

# Experiments on the Inhibitory Effect of Polysaccharides on Cation Ordering of Dolomite During Dolomitization Reaction at 200°C: Preliminary Results

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Dolomite is a mineral that consists of calcium-magnesium carbonate, with the chemical formula  $\text{CaMg}(\text{CO}_3)_2$ . The "dolomite problem" pertains to the challenge of understanding the significant variability in dolomite production over geological time periods and the difficulty of replicating dolomite formation under lab conditions, even though it has been found in surface environments in the past (e.g., Warren 2000). Recent research has shown that polysaccharides such as carboxymethyl cellulose (CMC), agar, and biomass can promote the formation of disordered dolomite at room temperature (e.g., Zhang et al., 2015; 2021). However, Wei and Konishi (submitted) discovered that CMC and agar inhibit the dolomitization reaction at 200°C, although the impact on cation ordering was not clear.

In our study, we are examining the impact of CMC on cation ordering during the dolomitization reaction at 200°C. The experiment involved heating two sets of solutions for varying durations. Both sets had a fixed concentration of Mg and Ca cations at 0.5M and a carbonate ion concentration of 0.1M. One set included 0.2g/L CMC, while the other set did not for comparison. The pH of the solutions was adjusted to 8 before heating. We measured the change in the ratio of 015 peak intensity to 110 peak intensity with different heating durations, which serves as an ordering index indicating the Ca and Mg ordering state in the dolomite structure. In 13 durations of the experiment, 6 showed significantly lower ordering index values with CMC, 6 had similar values, and 1 was higher without CMC. Overall, the trend indicated that the presence of CMC resulted in a lower ordering index in dolomite, suggesting an inhibitory effect on cation ordering.

Keywords: dolomite, Polysaccharides, dolomitization, Inhibitory Effect