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inhibition effects of polysaccharides on dolomitization at high temperature

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The “dolomite problem” is undoubtedly one of the most confusing but interesting puzzles in geology history. Dolomite, CaMg(CO3)2, is an abundant carbonate mineral in ancient sedimentary rocks, but it only occurs in limited modern environments such as hypersaline lakes and cold seeps. Dolomite still cannot be well synthesized at low temperatures. This enigma has been repeatedly referred to as the “dolomite problem” [1]. Recently, the microbial model for dolomite formation has been popular. It has been suggested that microbial activity can serve as the key to overcoming kinetic barriers to promoting dolomite precipitation[2][3].

The effect of dissolved polysaccharides, carboxymethyl cellulose (CMC) and agar, which are the analogs of extracellular polymeric substances, on dolomitization at 200 ℃ was investigated in this research. The results of our experiments demonstrate that the transitions from calcite to dolomite are inhibited in polysaccharide-bearing solutions with the conclusion that the higher concentration of polysaccharides is, the greater inhibition effect happens. The SEM study of the reaction products indicates that the decomposition products of polysaccharides adsorb onto the reaction interface, and thus prevent dissolution and precipitation processes. This indicates that microbial activity is not always favorable for dolomite formation in certain conditions.

keywords: dolomite problem, dolomitization, inhibition effect

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