

# Supplementary Material: Effects of Grafting Azacrown Ether on Thermal and Swelling Properties of Chitosan Films

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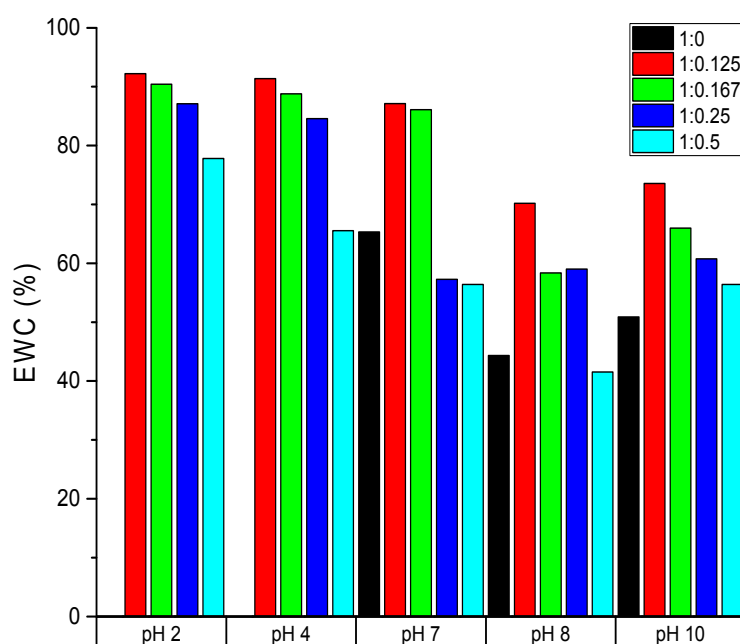
**Table S1.** Maximum degradation temperature, DMA and DSC values for the Ch-DAC films as a function of reacting ratio.

Samples	TGA		DMA		DSC	
	TD1	TD2	Tg (°C)	Tan $\delta$	Tg (°C)	$\Delta C_p$ (J g <sup>-1</sup> °C <sup>-1</sup> )
Ch-DAC (0)	316	NO	150±2.3	0.20	136±2.0	8.7
Ch-DAC (0.125)	315	NO	137±1.6	0.20	108±1.7	6.5
Ch-DAC (0.167)	318	NO	143±1.0	0.25	118±1.6	12.7
Ch-DAC (0.25)	321	337	146±1.6	0.32	123±1.6	4.0
Ch-DAC (0.5)	317	347	150±1.8	0.25	132±0.7	7.5

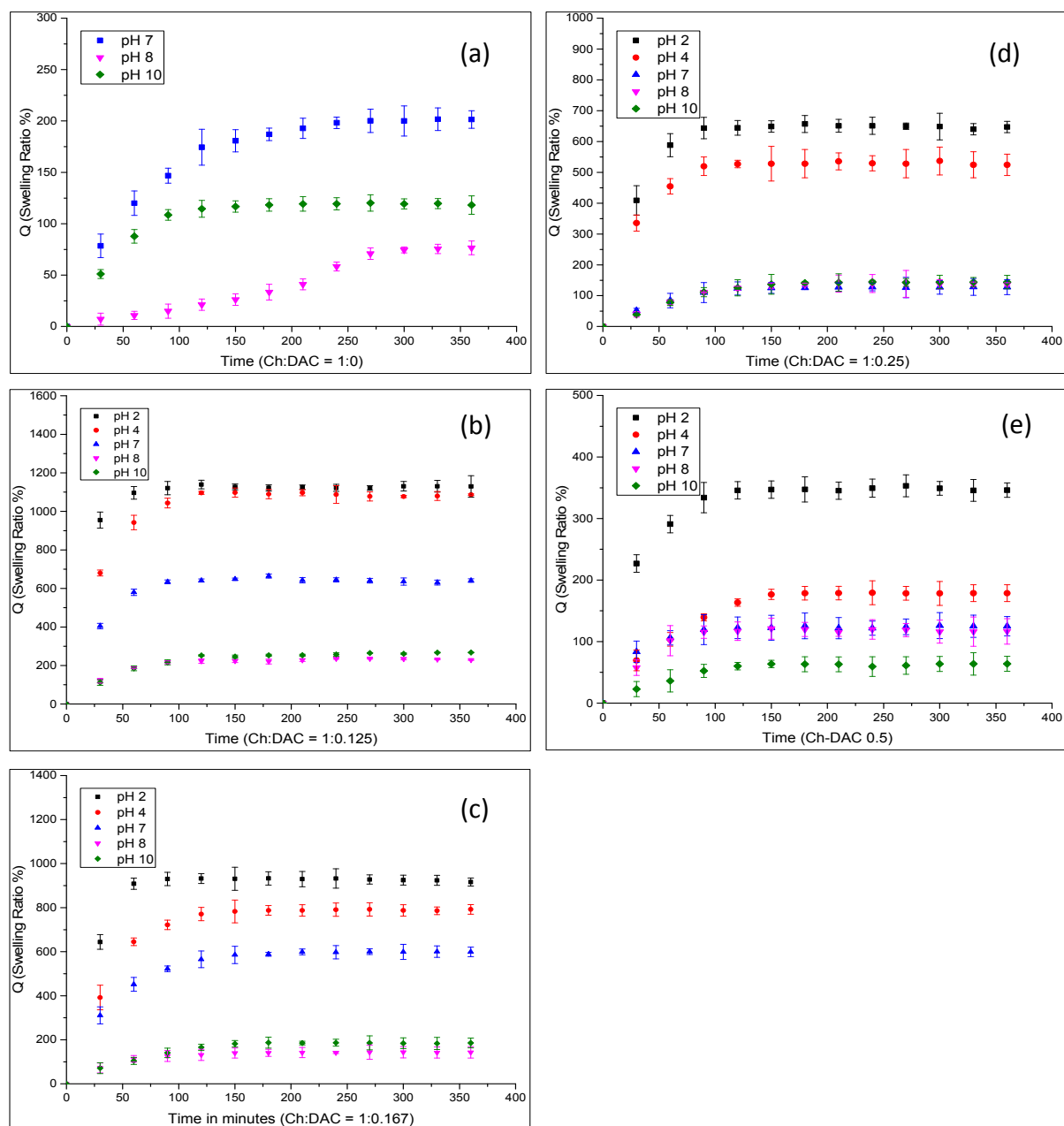
NO: Not observed.

**Table S2.** Swelling parameters of chitosan and Ch-DAC chitosan film hydrogels at various pH values.

Ch:DAC ratio	Parameters	pH 2	pH 4	pH 7	pH 8	pH 10
1:0	ks(104)	ND	ND	2.3	0.2	1.7
	Wmax (%)	ND	ND	70.4	50.3	56.5
1:0.125	ks(104)	420.8	94.6	80.4	6.8	4.7
	Wmax (%)	91.7	91.7	86.9	71.4	74.6
1:0.167	ks(104)	219.4	37.3	22.0	2.6	2.2
	Wmax (%)	90.1	89.3	87.0	60.6	68.5
1:0.25	ks(104)	70.0	18.8	1.5	1.2	1.1
	Wmax (%)	87.7	54.6	58.8	62.1	64.1
1:0.5	ks(104)	22.1	2.2	2.6	0.3	3.8
	Wmax (%)	78.1	67.6	55.2	42.5	56.5



**Figure S1.** Variation of water content (EWC%) for Ch-DAC films reacted with 0, 0.125, 0.167, 0.25, and 0.5 moles of azacrown ether per mole of chitosan at equilibrium as a function of pH and DAC content.



**Figure S2.** Swelling isotherms for Ch-DAC films reacted with 0, 0.125, 0.167, 0.25, and 0.5 moles of azacrown ether per mole of chitosan. (a) Equilibrium water content (%), (b) to (f) is Swelling ratio (%).

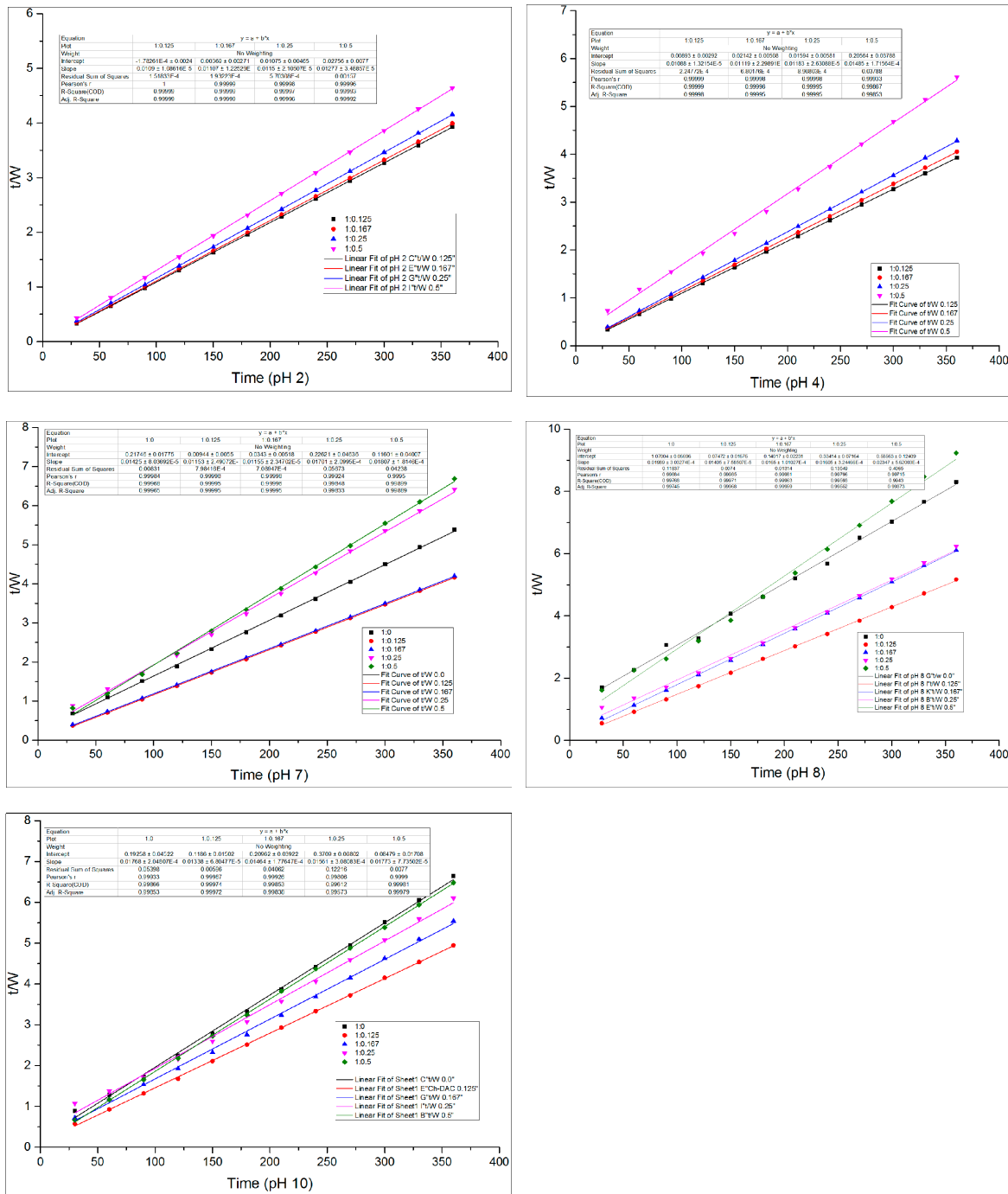


Figure S3. Plots of  $t/W$  vs.  $t$  for swelling rates of chitosan and chitosan-DAC films as a function of pH.



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