High-magnesium calcite: from synthesis to structure

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The main constituent of marine biominerals is calcite and it is usually found in nature with additives such as organic molecules and magnesium in various concentration. However, calcite is thermodynamically unstable at ambiant conditions when it contains more than 10% magnesium. Intriguingly, the concentration of magnesium found in biogenic calcite is in some cases much higher than that. It is now well accepted that this high content is facilitated via crystallization through Mg-stabilized amourphous calcium carbonate. Nevertheless very little is known about the underlying mechanism.

Inspired by this, we propose to synthetically reproduce high –magnesium content calcite, going through an amorphous precursour, study the crystallization process and analyze the obtained crystal structure, microstructure and nanostructure. Both of these features are of extreme interest for the understanding of biomineralization processes, the origin of the superior properties of biominerals and for the design of new materials.