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Mechanical Behavior and Size Effect of the Staggered Bio-Structure Materials

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Highlights

- A strain gradient shear-lag model for the staggered bio-structure is developed in which the effects of microstructures and scale were incorporated.
- The analytical expressions of the overall effective modulus, interfacial strengths and deformations of the staggered bio-structure material are obtained.
- The size effects of the properties of the staggered bio-structure are studied.
- The predicted effective moduli of nacreous layer in different shells are compared with corresponding experimental results and are in good agreement with experimental results.

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