

Dolomite formation within microbial mats in the coastal Khor Al-Adaid Sabkha of Qatar

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A concept of dolomite formation known as the “sabkhas model”, has been proposed to explain dolomite development, but does not consider an involvement of a biological component in this process. This “abiotic” model has been questioned with recent advances in geo-microbiological research. It has been demonstrated that, by effectively lowering the activation energy, carboxyl groups within exo-polymeric substances (EPS) responsible for dolomite precipitation. While experimental studies supported this hypothesis, in-depths field studies in the evaporitic environments such as coastal sabkhas are still rare.



Figure 1:
Microbial mats.

In this study, we performed *in-situ* high spatial resolution measurements of geochemical conditions, as well as characterization of microbial communities and microscopic and spectroscopic imaging in microbial mats from Qatar coastal sabkhas (Figure 1). Dolomite precipitates within these mats has been documented by X-ray diffractometry with a characteristic dolomite reflection peak at the main 104 (2.90 Å) position along with other common carbonate minerals throughout the mat profile.

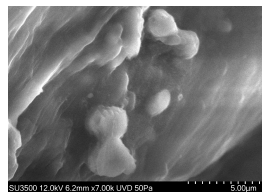


Figure 2: Dolomite within the top layer of microbial mats.

We determine the natural conditions within mats and provide new insights into the dolomite problem. This research allows us to help refine laboratory experiments and further dolomite precipitation models.