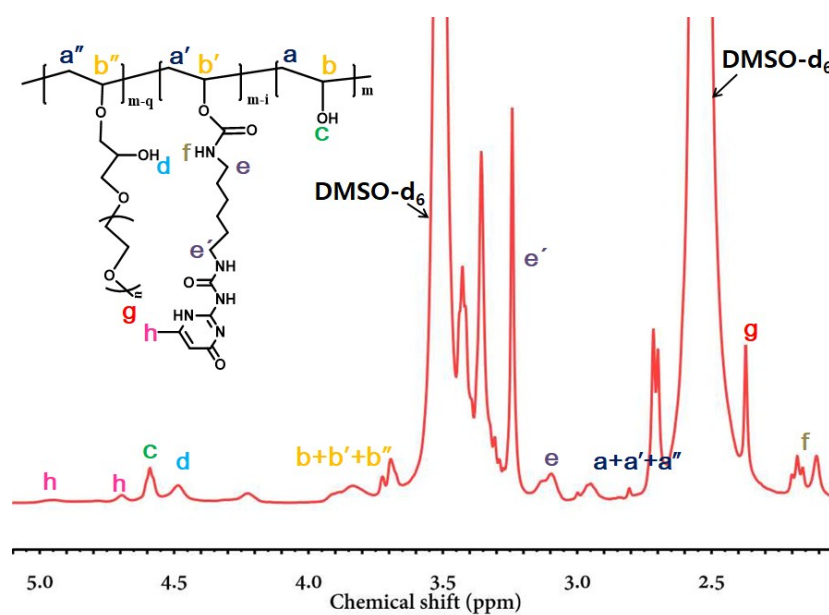
**Fig. S1.**  $^1\text{H}$  NMR spectrum of Upy-NCO.



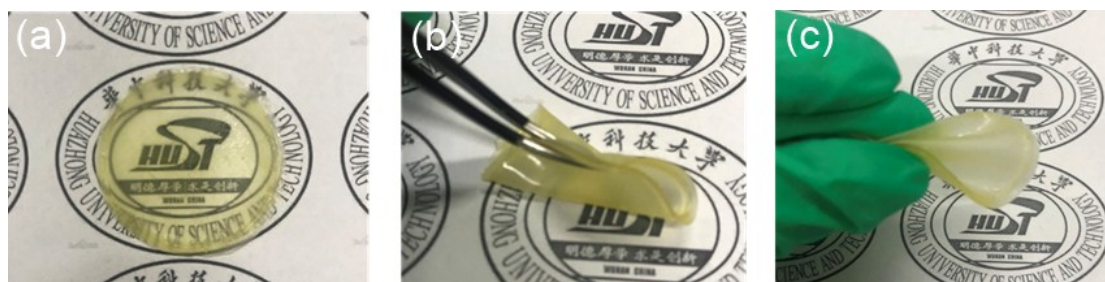
**Fig. S2.**  $^1\text{H}$  NMR spectrum of epoxide functionalized PEG



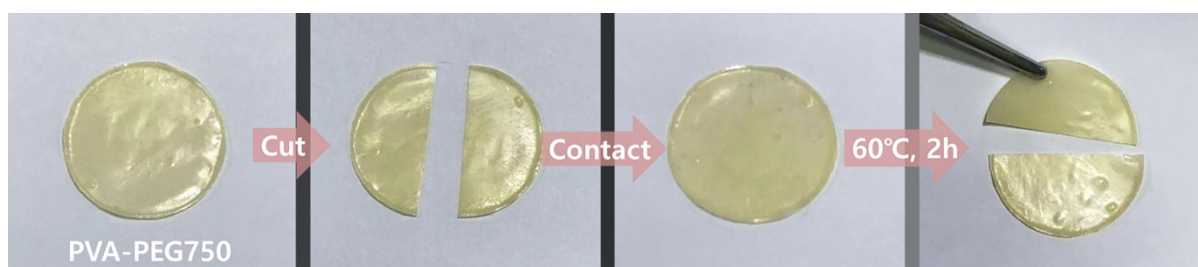
**Fig. S3.**  $^1\text{H}$  NMR spectrum of PVA-Upy.



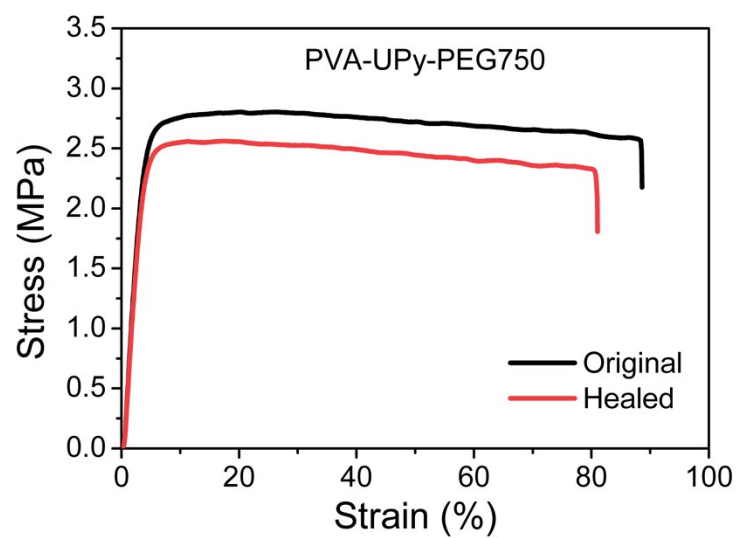
**Fig. S4.**  $^1\text{H}$  NMR spectrum of PVA-UPy-PEG.



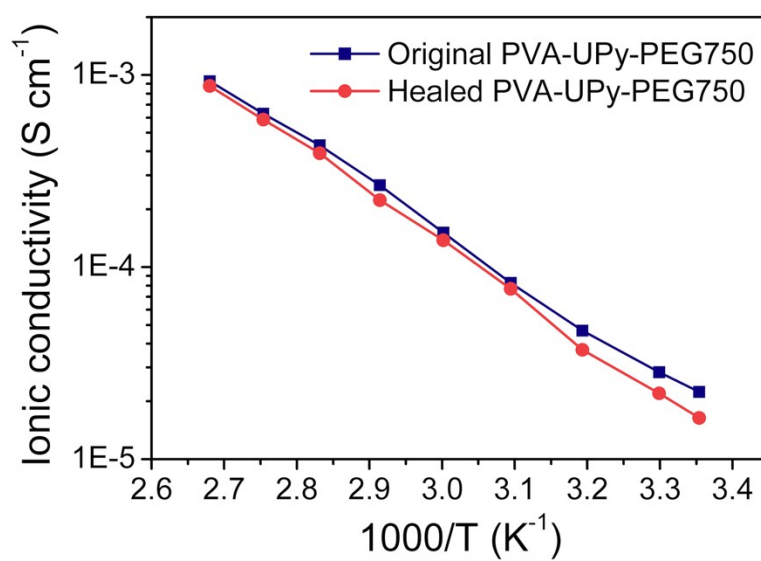
**Fig. S5.** Photograph of PVA-UPy-PEG750 (a), the polymer electrolyte bended once (b) and bended three times (c).



**Fig. S6.** Optical images of self-healing behavior of PVA-PEG750 without UPy units.



**Fig. S7** Stress-strain curves of the original and healed PVA-UPy-PEG750.



**Fig. S8.** The ionic conductivity of healed SSSPE and original SSSPE.