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## **Supporting Information**

## Strong, Thermo-Reversible Salogels with Boronate Ester Bonds as Thermal Energy Storage Materials

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Fig. S1. ATR-FTIR spectra of CNH and CND.



**Fig. S2.** Oscillatory rheology experiments showing linear viscoelastic regime obtained from a strain sweep experiment performed at a frequency of 10 rad/s for 4 wt% PVA<sub>90k,98</sub>.



**Fig. S3.** (a) Frequency sweep with 4 wt% PVA salogels: (a) PVA<sub>90k,98</sub>/CNH, (b) PVA<sub>60k,98</sub>/CNH, and (c) PVA<sub>90k,87</sub>/CNH systems; (d) analysis of relaxation time.



**Fig. S4.** Comparison of heat of fusion and melting point for 3 wt% PVA/CNH salogels containing PVA with 98% degree of hydrolysis of molecular weights 90 kDa and 60 kDa.



Fig. S5. (a) Temperature sweep of 3 wt%  $PVA_{90k,98}$  salogels with (a) 0 wt% and (b) 0.16 wt% borax.



**Fig. S6.** Frequency sweep of 3 wt%  $PVA_{90k,98}$  salogels with (a) 0 wt%, (b) 0.16 wt%, and (c) 0.32 wt% borax; as well as (d) relaxation time as a function of borax concentration.



**Fig. S7.** Repeatability of thermo-reversible gelation in 3 wt% PVA<sub>90k,98</sub>, 0.16 wt% borax salogels over three heating/cooling cycles.



**Fig. S8.** Frequency sweep at 25 °C with 3 wt% PVA<sub>90k,98</sub>, 0.16 wt% borax salogels at (a) pH 6 and (b) pH 7, and with borax-free 3 wt% PVA<sub>90k,98</sub> salogels at (c) pH 6 and (d) pH 8.



Fig. S9. Temperature sweep of 3 wt%  $PVA_{90k,98}$ , 0.16 wt% borax salogels at (a) pH=6 and (b) pH=7.



Fig. S10. Effect of pH on  $T_{gel}$  of 3 wt% PVA<sub>90k,98</sub> borax-free and 0.16 wt% borax salogels.



**Fig. S11.** Oscillatory rheology experiments showing linear viscoelastic regime obtained from a strain sweep experiment measured at 10 rad/s for 3 wt% PVA<sub>90k,98</sub>, 0.16 wt% borax (a) salogels and (b) hydrogels.



Fig. S12. Self-healing efficiency calculated using storage modulus (*G*') before rupture and after recovery steps from three cycles of step strain rheology experiments for 3 wt%  $PVA_{90k,98}$ , 0.16 wt% borax salogels and hydrogels.



Fig. S13. Melting of neat CNH vs. shape stabilization of CNH in 3 wt%  $PVA_{90k,98}$ , 0.32 wt% borax, CNH salogels at 50 °C.



**Fig. S14.** Demonstration of self-healing, shape stabilization, and prevention of leakage of CNH with 3 wt%  $PVA_{90k,98}$ , 0.32 wt% borax salogel. The pink color was due the presence of a small amount of a Rhodamine G dye added to the salogel for visualization.