

Preservation of Organic Matter in Evaporites

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ABSTRACT

Organic matter is abundant in the laminites of the Winnipegosis Formation (Middle Devonian of the Elk Point Evaporite Basin, Western Canada) where it is delicately preserved by virtue of early diagenetic coarsely crystalline calcite which grew through the organic matter before compaction. The organic matter is believed to have been mainly a mucilage secreted by blue-green algae, and its abundance was due to salinity (the rocks carry calcium sulphate minerals) that inhibited browsing organisms. The early diagenetic calcite was a by-product of the activities of sulphate reducing bacteria. Analogous formation of early diagenetic

calcium carbonate is taking place in present day algal mats and mucilaginous algal mounds in a saline lagoon at Laguna Mormona in Baja California. In the Winnipegosis laminites most of the calcite crystals pervaded the organic matter without disturbing it, but a few crystals did exert their mechanical force of crystallization and pushed the organic matter aside. The rocks were subsequently locally dolomitized—the dolomite replaced the calcite but displaced the organic matter formerly enclosed within the calcite. A small proportion of fluor spar is present. This also replaced calcite but incorporated the organic matter without disturbing it.