Supplementary Material (ESI) for Soft Matter

Supporting Online Material for

Tuneable Swelling of Thermo- and pH-Responsive Copolymer Films

Martin Kaufmann[a,b], Yunfei Jia [a,b], Lars Renner[a,b], Smrati Gupta[a], Dirk Kuckling[c], Carsten Werner [a,b,d], and Tilo Pompe *,[a,b]

[a] *Leibniz Institute of Polymer Research Dresden, Hohe Str. 6, 01069 Dresden, Germany*
[b] *Max Bergmann Center of Biomaterials Dresden, 01069 Dresden, Germany*
[c] *Department Chemie, Anorganische Chemie, Universität Paderborn, Warburger Str. 100, 33098 Paderborn, Germany*
[d] *Center for Regenerative Therapies Dresden (CRTD), 01307 Dresden, Germany*
**Phone: +49 351 4658 274; Fax: +49 351 4658 533; eMail: pompe-tilo@ipfdd.de*

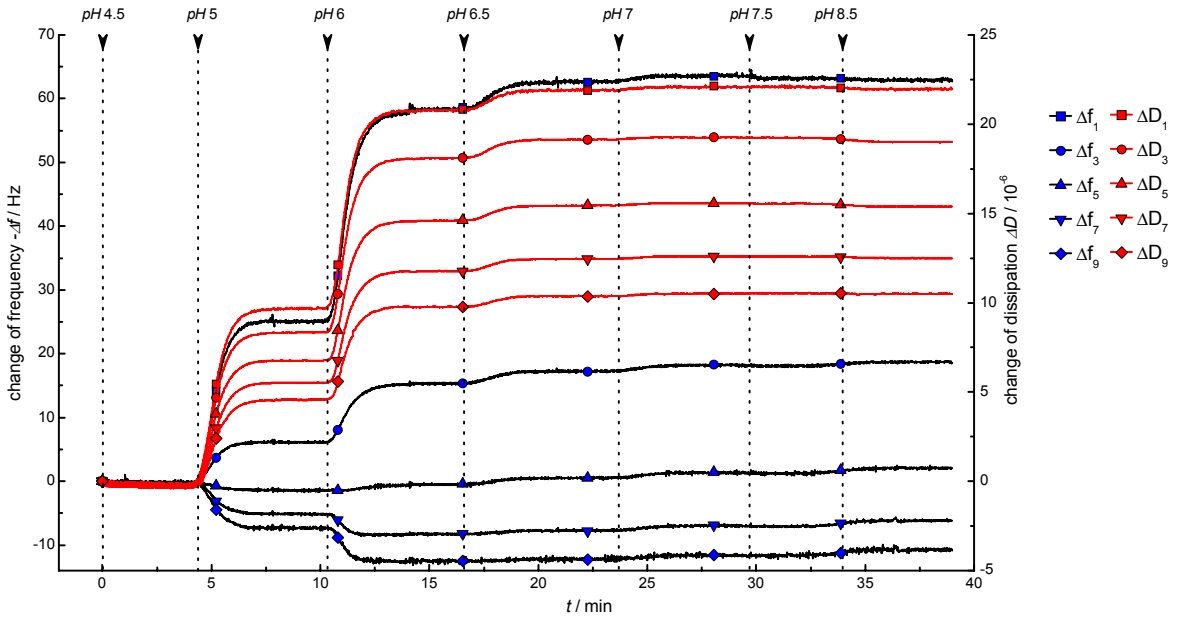

Fig. S1 QCM-D frequency and dissipation response of C_2AAm5 at 25 °C upon rinsing with buffers of increasing pH as indicated by the arrows, compare with Fig.2 in the manuscript. The 1st to 9th overtone of frequency shift is shown in blue, multiplied by (-1) and the corresponding dissipation shift in red. The frequency of the 5th overtone does not change, although dissipation shift indicates swelling of the PNIPAAm copolymer film. At the same time lower frequencies decrease and higher frequencies increase, enabling a thickness estimation as commented in the manuscript.

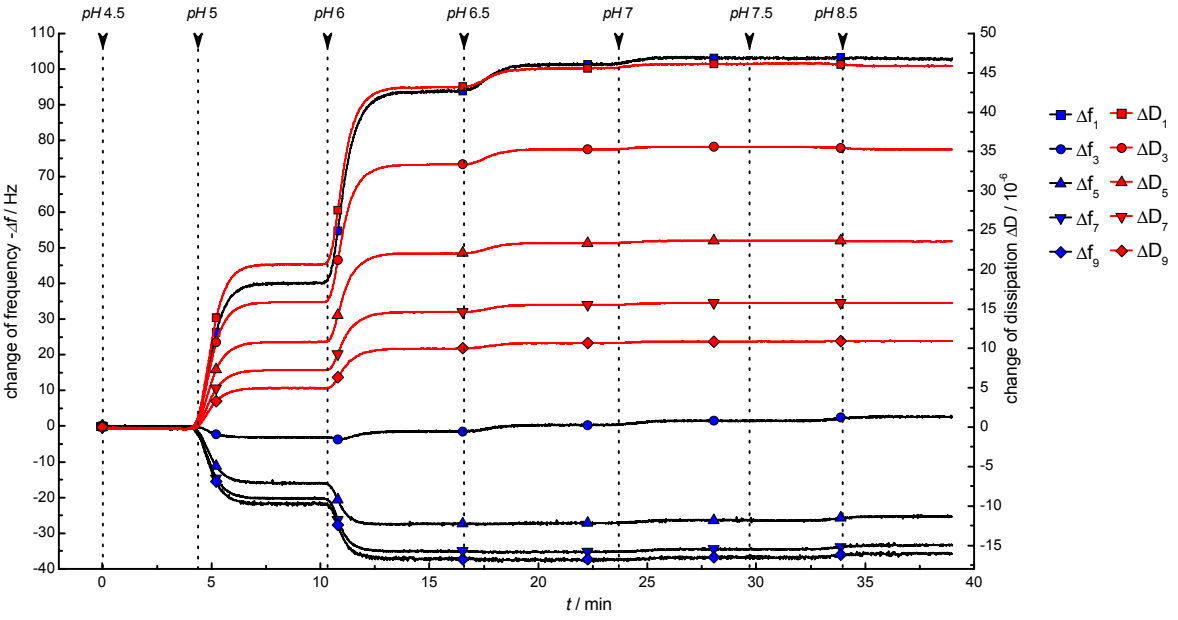

Fig. S2 QCM-D frequency and dissipation response of C_2AAm10 at 25 °C upon rinsing with buffers of increasing pH as indicated by the arrows. The 1st to 9th overtone of frequency shift is shown in blue, multiplied by (-1) and the corresponding dissipation shift in red. Opposed to C_2AAm5 (Fig. S1) the frequency of the 3rd overtone remains unaffected by pH-induced swelling, indicating a thicker swollen polymer layer.

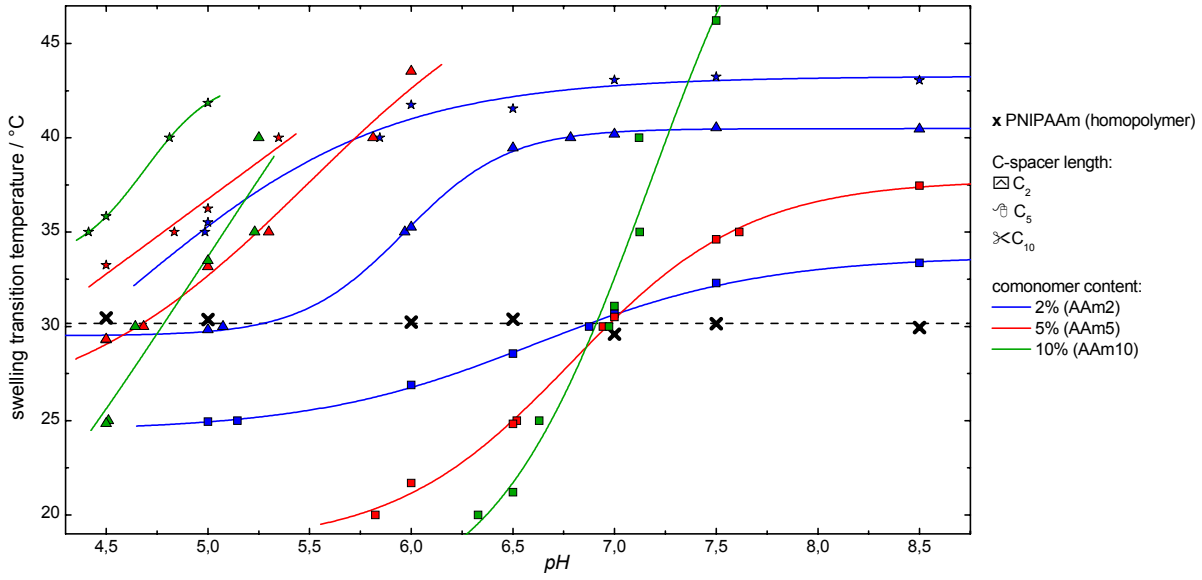

Fig. S3 Swelling onset transition temperatures of PNIPAAm copolymers in the examined range plotted over pH as determined from the onset of the sigmoidal fits in plots like shown in Fig. 3. The alkyl spacer length of the copolymer is indicated by the symbol and the comonomer content by colour as drawn in the legend. Data points of the pH non-responsive PNIPAAm homopolymer are given as a control. The lines were drawn as guide to the eye to group data points of a single polymer.

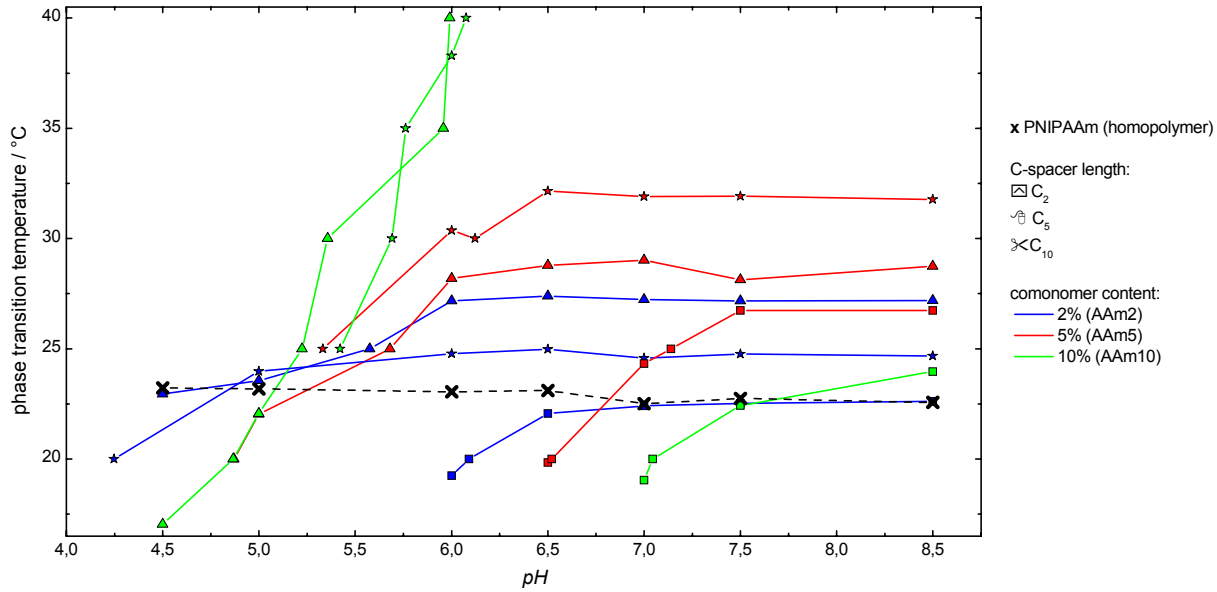

Fig. S4 Data set of phase transitions of all copolymers and the PNIPAAm homopolymer as determined from the collapse onset of QCM-D data similar to the example in Fig. 5.