Supporting Information

Rational Designed Hyperbranched Azopolymer with Temperature, Photo and pH Responsive Behavior

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Synthesis of N,N'-(diazene-1,2-diylbis(4,1-phenylene)) diacrylamide (AzoBA)

Figure S1 shows the ¹H NMR (400 MHz) spectrum of AzoBA with peak assignments in DMSO- d_6 . δ (ppm): 10.52 (-CONHPh-, 1H); 7.90 (azobenzene, 8H); 6.47, 6.37 and 5.80 (CH₂=CH-CO, 3H).



Figure S1. ¹H NMR spectrum and chemical structure of AzoBA.



Figure S2. GPC curve of HPAzoAMAM capped with palmityl chloride.



Figure S3. TEM and liquid AFM images of HPAzoAMAM-star-EG₃ LCMs at (a), (c)

30 $^{\circ}$ C and (b), (d) 20 $^{\circ}$ C. The inset in (c) and (d) are the AFM height profile along the

red line



Figure S4. UV-Vis absorption spectra of (a) HPAzoAMAM-star-EG₃ in DMF, (b)

HPAzoAMAM-star-EG₃ LCMs and (c) LCMs with SNPs upon irradiation of 450 nm

light.



Figure S5. SEM images of HPAzoAMAM-*star*-EG₃ LCMs irradiated by polarized light for (a) 0, (b) 10, (c) 20, (d) 30, (e) 60, (f) 90, (g) 120, and (h) 180 min and LCMs with SNPs irradiated for $(a_1) 0$, $(b_1) 10$, $(c_1) 20$, $(d_1) 30$, $(e_1) 60$, $(f_1) 90$, $(g_1) 120$, and

(h₁) 180 min, respectively.