

## Description of Additional Supplementary Files

File Name: Supplementary Movie 1

Description: Video of stretching a notched PAA-G8 hydrogel (G8: 100 mg mL<sup>-1</sup>) in the presence of an environment sensitive dye, ANS.

File Name: Supplementary Movie 2

Description: Video of stretching an intact PAA-G8 hydrogel (G8: 100 mg mL<sup>-1</sup>) in the presence of an environment sensitive dye, ANS.

File Name: Supplementary Movie 3

Description: Video of stretching an intact PEG-G8 hydrogel in the presence of an environment sensitive dye, ANS.

File Name: Supplementary Movie 4

Description: Description: Video of stretching a notched PEG-G8 hydrogel in the presence of an environment sensitive dye, ANS.

File Name: Supplementary Movie 5

Description: Video of stretching an intact PAA-G8 hydrogel (G8: 120 mg mL<sup>-1</sup>) in the presence of an environment sensitive dye, ANS.

File Name: Supplementary Movie 6

Description: Video of stretching an intact PAA-G8 hydrogel (G8: 80 mg mL<sup>-1</sup>) in the presence of an environment sensitive dye, ANS.