

Evidence for helical microstructure of aragonite fibers in pteropod shells

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Supplementary Figures S1 to S3

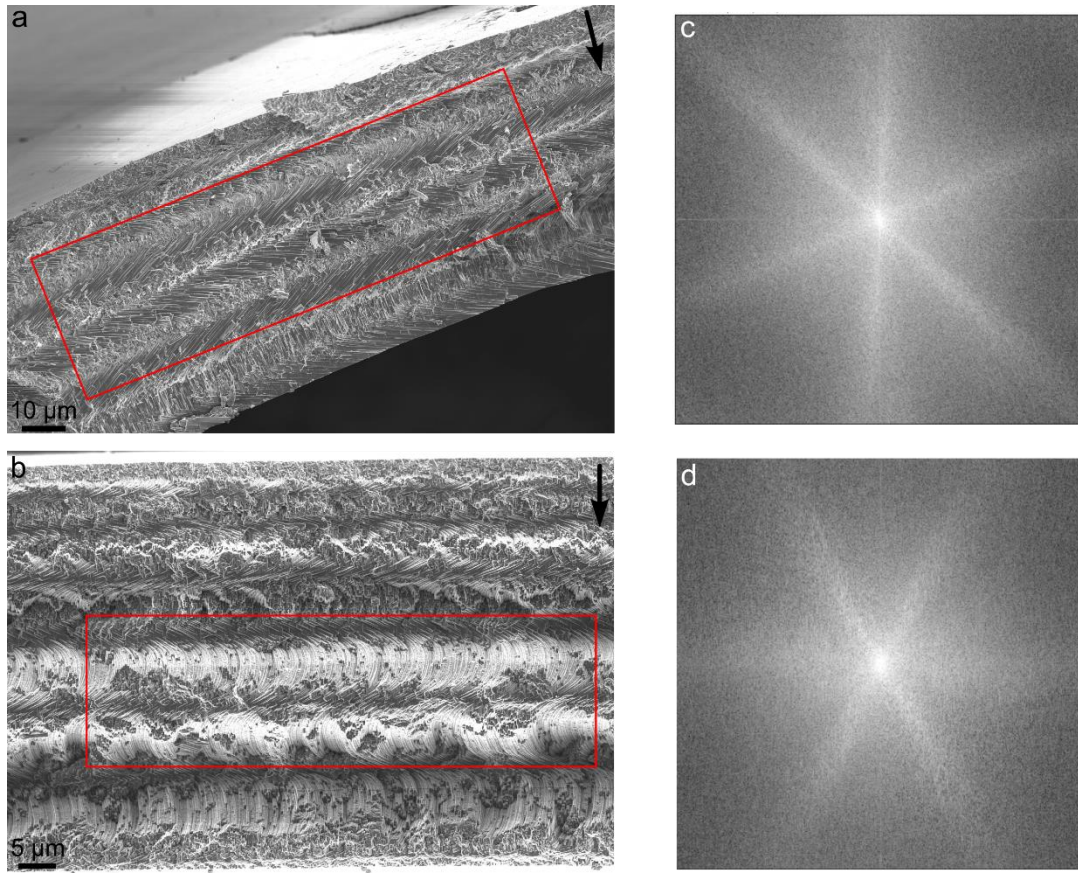


Figure S1. Two SEM images of *Cuvierina columnella* shell fractures perpendicular to the shell surfaces showing the helical microstructure (a, b) and corresponding calculated FFT patterns from the rectangular areas framed in red in the SEM images (c, d). The FFT patterns display a characteristic six-rayed pattern corresponding to the predominant orientations of the fibers. The arrows indicate the normals to the shell surfaces.

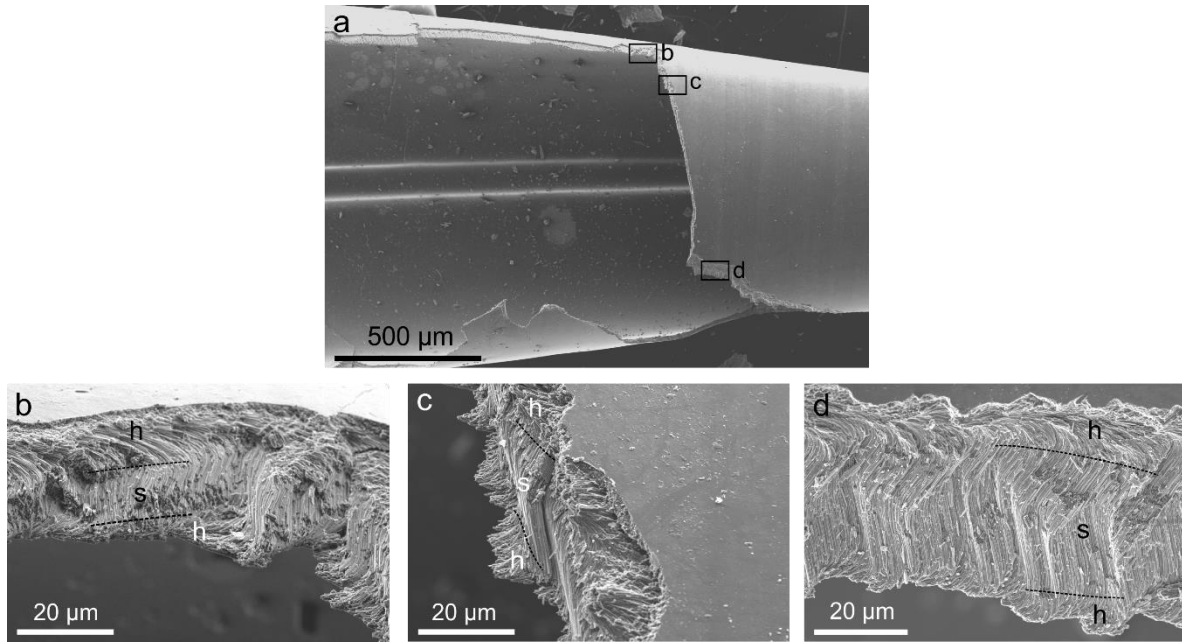


Figure S2. Microstructure of *Creseis acicula*. View of a specimen fractured around its mid length (a), and details (b-d) (framed in (a)) showing the microstructure. Fibers have a coiled external part (h), a middle sigmoidal part (s) and an inner helical part (h). The boundaries are tentatively indicated with broken lines. (b) and (c) are oblique views of the fracture whereas (d) is a plan view. The sigmoids are inclined at a low angle to the shell surfaces and oriented more or less parallel to the aperture (note growth lines in (a)).

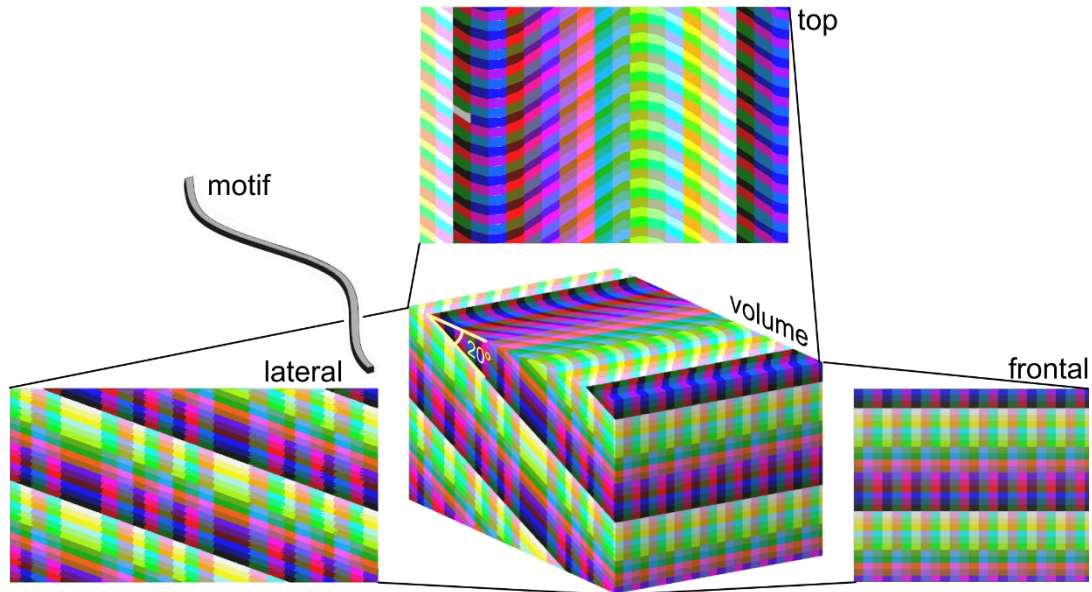


Figure S3. Three dimensional model consisting of a cuboidal volume filled completely with in-phase sigmoidal fibers of the kind indicated. Different sets of fibers appear in different colors. Fibers are arranged in planes inclined by 20° with respect to the horizontal plane. Besides the 3D view, the frontal, lateral and top surfaces are provided. Only the top surface (at a low angle to the fiber planes), displays a seemingly wavy pattern, constituted of homogeneously elongated transversal sections of the fibers. The vertical sections consist of brickwall arrangements, constituted of either evenly shaped transversal sections (frontal section) of alternating more (if close to the crests) or less elongated (if at the flanks) fiber sections (lateral section).