Supporting information

for

Smart Composite Hydrogel with pH-, Ionic strength- and Temperature-induced Actuation

by

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1. Determination of the parameters for the preparation of hydrogel

Table S1. The water content of the prepared hydrogels

Prepared Hydrogels	PNIPAm hydrogel	PAA hydrogel	Composite hydrogel (g)	PNIPAm/PAA composite hydrogel (l)	Bilayer hydrogel (n)
Water contents (wt%)	617±51	642±43	478±37	189±23	278±32

The water contents were calculated as the equation: Water content (*wt*%)=[(W_1-W_0)/W_0]×100%, where W_0 and W_1 represent the weights of the dry and the water-swollen hydrogel, respectively. Each value is a mean of five determinations.

Table S2. The parameters of AA solution used to prepare optimum hydrogels

AA solution				Prepared homogeneous hydrogel
Volume (mL)	Concentation of AA (wt %)	Concentation of MBA (wt %)	Concentation of V-50 (wt %)	Thickness (μm)
5	1.5	0.6	0.6	873±15
5	1.0	0.6	0.6	467±18
5	0.7	0.6	0.6	403±8
7.5	1.5	1	1	1343±11
7.5	1.0	1	1	920±15
7.5	0.7	1	1	714±9
10	1.5	1	1	1990±7
10	1.0	1	1	1340±11
10	0.7	1	1	1050±13
7.5	1.5	2	2	1256±8
7.5	1.0	2	2	893±15
7.5	0.7	2	2	642±14

2. Demonstration of the responsiveness of homogeneous PAA hydrogel

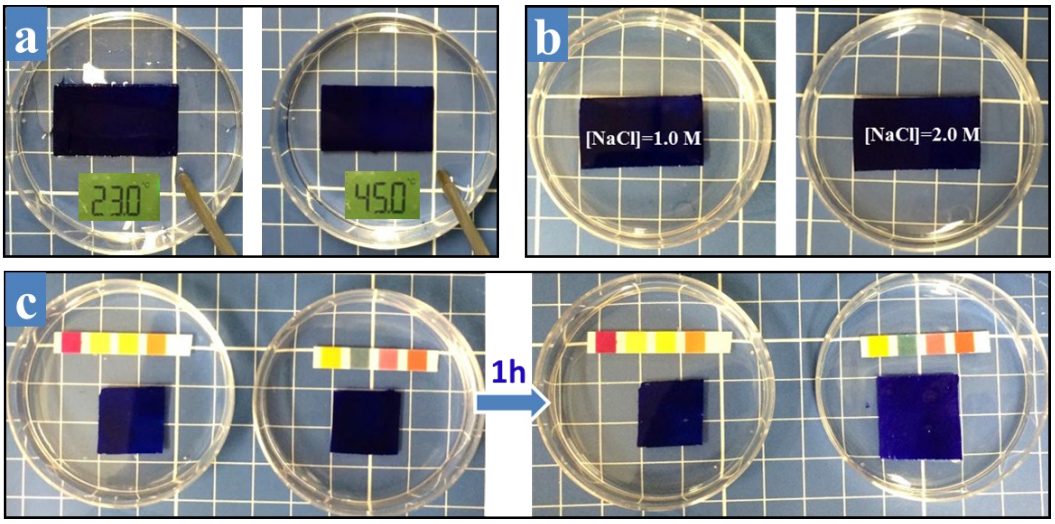

Figure S1. Photo images of blue dyed PAA hydrogel: immersing hydrogel into solution with different temperature (a), concentration of NaCl (b) and pH of 2 and 11 (c).

3. Demonstration of the responsiveness of homogeneous PNIPAm hydrogel

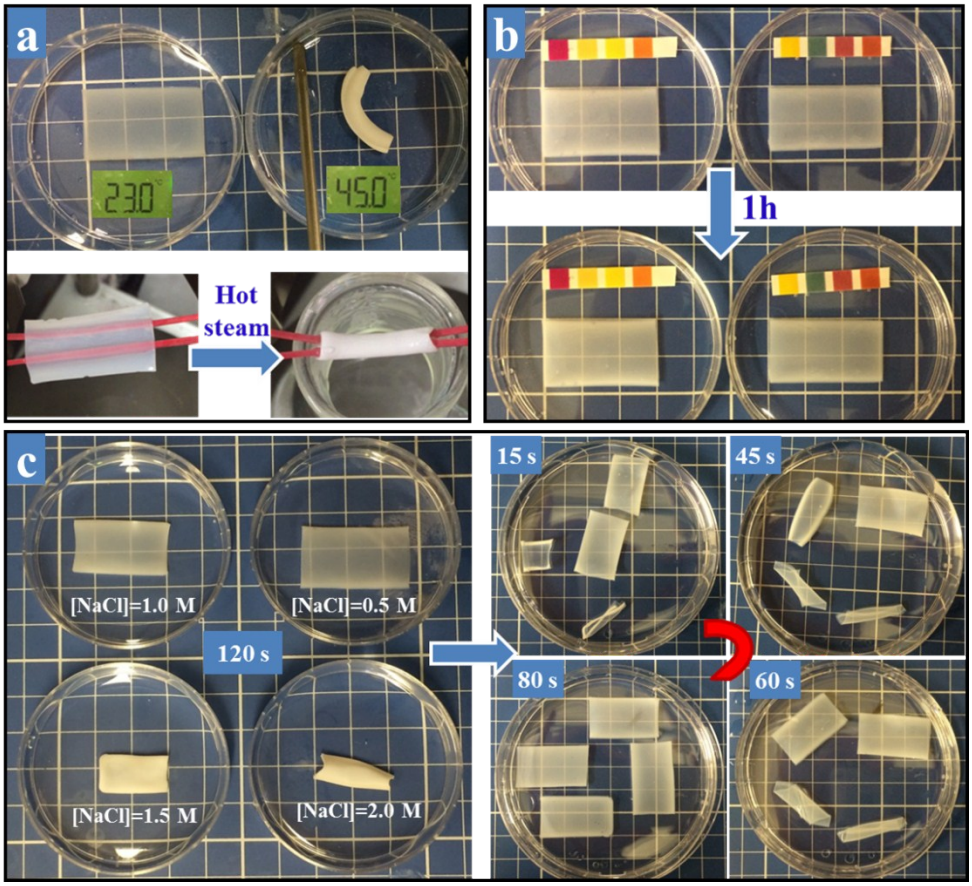

Figure S2. Photographs of homogeneous PNIPAm hydrogel before and after stimulations at 45°C and hot steam (a), variations of pH (b) and Ionic strength (c).