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Seeded crystallization of calcite and aragonite in seawater as a pretreatment scale control process, a study of supersaturation limits

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ABSTRACT

The seeding crystallization of calcite and aragonite in seawater was evaluated theoretically and experimentally. The level of supersaturation with respect to calcium carbonate, which is the driving force for the crystal growth, was found to be influenced by the pH value of seawater, the temperature and the seed morphology. It was proven experimentally and theoretically that the level of supersaturation in seawater with respect to calcium carbonate is more sensitive to pH than to temperature. The growth process of calcite or aragonite cannot start if the pH value of seawater is not adjusted to be higher than 8.0 in the basic medium. An initial pH value of 8.2 is found to be enough to initiate the growth process of both calcite and aragonite seeds. Calcite seeds were found to be subjected to higher levels of supersaturation than aragonite.

Keywords: Seeding crystallization; Seawater; Calcium carbonate; Scale control; pH, Calcite; Aragonite

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