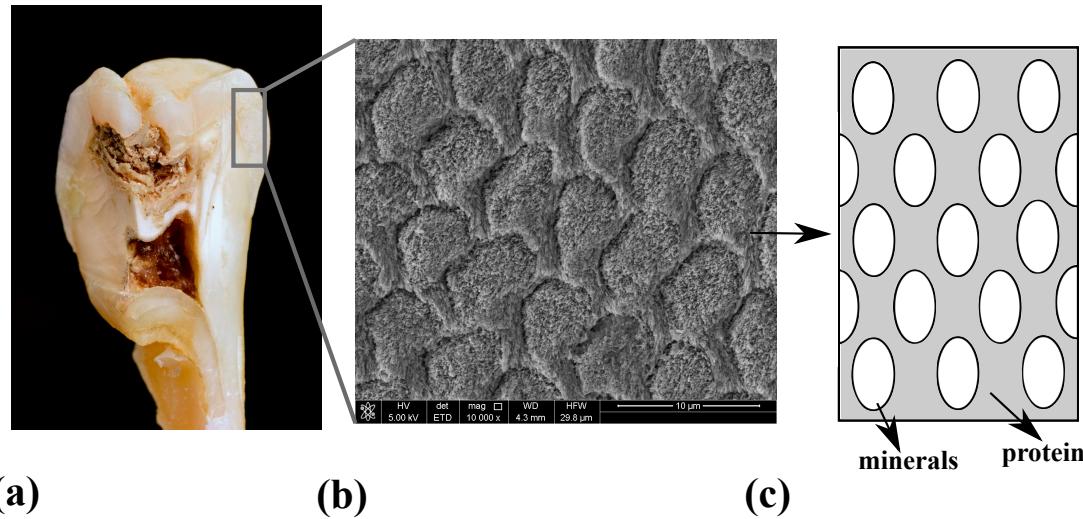
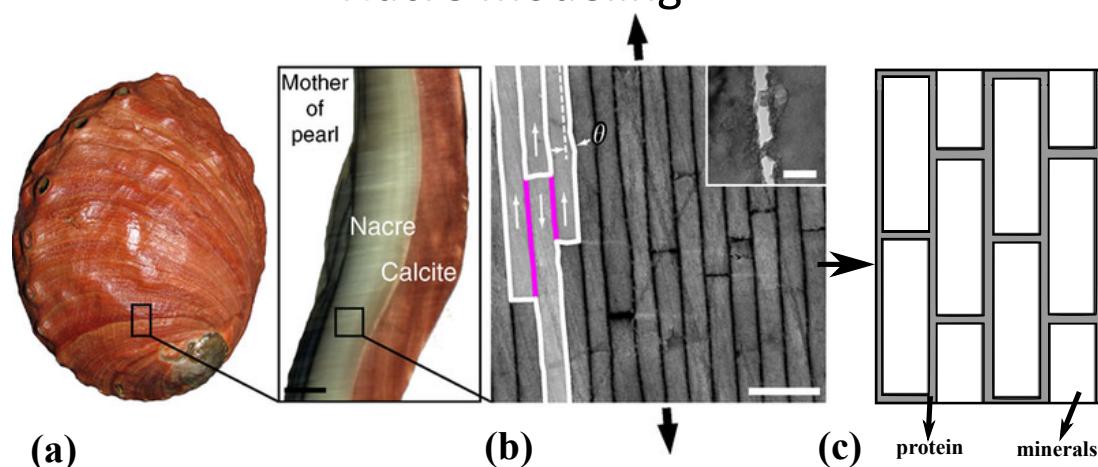


Enamel modeling

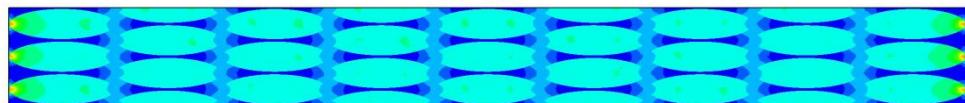
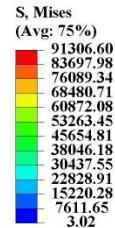


Nacre modeling

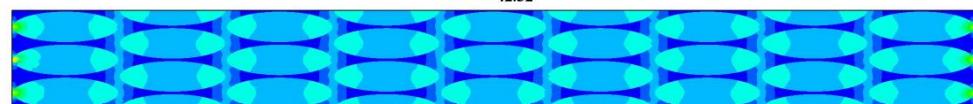
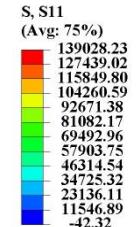


Enamel 1-direction stress-strain distribution

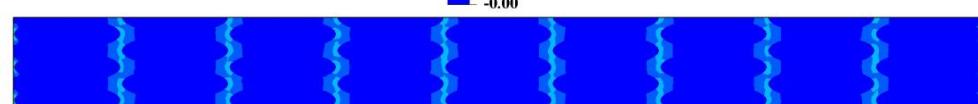
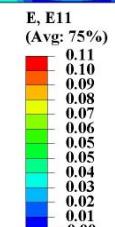
(a)



(b)

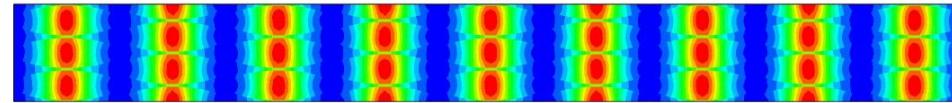
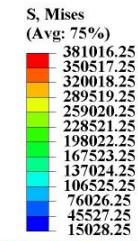


(c)

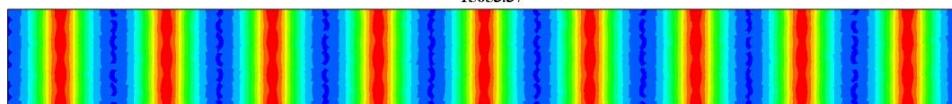
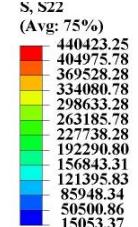


Enamel 2-direction stress-strain distribution

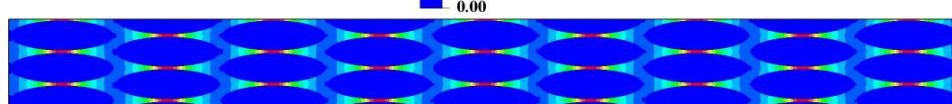
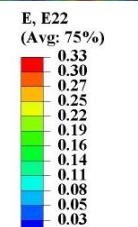
(a)



(b)

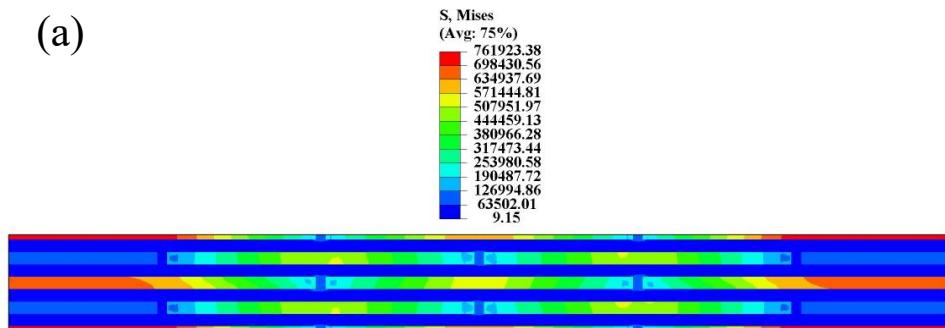


(c)

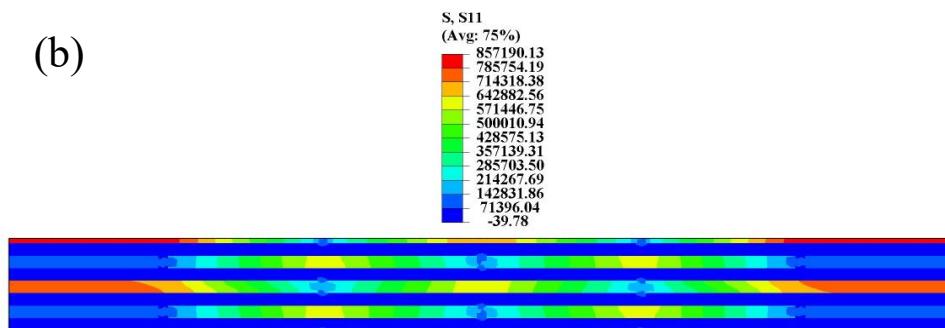


Nacre 1-direction stress-strain distribution

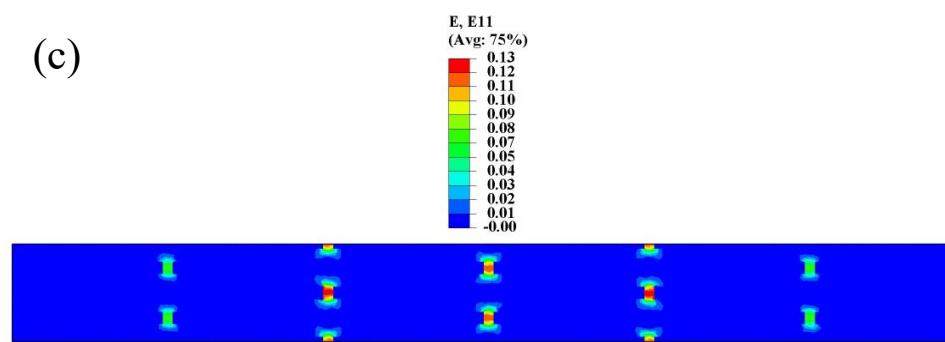
(a)



(b)

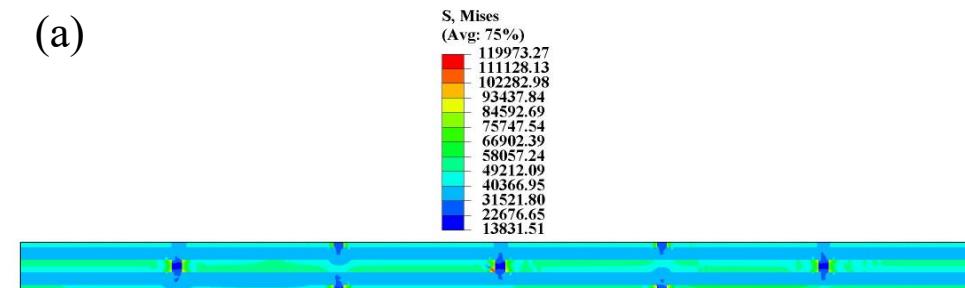


(c)

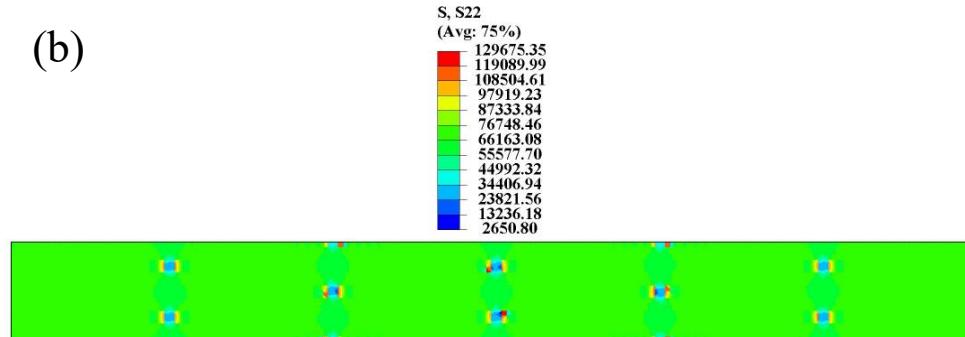


Nacre 2-direction stress-strain distribution

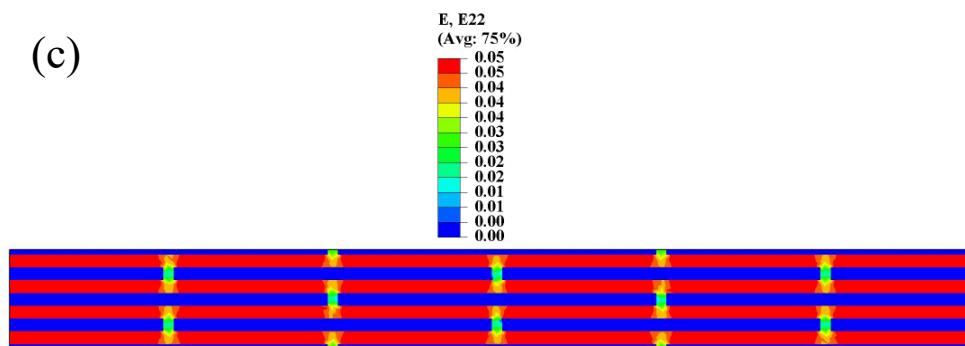
(a)



(b)

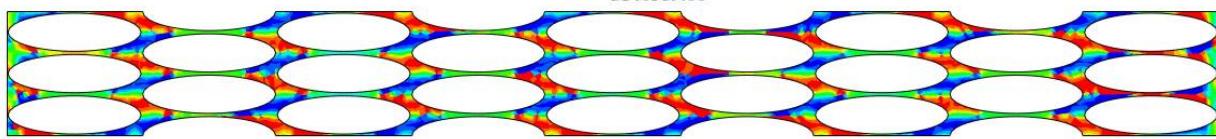
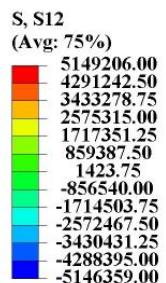


(c)

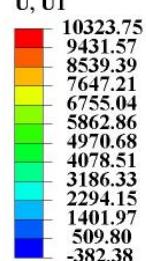


Enamel matrix 1-direction shear stress distribution

(a)

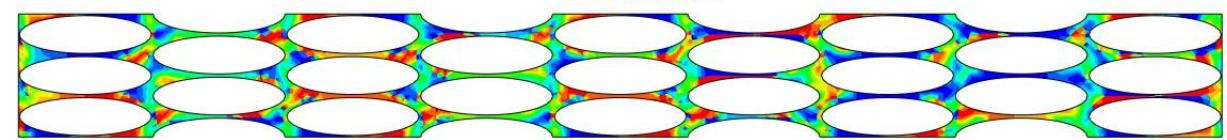
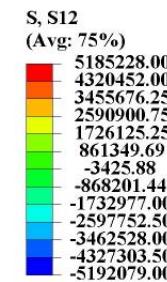


(b)

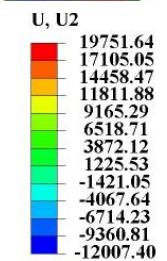


Enamel matrix 2-direction shear stress distribution

(a)

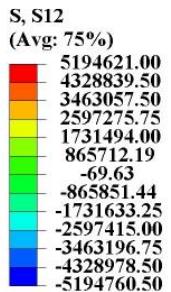


(b)

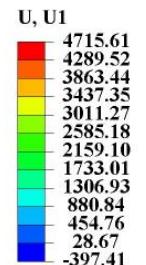


Nacre matrix 1-direction shear stress distribution

(a)

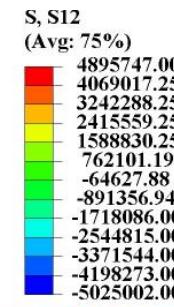


(b)

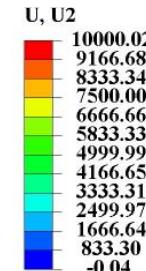


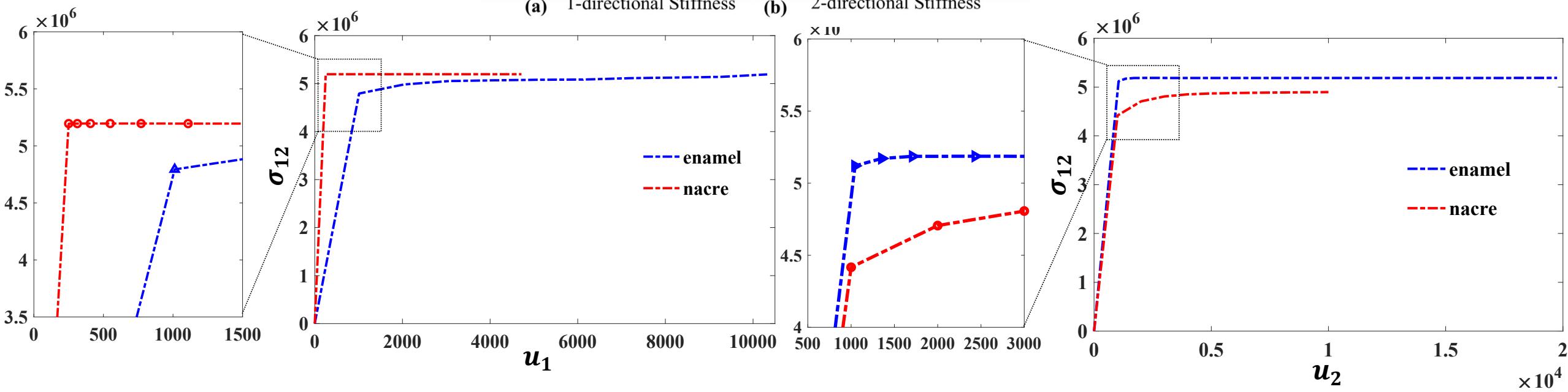
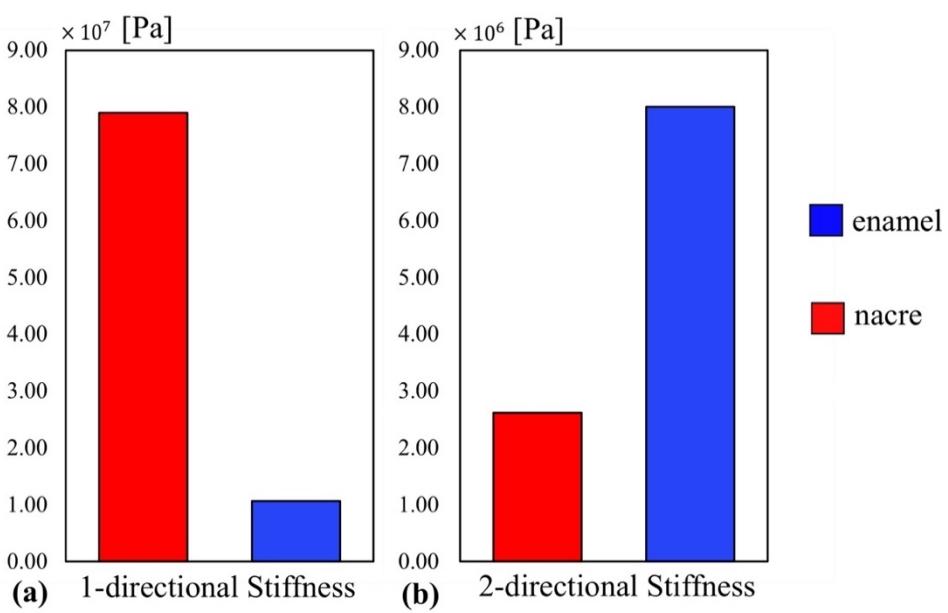
Nacre matrix 2-direction shear stress distribution

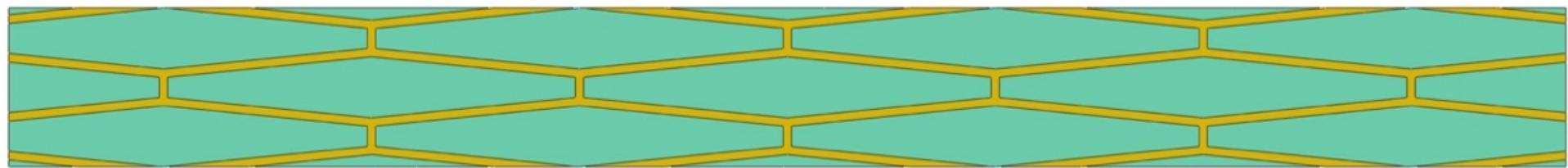
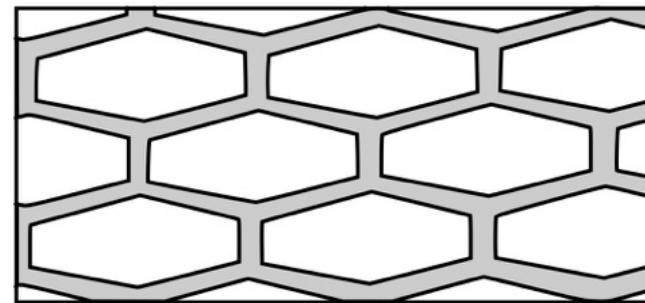
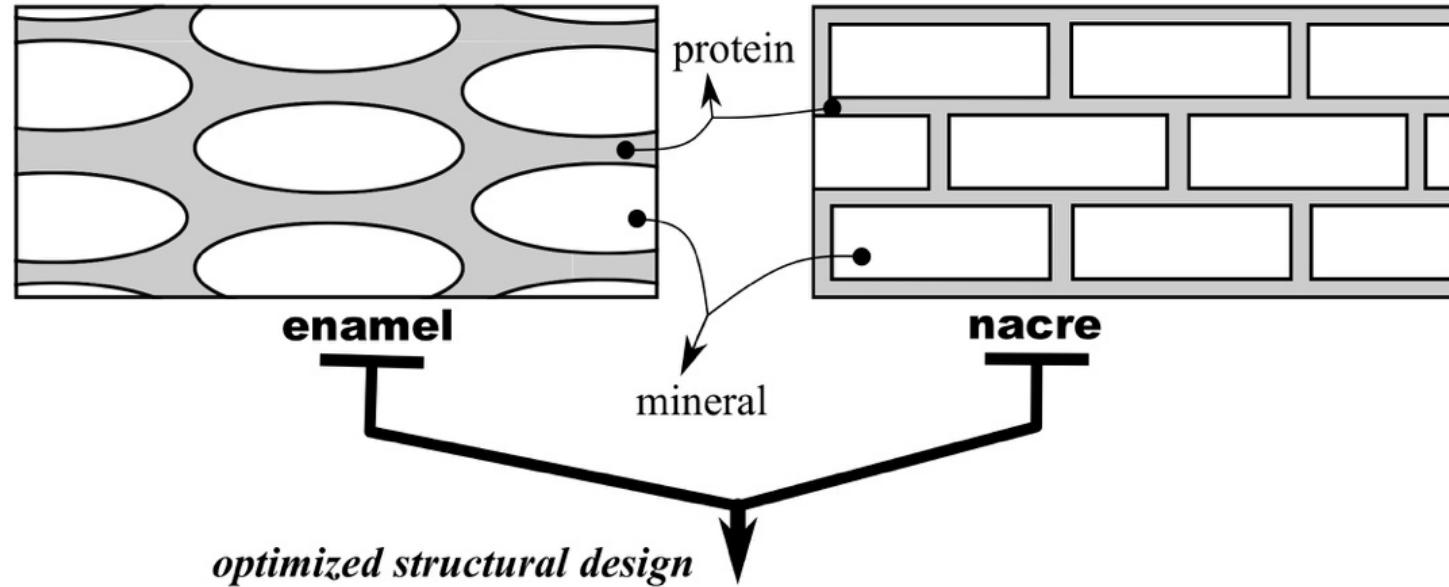
(a)



(b)



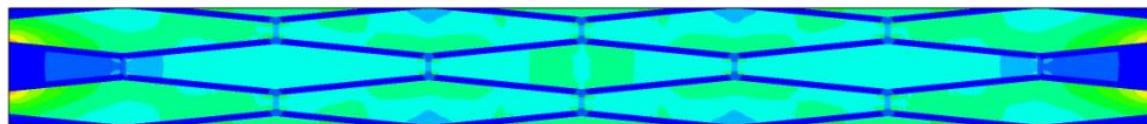
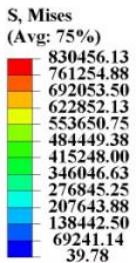




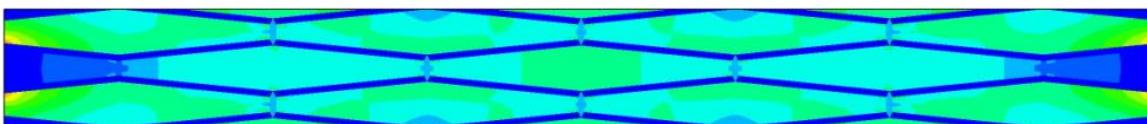
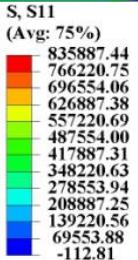
Structural design based on the simulation results

Optimized structure 1-direction stress-strain distribution

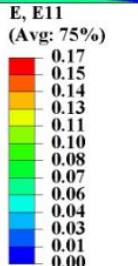
(a)



(b)

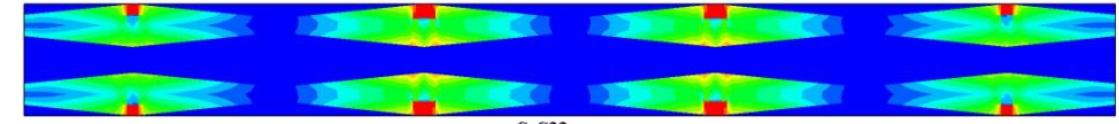
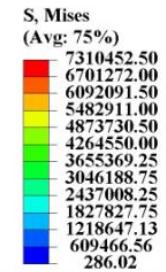


(c)

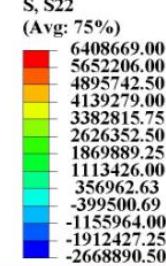


2-direction stress-strain distribution

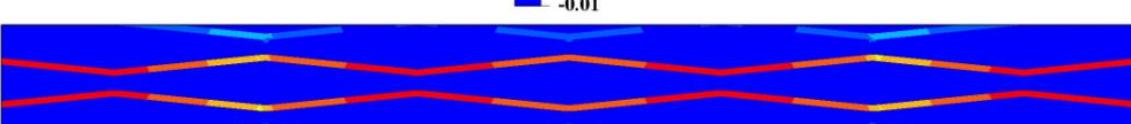
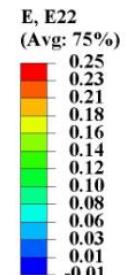
(a)



(b)



(c)



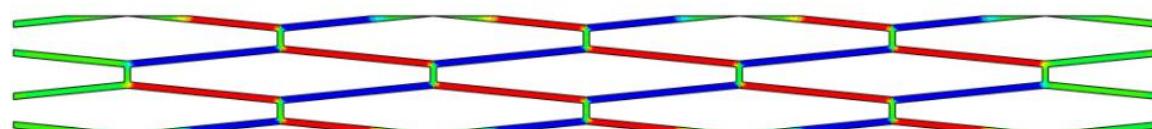
Optimized structure matrix 1-direction shear stress distribution

2-direction shear stress distribution

(a)

S, S12
(Avg: 75%)

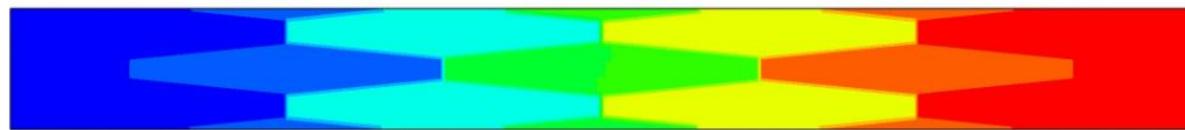
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1698403.75
849187.31
-29.13
-849245.56
-1698462.00
-2547678.50
-3396895.00
-4246111.50
-5095328.00



(b)

U, U1

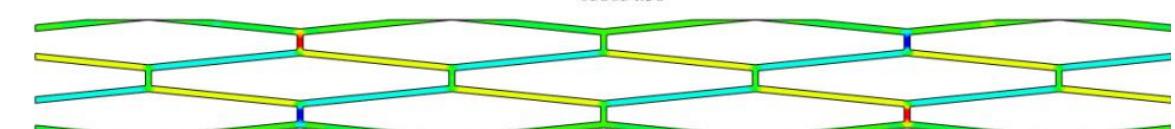
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9166.67
8333.33
7500.00
6666.67
5833.33
5000.00
4166.67
3333.33
2500.00
1666.67
833.33
0.00



(a)

S, S12
(Avg: 75%)

653363.00
544028.19
434693.41
325358.63
216023.84
106689.06
-2645.72
-111980.50
-221315.28
-330650.06
-439984.84
-549319.63
-658654.38



(b)

U, U2

10001.49
9167.91
8334.33
7500.75
6667.16
5833.58
5000.00
4166.42
3332.84
2499.25
1665.67
832.09
-1.49

