Supporting Information

Table S1. Properties of shape memory hydrogels. C_o is the initial monomer concentration at the gel preparation. The elastic modulus *G'* and the loss factor tan δ of the hydrogels at 80 and 5°C, and after heating back to 80°C are given. *G'* and tan δ data are averages of 17 measurements at the given temperatures with a standard deviation of less than 5 %.

Hydrogel			*G'*			*tan* δ		
C_o / M	**C18 mol %**	**H2O %**	**80°C**	**5°C**	**80°C**	**80°C**	**5°C**	**80°C**
1	20	84	27 kPa	3.6 MPa	23 kPa	0.13	0.12	0.13
1	35	63	15.5 kPa	8 MPa	15.5 kPa	0.16	0.044	0.16
1	50	61	17 kPa	17.6 MPa	16.1 kPa	0.22	0.015	0.23
0.75	35	75	8.6 kPa	7.6 MPa	8.8 kPa	0.26	0.055	0.27
0.75	35	46 [a)]	16.5 kPa	15.1 MPa	15.7 kPa	0.29	0.022	0.31
0.75	50	70	13.4 kPa	14.1 MPa	12.6 kPa	0.35	0.022	0.29
0.75	50	46 [a)]	14.9 kPa	17.0 MPa	14.9 kPa	0.31	0.016	0.31

[a)] To obtain the hydrogel sample with 46 % water, equilibrium swollen gel was placed in a sealed vial at room temperature to evaporate a desired amount of the gel water. This procedure ensured uniformity of the network concentration throughout the gel sample (See: N. Gundogan, D. Melekaslan, O. Okay, Macromolecules 2002, 35, 5616). After a given evaporation time, the mass of partially swollen gel was measured, from which its water concentration was calculated.

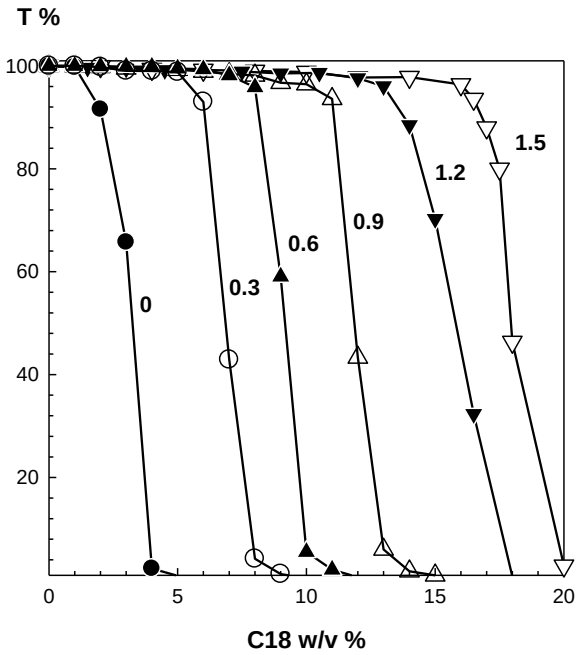

Figure S1. Transmittance T at 500 nm of aqueous SDS – NaCl solutions plotted against the added amount of C18. SDS = 22 w/v %. Temperature = 55°C. NaCl concentrations (in M) are indicated.

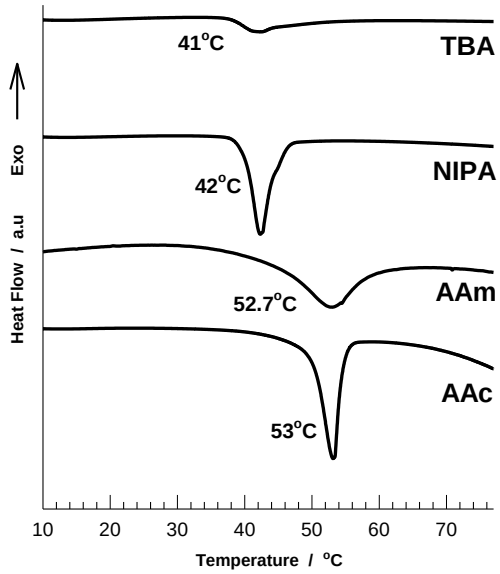

Figure S2. DSC curves of equilibrium swollen hydrogels formed by random copolymerization of C18 with the hydrophilic monomers indicated. Melting temperatures T_m are also indicated. C18 = 35 mol %. $X = 1/100$.

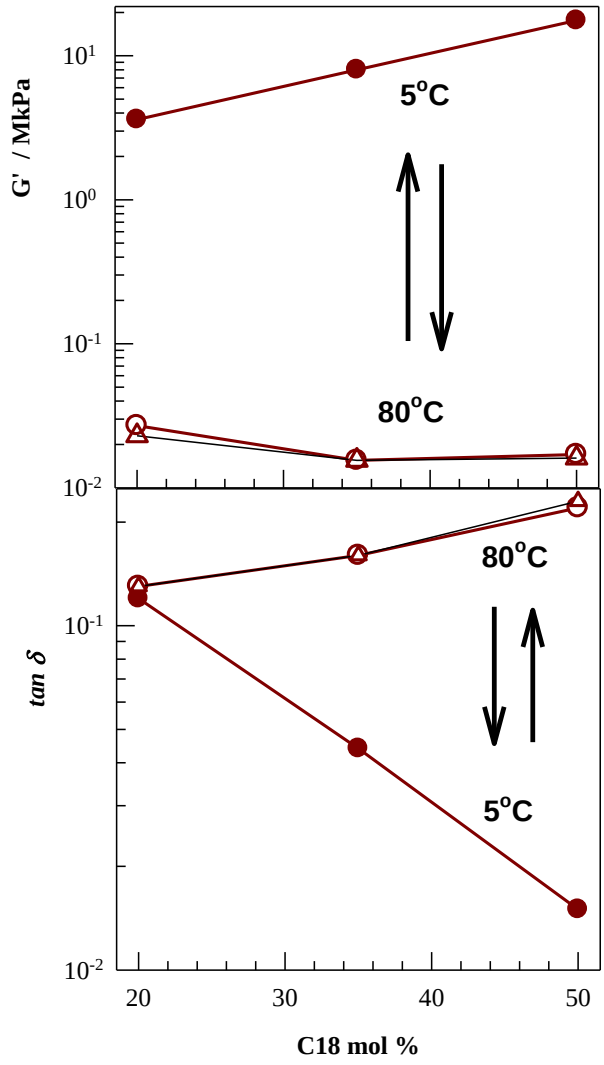

Figure S3. The elastic modulus *G'* and the loss factor tan δ of the hydrogels at 80°C (open circles), 5°C (filled circles), and after heating back to 80°C (open triangles) shown as a function of C18 %. C_o = 1 M. ω = 6.28 rad/s. γ_o = 0.001.

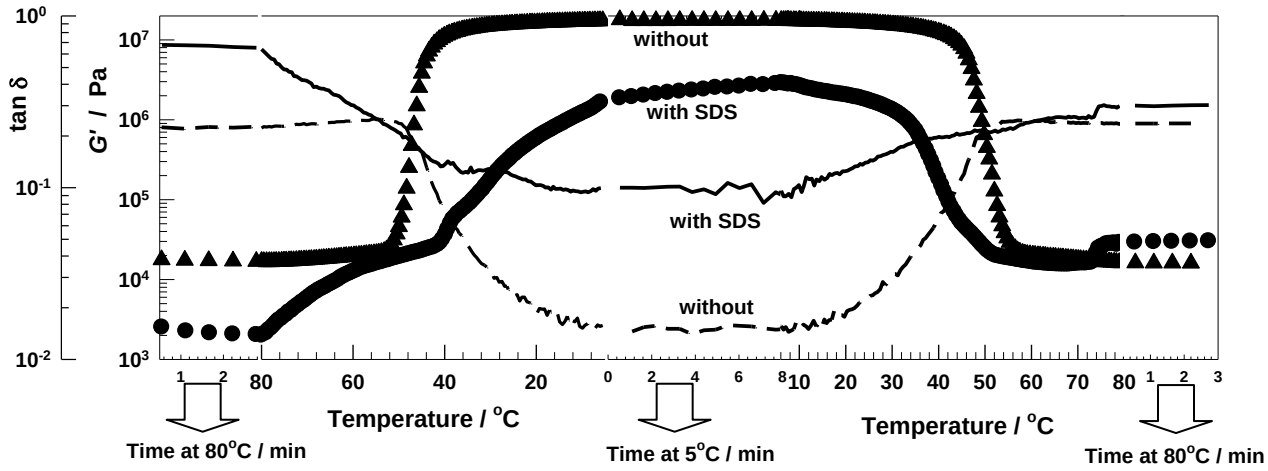

Figure S4. *G'* (symbols) and *tan δ* (curves) of the hydrogels without and with SDS (22 w/v %) during the cooling - heating cycle between 80 and 5°C. C_o = 1 M. C18 = 50 mol %. X = 1/100. Water content = 61 wt %.