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Kinetics of Magnesium Calcite Nucleation and Growth

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Calcium carbonate nucleation and growth in marine environment is strongly influenced by presence of magnesium ions. If Mg ions are present in a sufficient concentration, magnesium calcite particles with a spherulitic morphology are formed.

Here we present how growth rate are evolving along the nucleation, and crystal growth pathway. By combining macroscopic rate laws with the in-situ time-dependent measurements of the changes in the bulk solution composition we were able to get a quantitative insight into kinetics of magnesium carbonate growth [1]. Simultaneously, we monitor particles morphology and solid crystal structure, revealing that spherulitic particles with only slightly disturbed calcite structure.

This research is relevant for a long-standing questions concerning impurities influence on carbonate sediments diagenesis or the environmental conditions influence on $CaCO_3$ growth, transformation and properties.

[1] M. Prus et al Journal of Colloid and Interface Science, 593 (2021) 359-369