The Transition of Calcite to Aragonite as Seen in Oceans and Caverns

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Abstract

Aragonite and calcite, two of the most common and naturally occurring crystal forms of calcium carbonate, are chemically the same; however, they each have a unique crystal framework that makes them individualistically recognized minerals. The transition from calcite to aragonite has been seen throughout different geological formations, from underground caverns in Virginia to North Carolina beaches. So here lays the question, when and why did the geological creations of the world shift from calcite to aragonite? The answer to this question must take into account of many variables. In caverns, components that directly stimulate the formation of aragonite are high temperature, low concentration of calcium bicarbonate, and high concentrations of magnesium, strontium, and lead. Several physical factors play a part in the influence of the formation of calcite compared to the formation of aragonite as well. These include the frequency of which the water reaches the surface and the humidity in that area. In the ocean, temperature and proteins play an important role in which polymorph of calcium carbonate is created. This paper will examine the details of the changes seen throughout two different geological formations and their connection to aragonite and calcite, particularly why one polymorph forms while the other does not.