

Supporting Information for

Enzyme-mimic peptide assembly to achieve amidolytic activity

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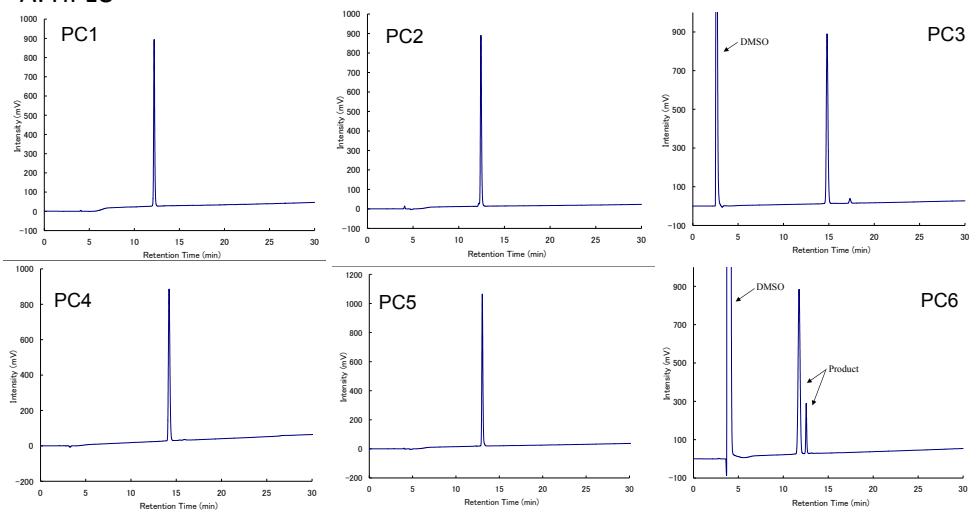
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A: HPLC



B: MALDI-TOF

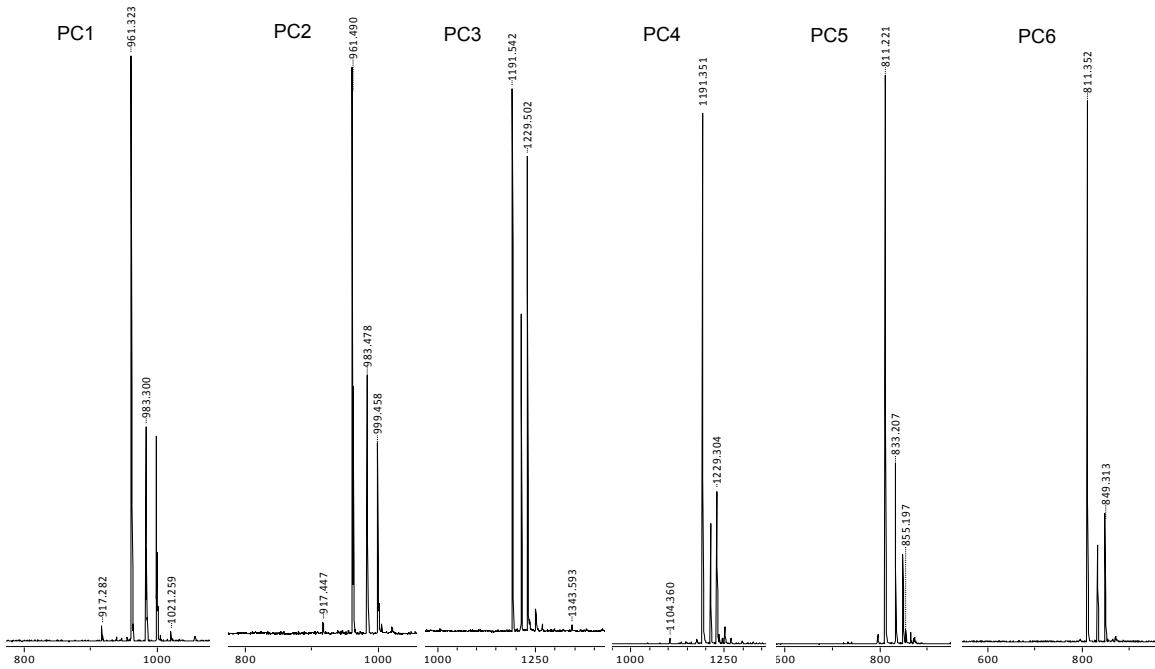


Figure S1. HPLC (A) and MALDI-TOF data (B) of PC used in this study.

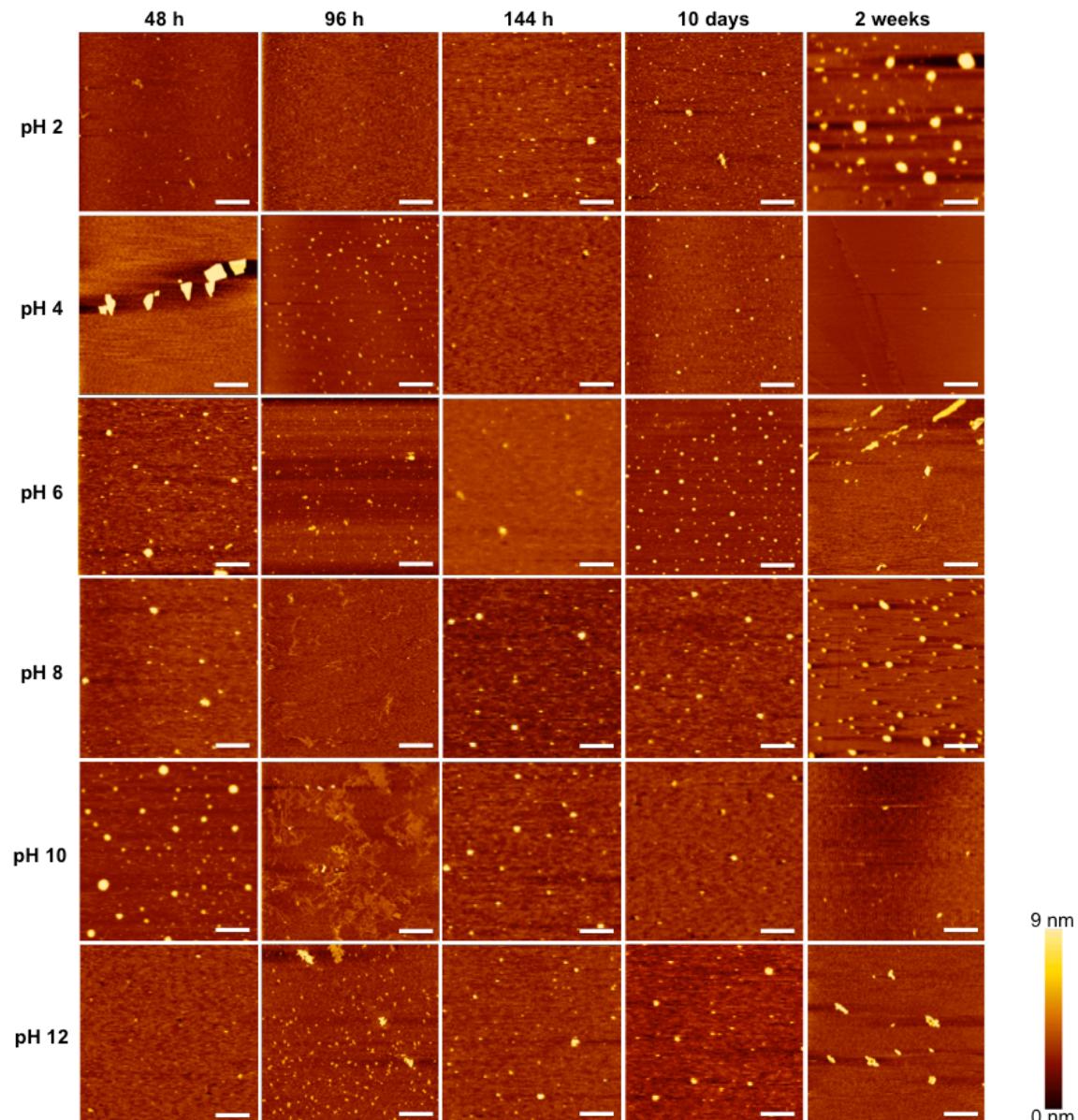


Figure S2. AFM images of PC1 fibrillated at different pH values and obtained at different time points at 25°C. Scale bar: 1 μ m.

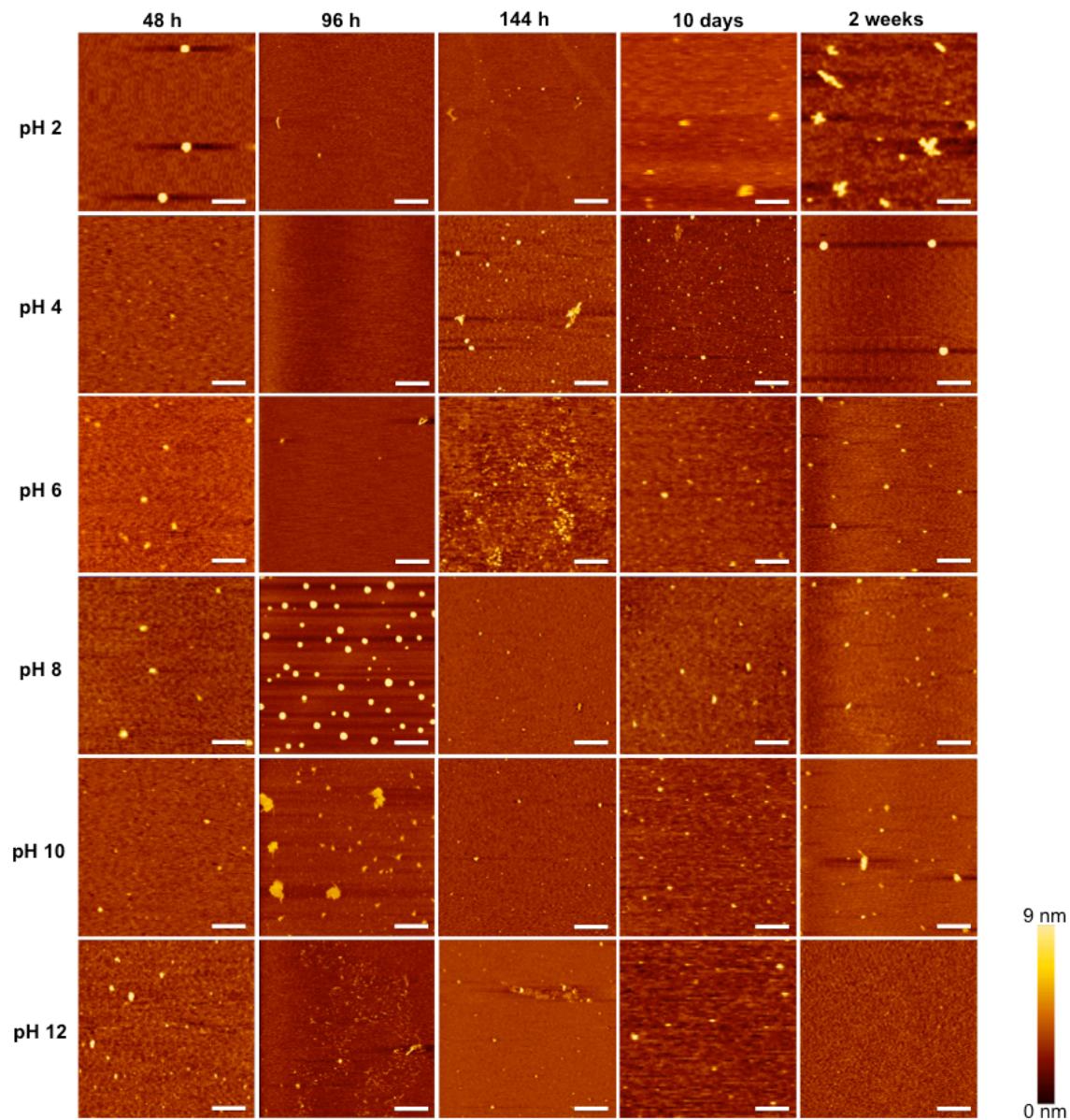


Figure S3. AFM images of PC2 fibrillated at different pH and obtained at different time points at 25°C. Scale bar: 1 μ m.

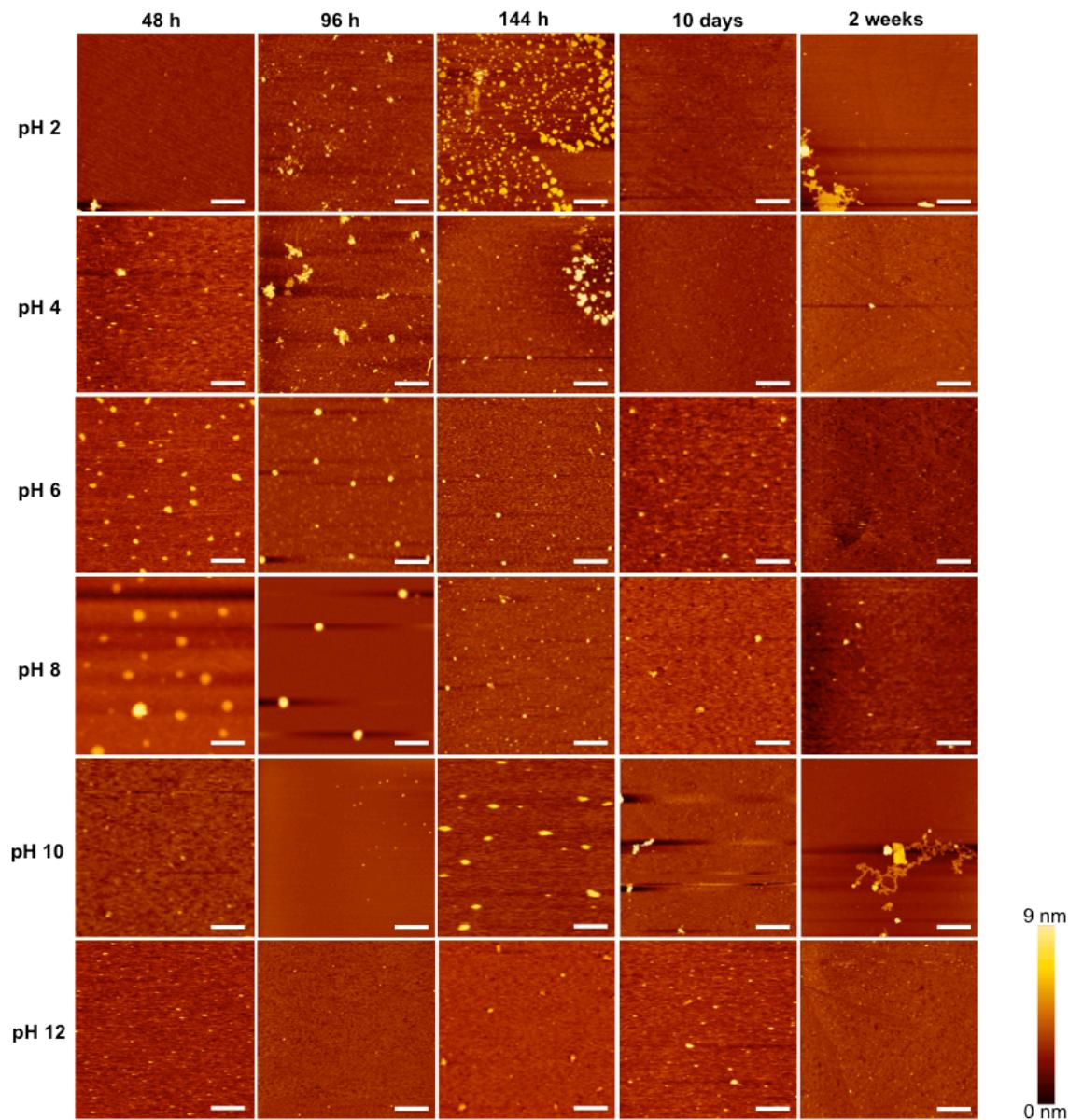


Figure S4. AFM images of PC5 fibrillated at different pH and obtained at different time points at 25°C. Scale bar: 1 μ m.

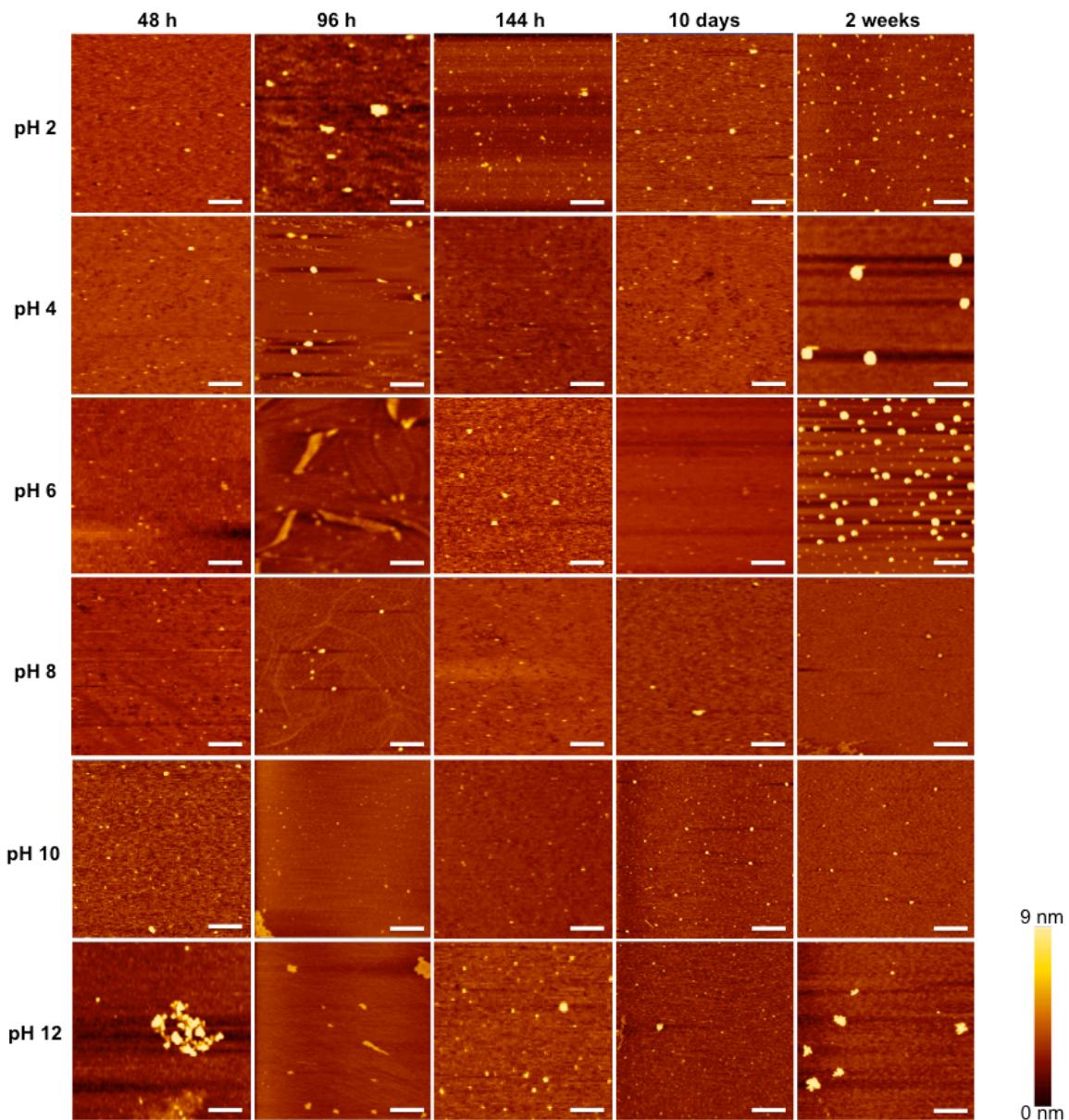


Figure S5. AFM images of PC6 fibrillated at different pH and obtained at different time points at 25°C. Scale bar: 1 μ m.

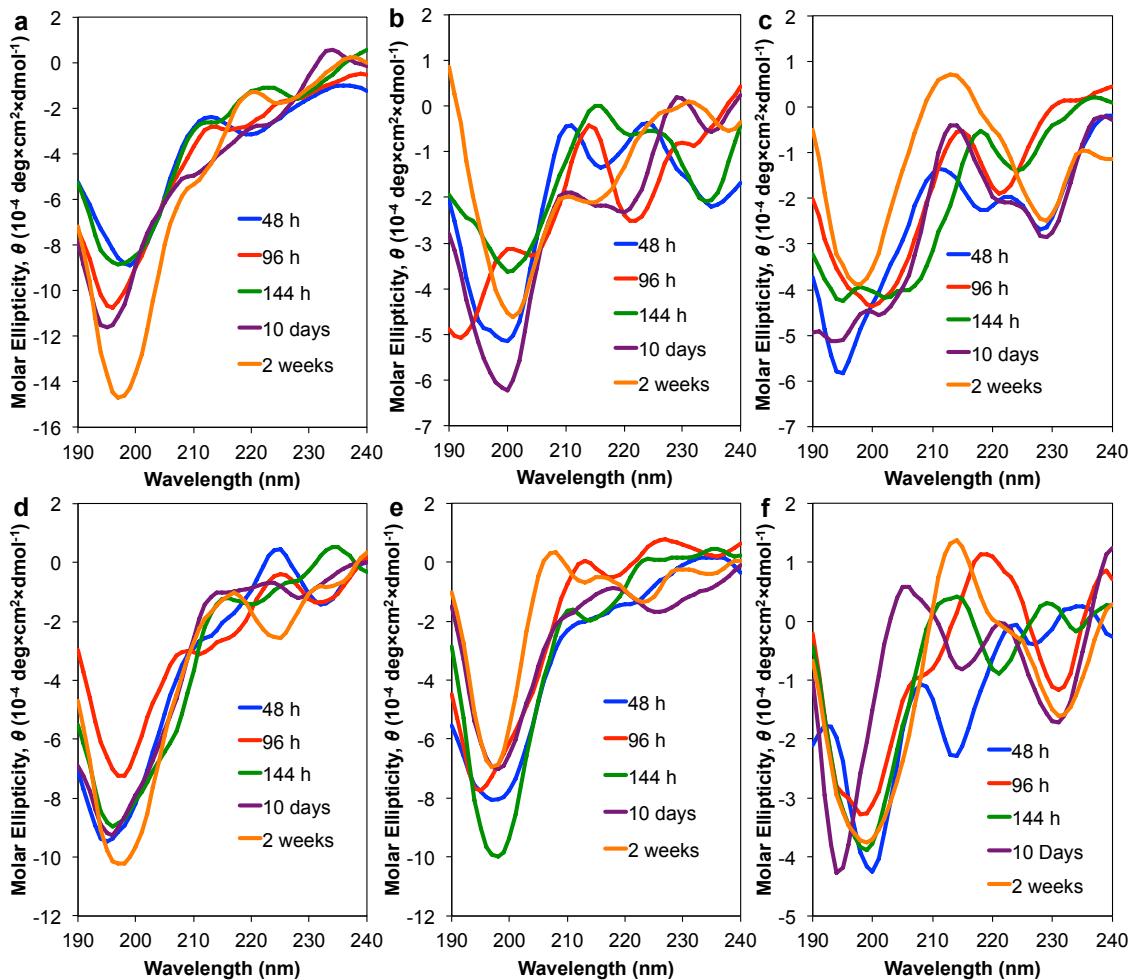


Figure S6. CD spectra of PC1 fibrillated at different pH and collected at different time points at 25°C: (a) pH 2, (b) pH 4, (c) pH 6, (d) pH 8, (e) pH 10, and (f) pH 12. Peptide concentration is 10 μM .

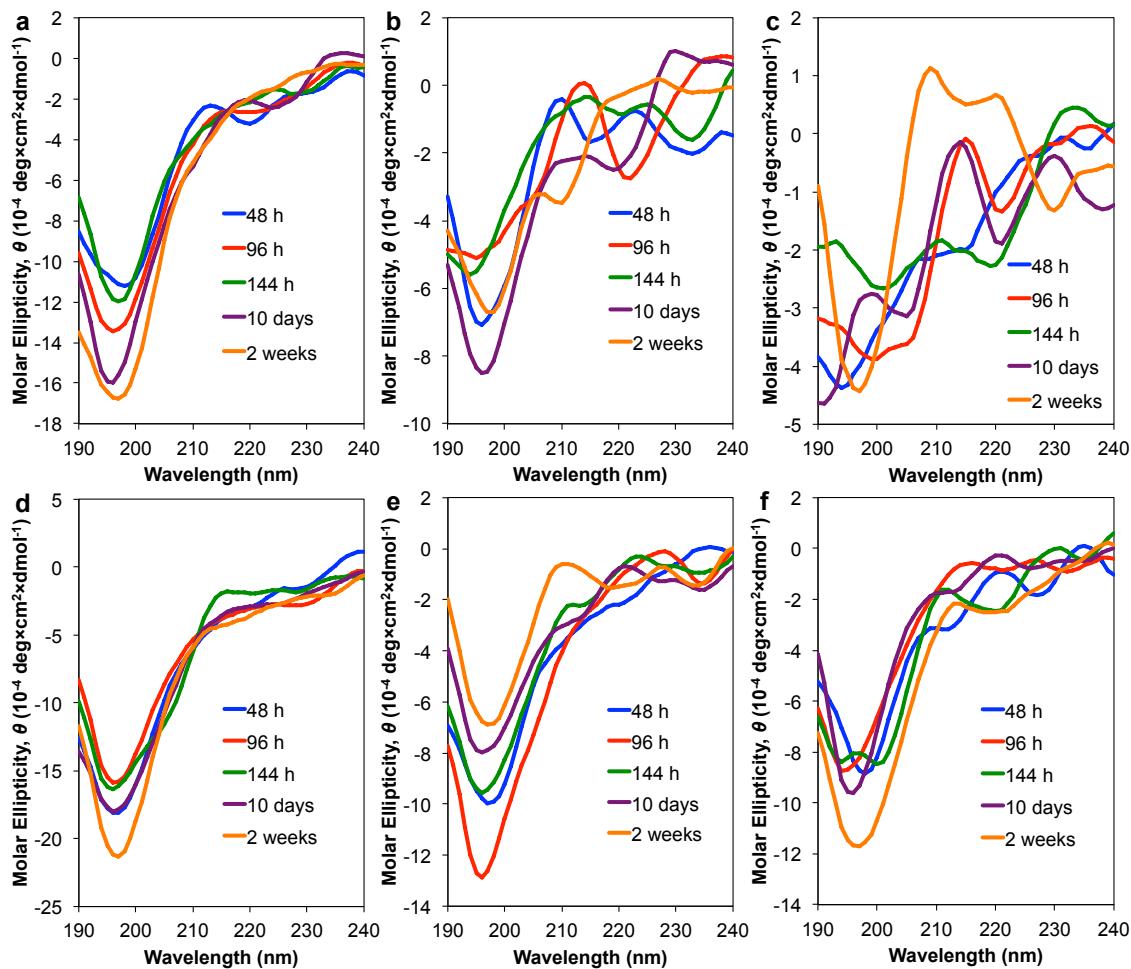


Figure S7. CD spectra of PC2 fibrillated at different pH and collected at different time points at 25°C: (a) pH 2, (b) pH 4, (c) pH 6, (d) pH 8, (e) pH 10, and (f) pH 12. Peptide concentration is 10 μ M.

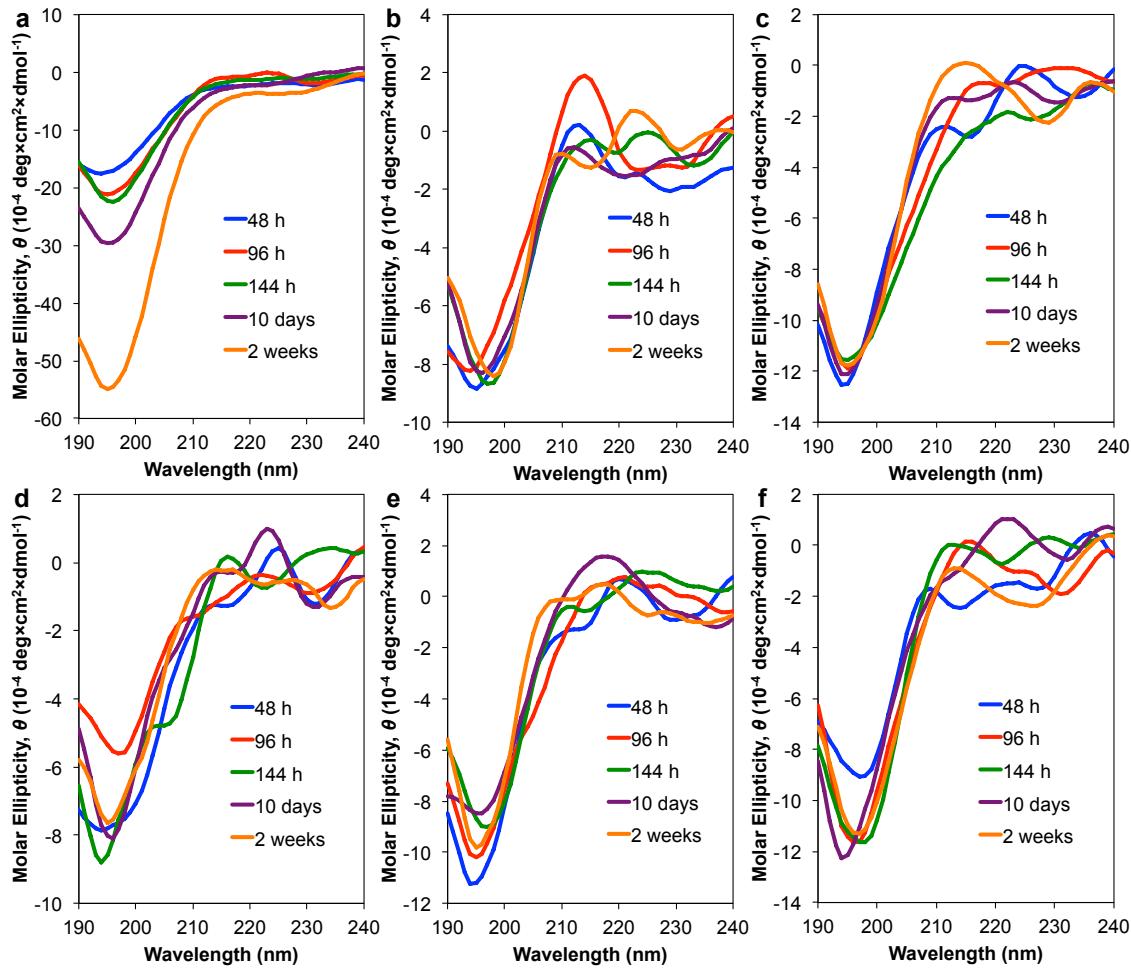


Figure S8. CD spectra of PC5 fibrillated at different pH and collected at different time points at 25°C: (a) pH 2, (b) pH 4, (c) pH 6, (d) pH 8, (e) pH 10, and (f) pH 12. Peptide concentration is 10 μ M.

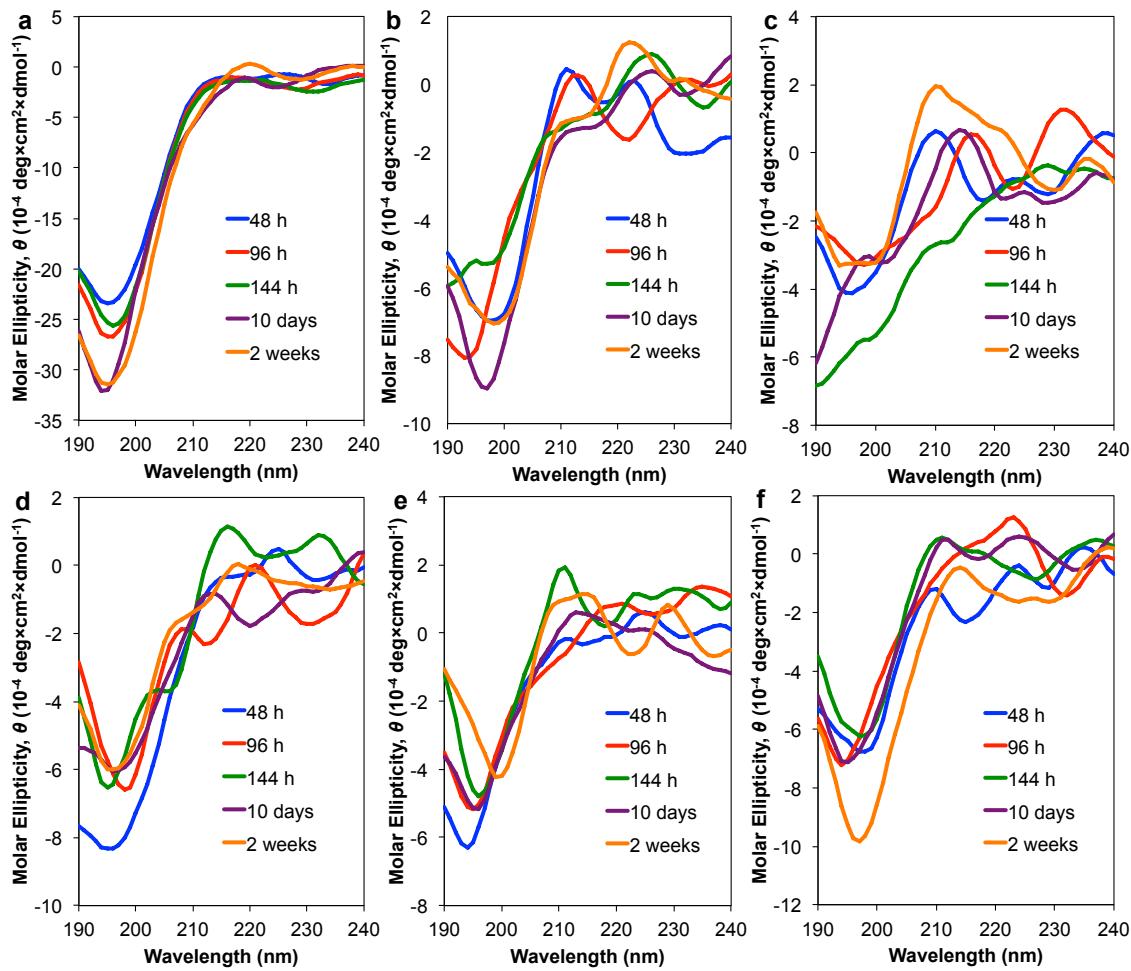


Figure S9. CD spectra of PC6 fibrillated at different pH and collected at different time points at 25°C: (a) pH 2, (b) pH 4, (c) pH 6, (d) pH 8, (e) pH 10, and (f) pH 12. Peptide concentration is 10 μ M.

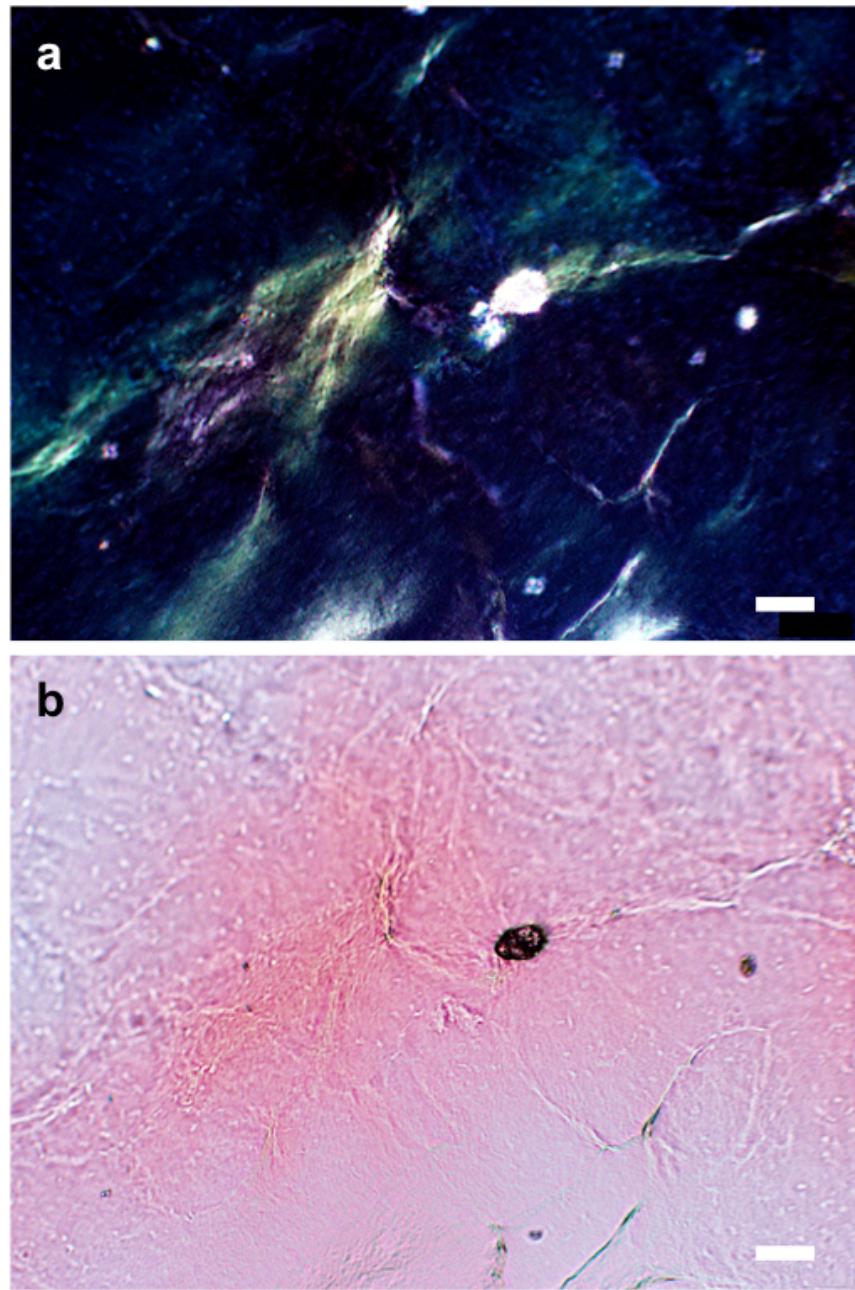


Figure S10. Optical microscope images of *Bombyx mori* silk as positive control, were taken under cross-polarized light stained with Congo red. (a) *B. mori* showed green birefringence coming from regions rich in β -sheet structures. (b) Non-polarized images of *B. mori*; scale bar: 20 μm .

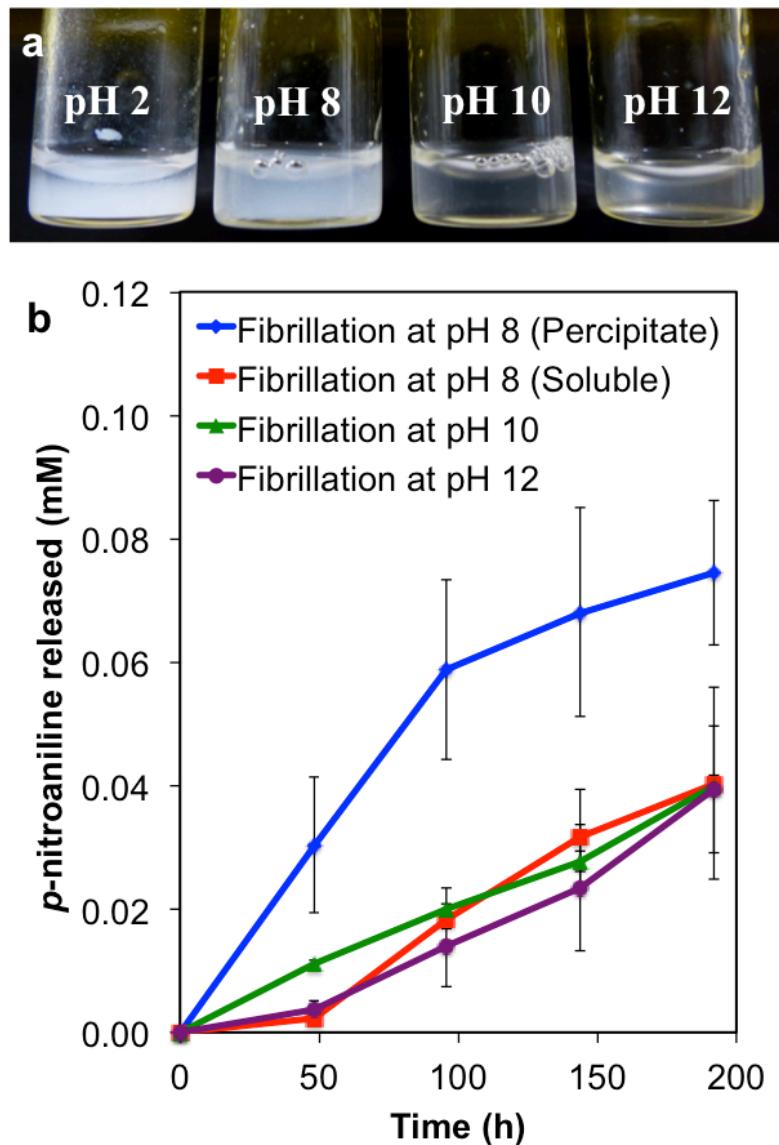


Figure S11. (a) The PC solution becomes viscous and transparent when the incubation pH increases from pH 8 to pH 10 and 12. (b) Amidase activity with a substrate, L-alanine *p*-nitroanilide (0.25 mM), using soluble fibrils of PC4 at 25°C, pH 8 to confirm the less active soluble form of PC4. All data shown are the means of triplicate tests.

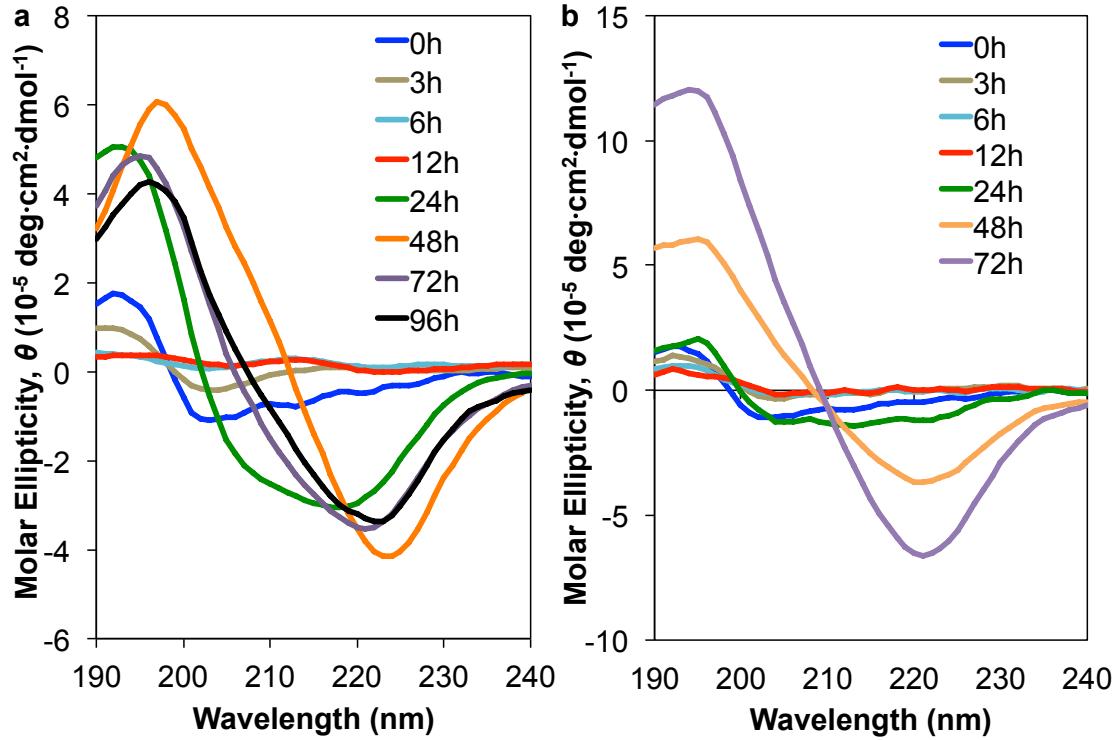


Figure S12. CD spectra of PC4 fibrillated at 50°C (a) and 70°C (b) at different time points.

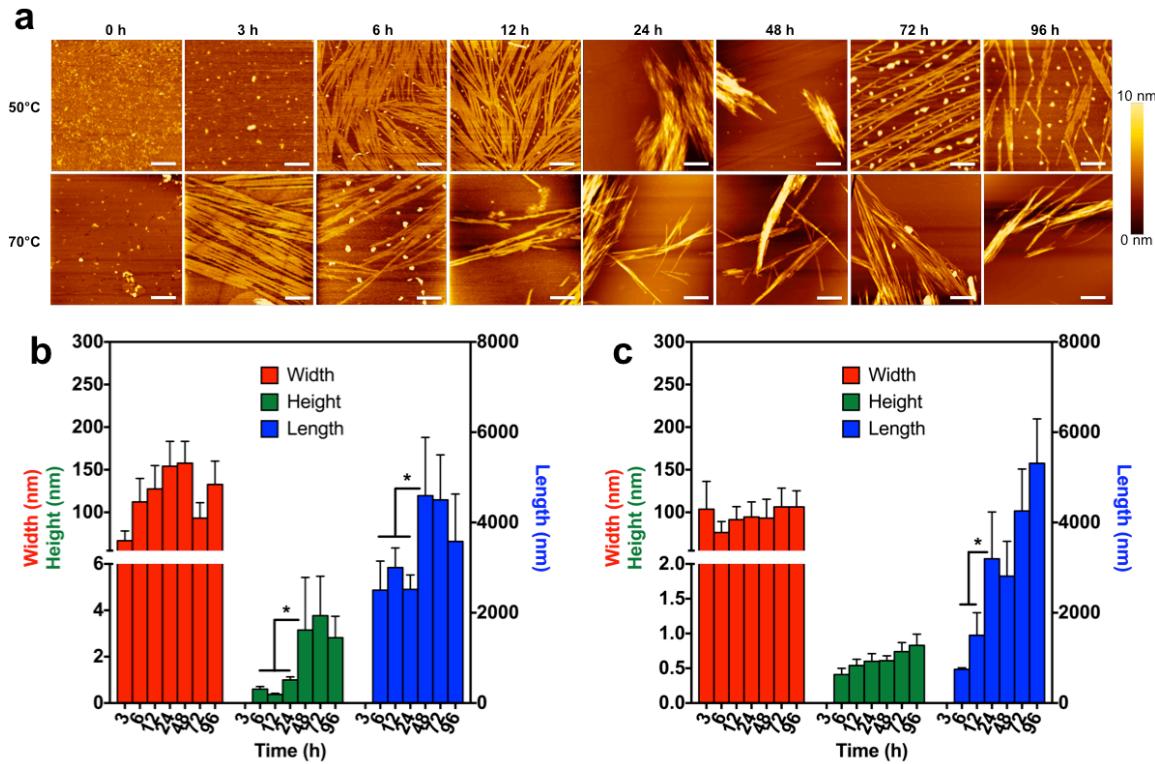


Figure S13. (a) AFM images of PC4 fibrillated at different temperature and obtained at different time points at 25°C. Scale bar: 1 μm. The size distributions of PC4 fibrillated at 50°C (b) and 70°C (c) in terms of width, height, and length of fibrillated fibers at different pH with different incubation times. All data shown are the means of replicate tests ($n = 30$), and mean data accompanied by asterisks (*) are significantly different (Tukey's HSD test; $p < 0.05$).

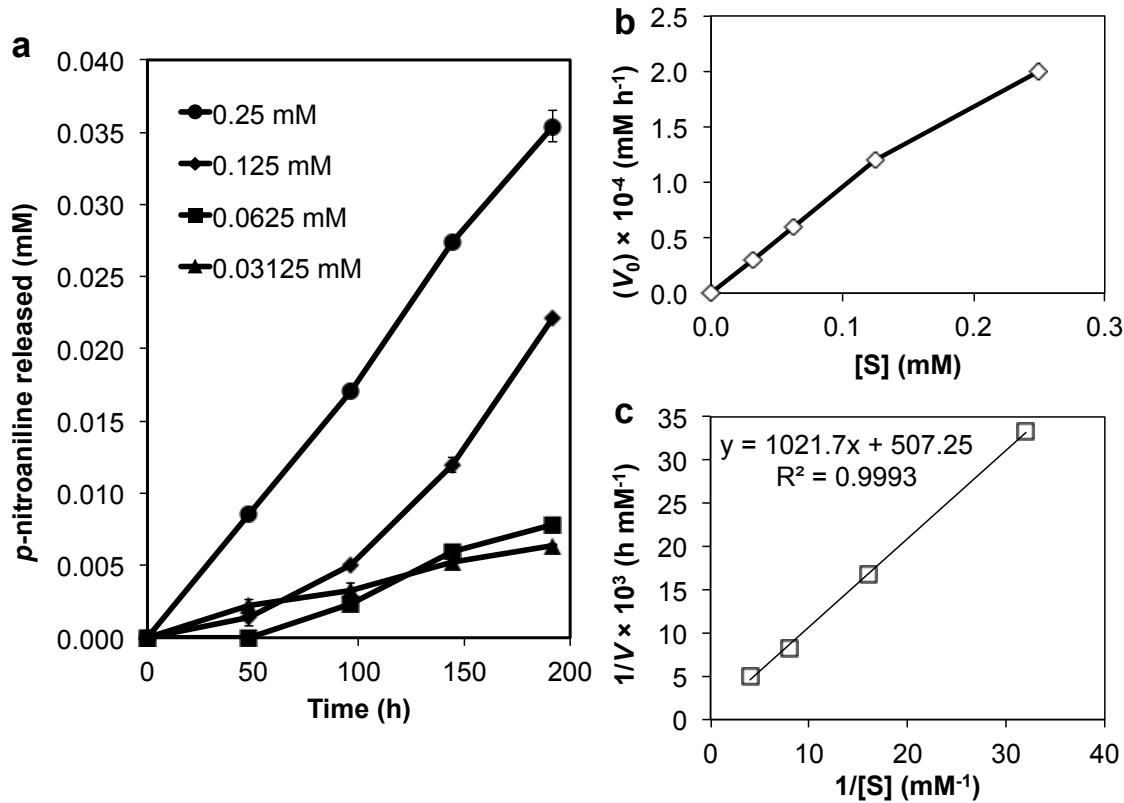


Figure S14. Amidase activity on different concentrations of substrates, L-alanine-*p*-nitroanilide using 2 mM of PC4 at 25°C, pH 8. (a) Amount of *p*-nitroaniline released as a function of time. Initial velocity obtained was plotted as (b) Michaelis-Menten plot and followed by (c) Lineweaver-Burk plot to determine the catalytic constants. All data shown are the means of triplicate tests.

Table S1. Analyses of the secondary structures of PCs from the CD data.

PC (at different pH)	Estimated secondary structure (%) ^a		
	α -helix	β -strand	Random
PC3			
pH 2	33.4	66.6	-
pH 4	17.2	-	82.8
pH 6	12.3	-	87.7
pH 8	-	54.0	46.0
pH 10	53.1	24.0	22.9
pH 12	93.0	7.0	-
PC4			
pH 2	83.4	16.6	-
pH 4	35.4	-	64.6
pH 6	11.4	-	88.6
pH 8	5.4	93.6	1.0
pH 10	7.8	69.6	22.6
pH 12	26.6	58.4	15.0

^aSecondary structures were estimated from dichroweb using Set7 of CONTIN method.¹

REFERENCES

- (1) Whitmore, L.; Wallace, B. A. *Biopolymers* **2008**, *89*, 392–400.