

KINETICS OF CARBONATE-SEAWATER INTERACTIONS

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ABSTRACT

Most of the calcium carbonate removed from the oceans is precipitated out by pelagic organisms living in the upper layers of the world's oceans. However, only a small fraction of that amount accumulates on the ocean floor as sediments. Thus, there is the question of where the dissolution takes place.

This question will not be finally answered until the chemical process of the dissolution in seawater is fully understood. Since most oceanic waters are out of equilibrium with the calcium carbonate system, it is more important to consider the kinetics of the reaction, rather than the equilibrium itself.

Using the spinning disk method, an experimental set-up was devised to study the rate of dissolution of calcite in aqueous solutions. Different models were developed to describe the reaction and to estimate what chemical processes may take place.

The object of this study was to compare the relative influence of individual seawater constituents such as Mg^{++} , Sr^{++} , Ba^{++} , Ca^{++} , SO_4^{--} , PO_4^{3-} , and dissolved organic matter, on the rate of calcite solution. The effect of temperature was studied by the same method. Calcium ions, followed by magnesium ions and dissolved organic matter, were found to have the greater influence on the solution-rate constant.