

**LETTERS**

**Tailoring calcite: Nanoscale AFM of coccolith biocrystals**

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**ABSTRACT**

Biom mineralization produces crystals of elaborate shapes, never seen in inorganic mineralogy, with tightly regulated compositions and axis orientations. The calcite coccoliths produced by unicellular marine algae provide an example of such control at very tiny scales. Atomic force microscopy (AFM) of two species provided nanoscale images allowing us to define crystallographic orientation in the crystal elements and to establish the relationship between crystallographic orientation and coccolith morphology. Both species adopt the inorganically stable calcite rhomb, but differences in crystal orientation enable them to construct distinct architectures with properties tailored to suit the requirements of their ecological niche.