

Biological control of ultra-skeleton mineralization in coral

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ABSTRACT

Understanding the mineralization of coral is significant for the formation of coral reefs and paleoclimatic reconstructions. However, the fundamental mechanisms involved in biomineralization are poorly understood. A combination of Raman spectral and cross-polarized reflected light microscopy imaging was used to examine the three-dimensional spatial distribution of the skeletal ultrastructures and their associated mineral, organic, and water chemistry in coral, which enable insight into the spatial growth features of the ultrastructures and possible formation processes. A possible mechanism is proposed that controls the formation of skeletal ultrastructures, which likely involves compartmentalized calcifying cells and their related cellular activities. This could clarify the association between coral skeletal mineralization and biology, and it may be beneficial to better protection and application of coral reefs.

Keywords: Coral, skeletal ultrastructure, calcifying cells, three-dimensional distribution, mineralization mechanism