Electronic Supplementary Material (ESI) for Soft Matter.

Supplemental Information

Effects of Sea Water pH on Marine Mussel Plaque Maturation

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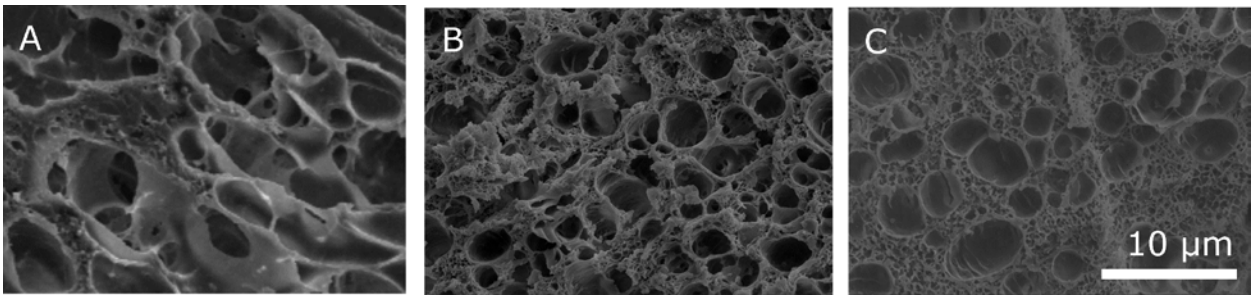

Figure S1. Cross-sectional SEM images at a magnification of 6500x for plaques submerged in ASW pH 7.8 for 24hrs. demonstrating the natural degree of variation in microstructure observed in fields of view obtained from different slices within the same plaque (A vs. B), and different plaques produced by different mussels (B vs. C).

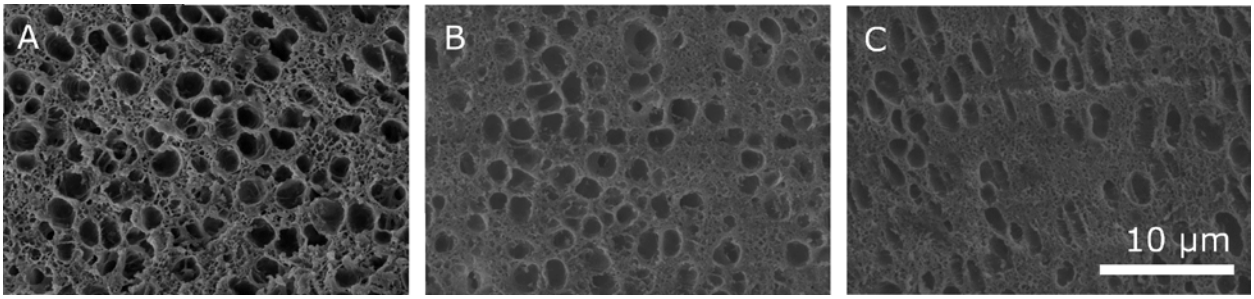

Figure S2. Cross-sectional SEM images at a magnification of 6500x for plaques submerged in ASW pH 6.7 for 24hrs. demonstrating the natural degree of variation in microstructure observed in fields of view obtained from different plaques produced by different mussels (A vs. B), and different slices within the same plaque (B vs. C).

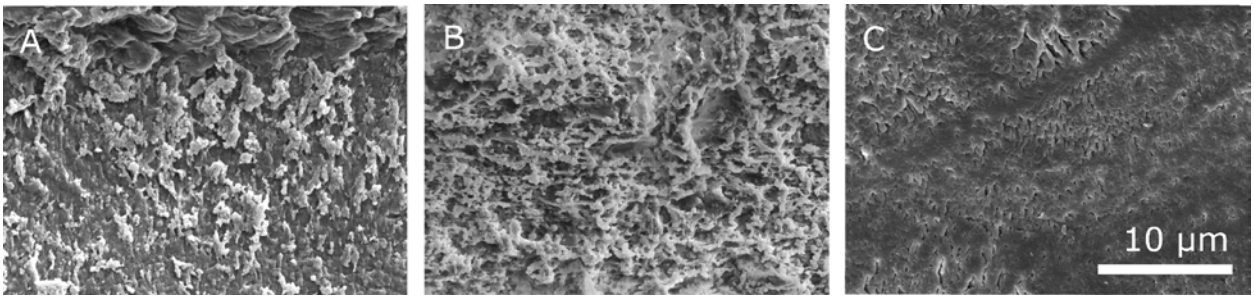

Figure S3. Cross-sectional SEM images at a magnification of 6500x for plaques submerged in ASW pH 3.0 for 24hrs. demonstrating the natural degree of variation in microstructure observed in fields of view obtained from different slices within the same plaque (A vs. B), and different plaques produced by different mussels (B vs. C).

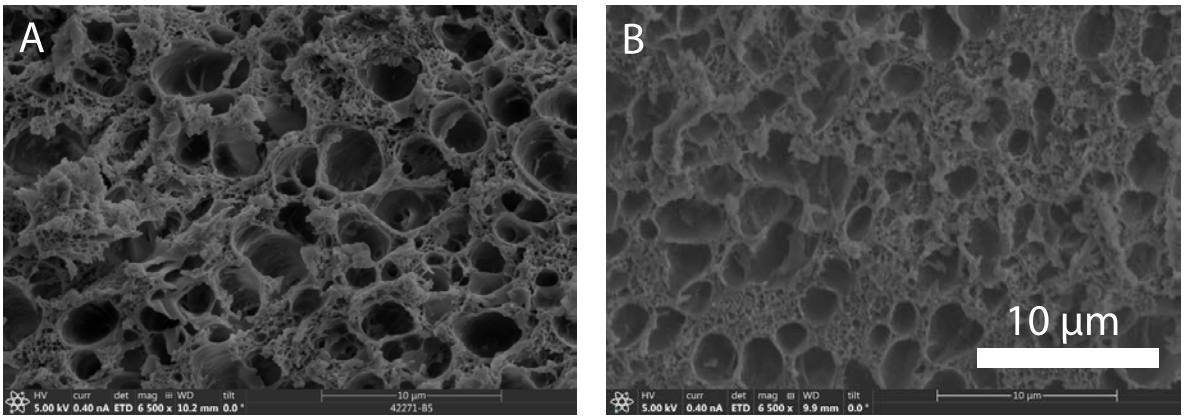

Figure S4. Cross-sectional SEM images at a magnification of 6500X showing the similarities in structure between the (A) ASW pH 7.8 plaques and (B) plaques collected in natural seawater (pH ~8.0) at 24 hours.

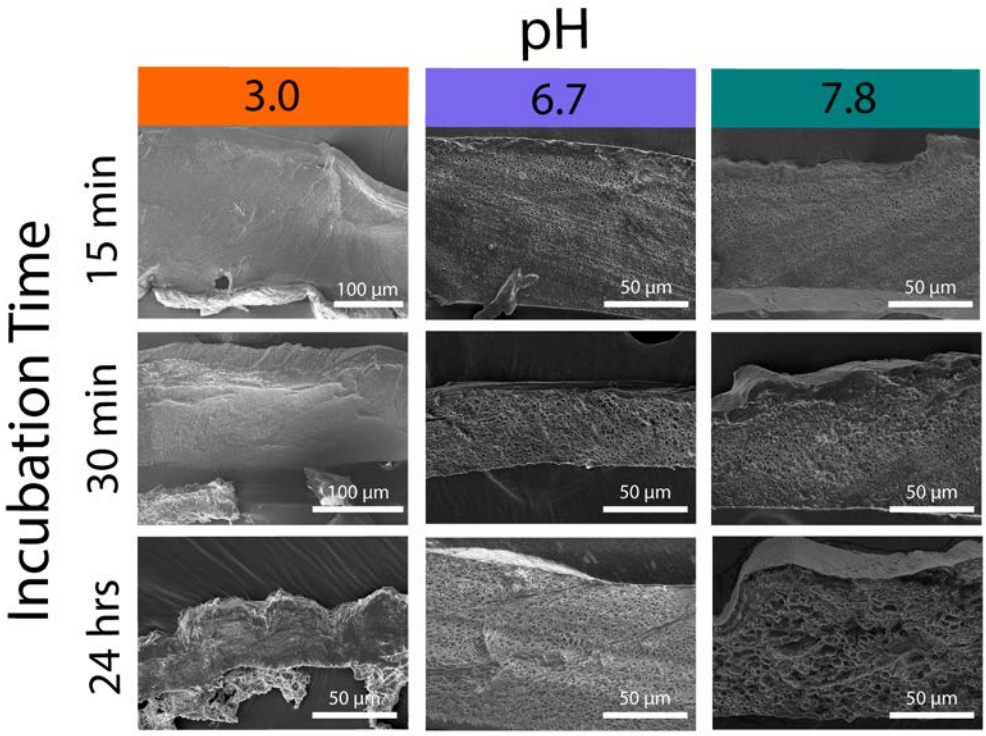

Figure S5. Cross-sectional SEM images at a magnification of 1200X showing the pH and time dependent structural evolution for plaques submerged in artificial seawater at pH 3.0, 6.7, and 7.8 for 15 min, 30 min, and 24 hrs.

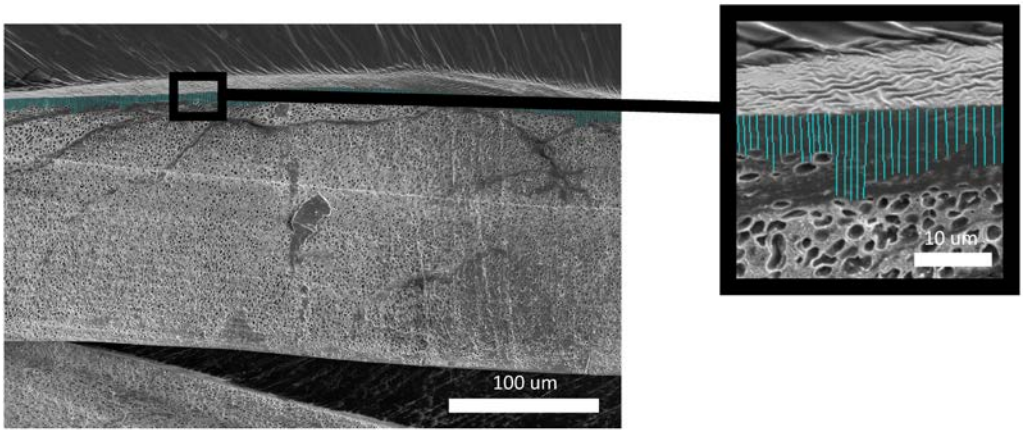

Figure S6 . Example SEM image demonstrating how cuticle thickness was measured. Cyan lines were drawn by hand to indicate the the electron dense, pore-free, interlayer just inside the outer plaque boundary . The measured line lengths were used to determine the mean and standard deviation of the cuticle thickness.

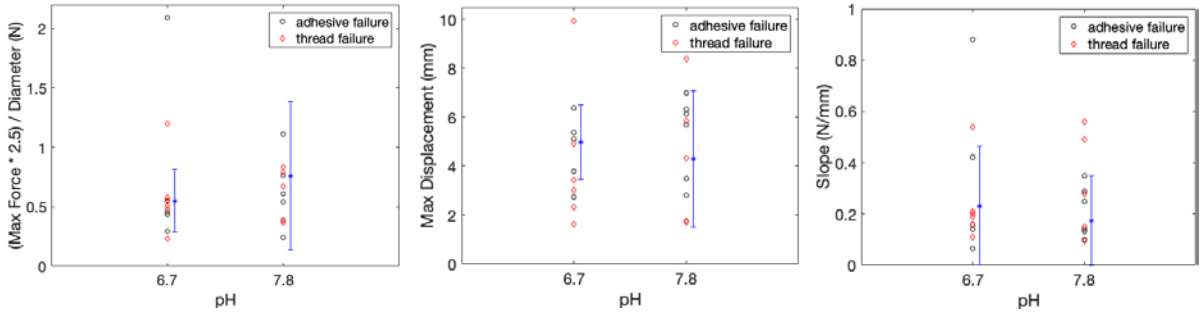

Figure S7. (a) Maximum force, (b) maximum displacement, and (c) slope of the linear portion of the force-displacement curve data for pH 6.7 and 7.8 where the blue asterisks and lines represent the means and standard deviations for each pH respectively.

Table S1. Average experimentally determined values of cuticle thickness in μm.

Sample	Thickness (μm)	Standard Deviation (μm)	Number of Measurements	Number of Plaques	Number of Images
pH3.0 ,15 min	14.4	3.2	118	1	2
pH3.0, 30 min	13.1	3.8	78	1	2
pH3.0, 24 hrs	N.D.	N.D.	N.D.	N.D.	N.D.
pH6.7, 15 min	6.9	3.9	1061	2	9
pH6.7, 30 min	4.1	5.4	308	2	3
pH6.7, 24 hrs	5.1	2.4	3368	2	12
pH7.8, 15 min	3.23	3.9	1217	2	6
pH7.8, 30 min	11.2	3.4	161	2	2
pH7.8, 24 hrs	4.0	3.9	1889	2	12