

# Electronic Supplementary Information (ESI)

## Tough and Responsive Oppositely Charged Nanocomposite Hydrogels for Assembled Bilayer Actuators Through Interfacial Electrostatic Attractions

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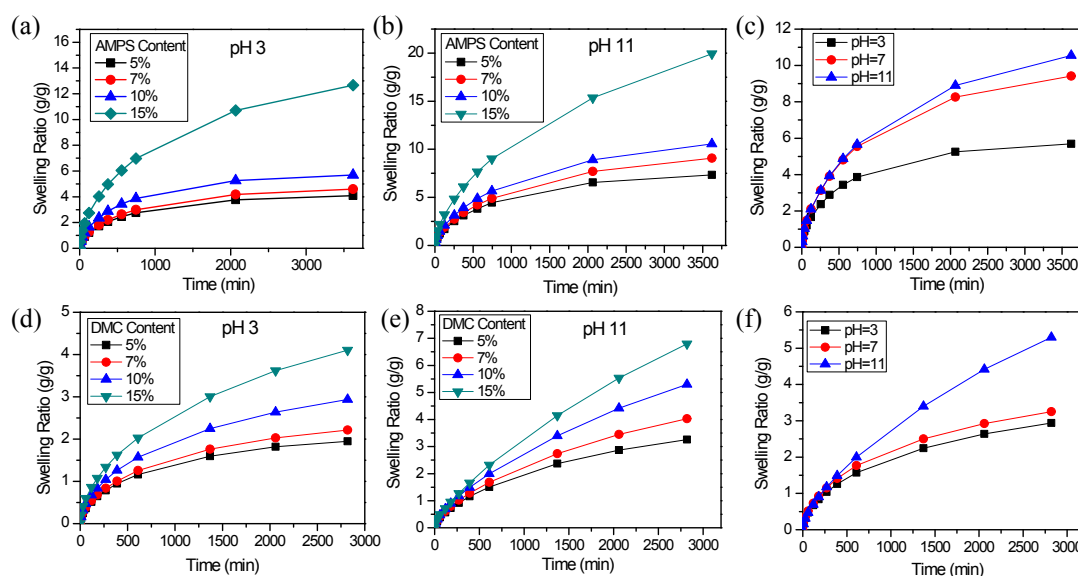


Figure S1 Representative swelling curves of different  $S_n$ AM gels at (a) pH=3 (a) and (b) pH=11 (b), and (c)  $S_{10}$ AM gel swelling at different pH; and swelling properties of different  $D_m$ AM gels at (d) pH=3 and (e) 11, and (f)  $D_{10}$ AM gel swelling property at different pH.

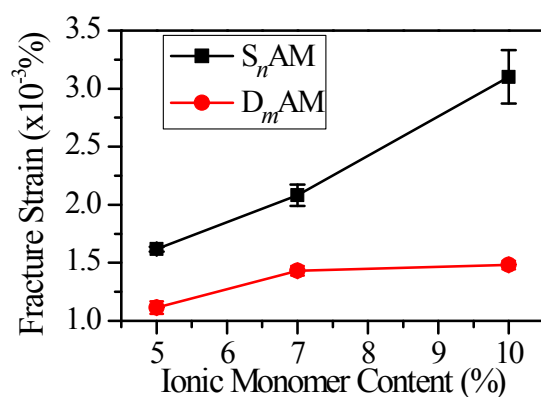


Figure S2 Tensile strstrain of  $S_n$ AM and  $D_m$ AM as a function of ionic monomer content.

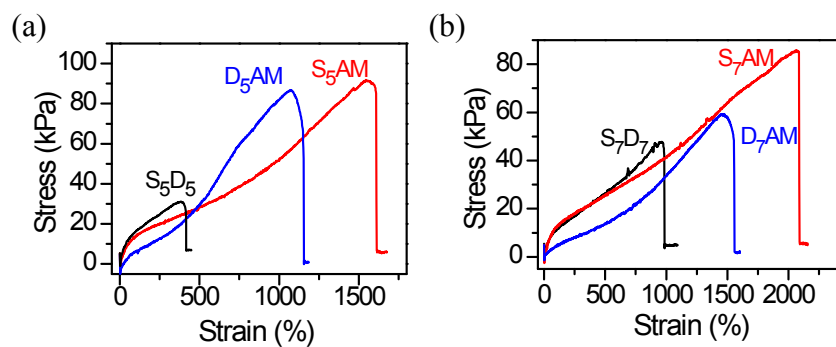


Figure S3 Representative swelling curves of different  $S_n$ AM gels at (a) pH=3 (a) and (b) pH=11 (b), and (c)  $S_{10}$ AM gel swelling at different pH; and swelling properties of different  $D_m$ AM gels at (d) pH=3 and (e) 11, and (f)  $D_{10}$ AM gel swelling property at different pH.