

## The morphology and orientation of aragonite crystals constituting the nacreous layer of gastropods

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In shells, the nacreous layer is composed of thin aragonite (Orthorhombic:  $a=4.959, b=7.968, c=5.741$ ) tablets intercalated in organic matrix, and the c-axis of aragonite is perpendicular to the shell surface. It is known that aragonite crystals at the growing surface of gastropod nacre form pyramid-shaped stacks, whereas bivalves such as *Pinctada fucata* usually show a step-like structure.

In this study, the growing surface of nacreous layer of abalone, a representative of the gastropod having nacreous layer, was observed by a scanning electron microscope (SEM), and the crystal orientation was measured by electron back scattered diffraction (EBSD). The cross section of the pyramid-shaped stacks that was fabricated by focused ion beam (FIB) was also investigated by a transmission electron microscope (TEM), and we consider a growth model of abalone nacre that is based on mineral bridges in the organic matrix.

From the SEM imaging, pyramid-shaped stacks of pseudo-hexagonal aragonite tablets were observed in the growing surface of abalone nacre. The crystal orientation of the aragonite tablet was determined by the EBSD, and it was found that the aragonite tablet is a single crystal slightly elongated along the a-axis. The analysis of the Kikuchi pattern of the sample processed by FIB showed that the change of crystal orientations between layers has a constant tendency. This result may suggest that the crystal orientation is controlled by mineral bridges.