

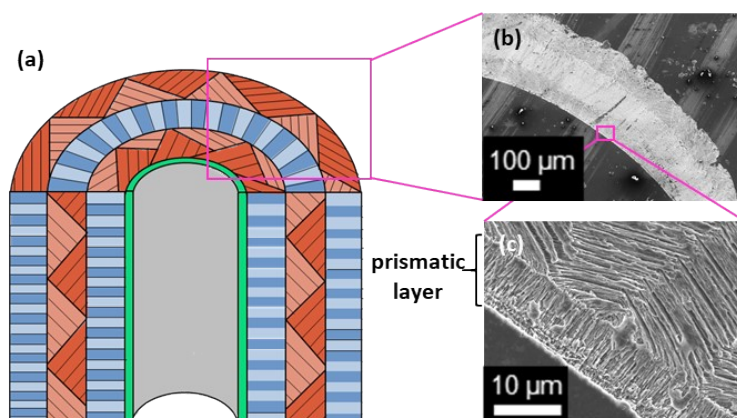
## Supporting Information

### Departmental Characterization of Structural and Mechanical Properties of Crossed Lamellae of a gastropod *Murex pecten*

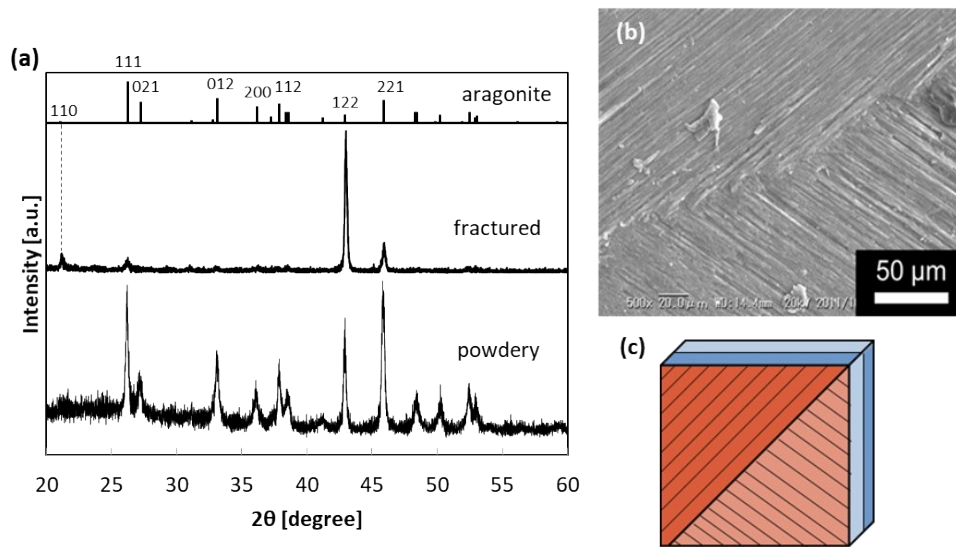
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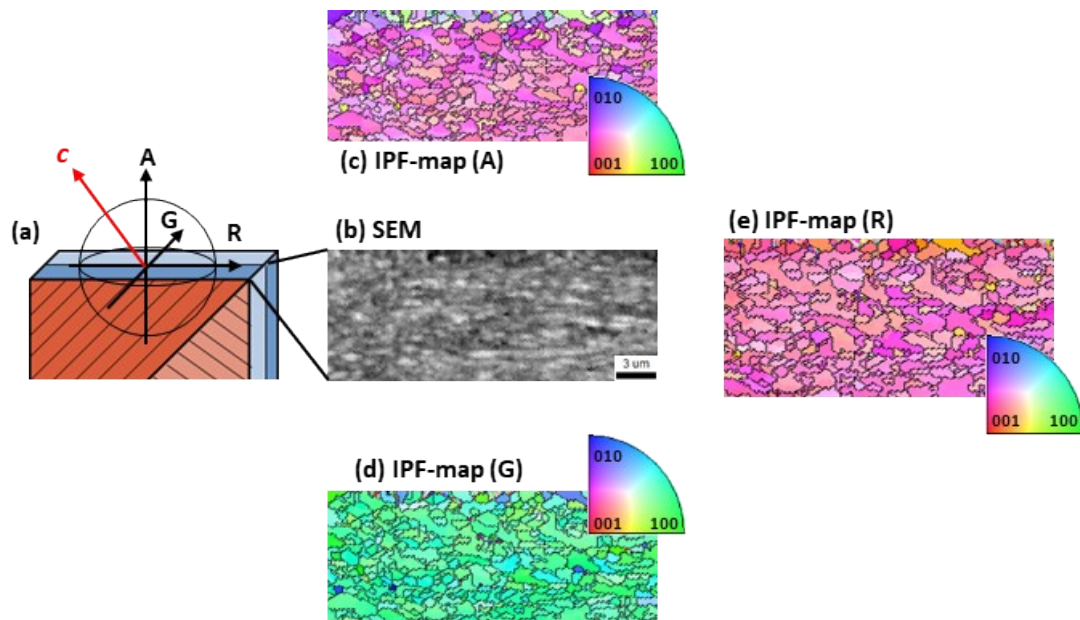
<sup>b</sup> The University Museum, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan



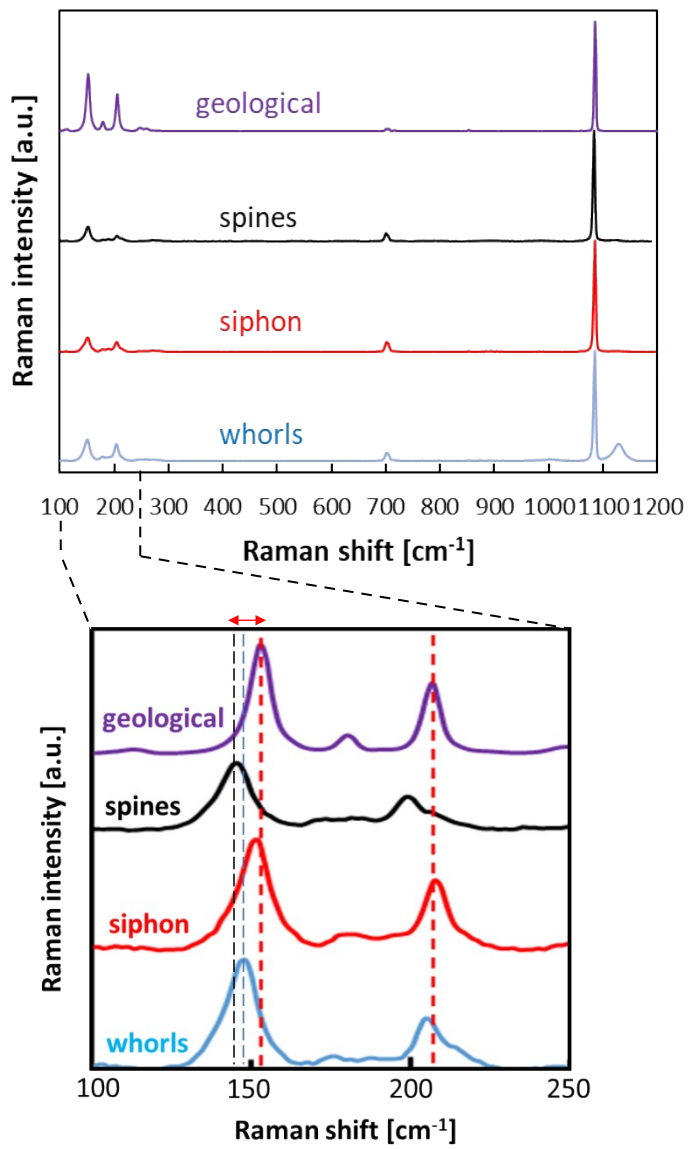
**Fig. S1** Schematic and SEM images of a cross-section of a siphonal canal. (a) An illustration and (b) SEM image of the siphon canal embedded in epoxy resin. (c) Enlarged SEM image of a prismatic layer of the siphon canal.



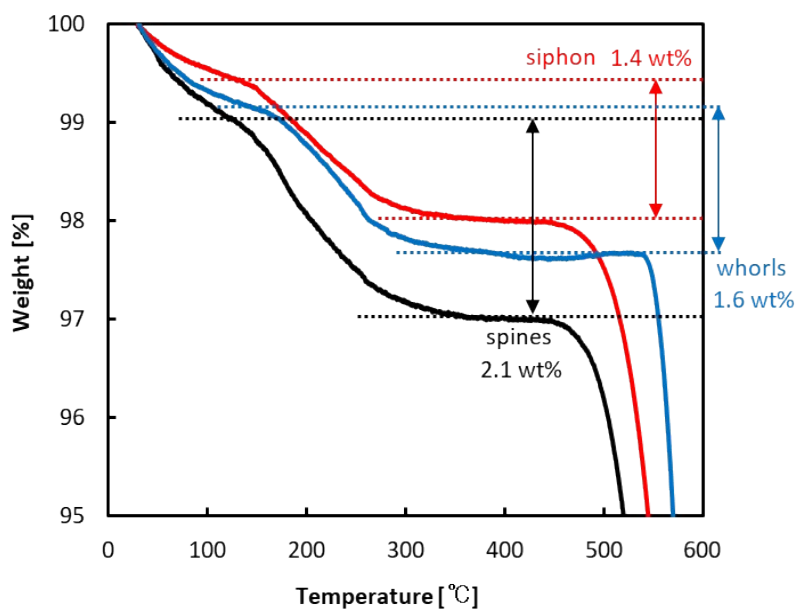
**Fig. S2** (a) XRD patterns for powdery and fractured samples of a shell of *Murex pecten*. (b) SEM image of the fractured sample. The fractured surface exposed the orange plane (c).



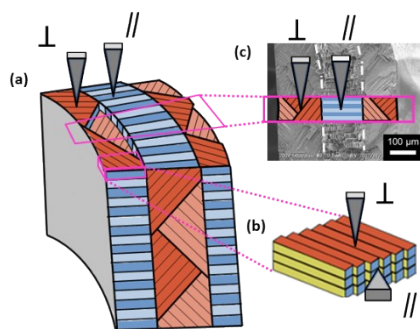
**Fig. S3** SEM and IPF mapping images and the pole figure of the end of the sheet as a unit of the 1st lamella. (a) Schematic illustrations of the sample; (b) SEM image observed from A; (c) an IPF mapping image for M; (d) an IPF mapping image for G; (e) The IPF mapping image for R.



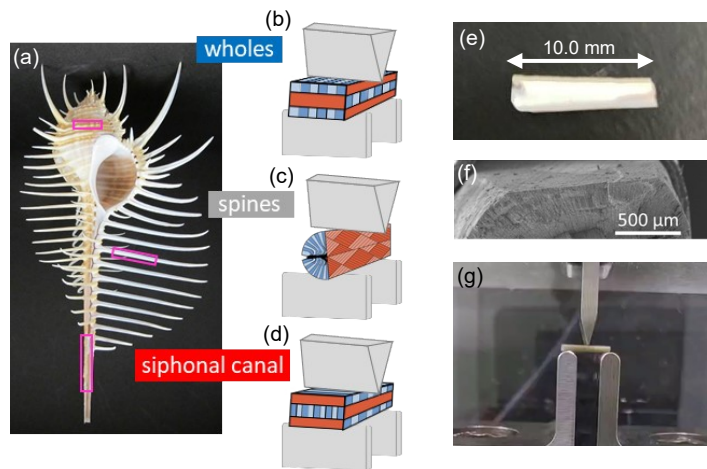
**Fig. S4.** Raman scattering spectra of the crossed lamellar structures in a *Murex pecten* shell.



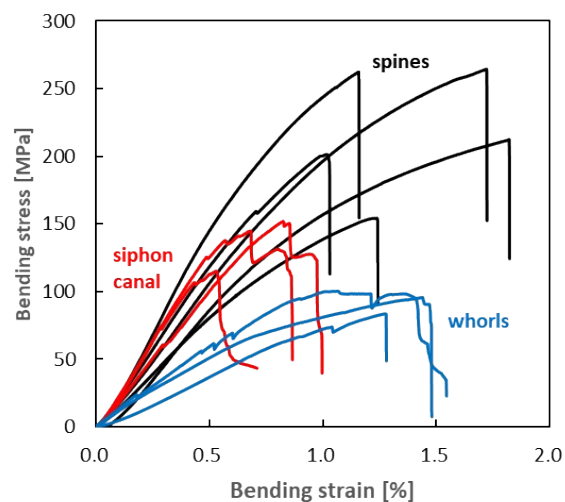
**Fig. S5.** The contents of organic molecules in the crossed lamellar structures estimated from thermal gravimetry curves of the samples.



**Figure S6.** Schematic illustration and SEM image of the crossed lamellar structure for indicating the indentate directions. (a, b) Illustration of crossed lamellar structure and the directions. (c) SEM image of crossed lamellar structure and the directions. The evaluation was performed in two directions: parallel and perpendicular to the long axis of the 3rd lamella planks



**Figure S7.** Photos and schematic illustrations of samples for the bending test. (a) A photo that indicates the direction of bending test samples. (b, c, d) Illustrations of bending test samples of (b) whorls, (c) spines, and (d) siphon canal. (e) A photo and (f) an SEM image of a bending test sample of spines. We used spines having the single-layer lamellae as a test sample because long pieces were prepared from the parts on the siphon channel. The round edges of the samples were polished to fix the bending machine. (g) A photo of the test sample fixed on the machine.



**Figure S8** Force curves of bending test samples.