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Phase Chemistry Study of the Dangxiongcuo Salt Lake Brine: Isothermal Evaporation at 25°C

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Production of lithium carbonate from brines has become the dominate trend in the world from the beginning of this century. Dangxiongcuo, a carbonate-type salt lake, is located in the interior of the Tibetan Plateau, China. As a salt lake deposit, rich in Li, B, K and other useful trace elements, the lake is of great economic value. Based on an isothermal evaporation experiment, the concentration behavior of these elements and the crystallization paths of salts in the brine were studied at 25°C. The compositional point of the original brine for the experiment is located in the Glaserite region at the metastable phase diagram of the quinary system Na-K-CO₃-SO₄-Cl-H₂O at 298K. The sequence of the primary salts crystallized from the brine during evaporation experiment at 25°C is halite (NaCl), trona (Na₂CO₃·NaHCO₃·2H₂O), zabuyelite (Li₂CO₃), Glaserite (3K₂SO₄·Na₂SO₄), sylvite (KCl) and borax (Na₂B₄O₇·10H₂O) respectively. That is in accordance with the metastable phase diagram. In the experiment, Lithium precipitation is a continuous process that occurred throughout the experiment. But, it was difficult to obtain high-grade lithium salt during the experiment. Potash is precipitated as Glaserite and sylvite in the experiment with high grade, that made the Dangxiongcuo Salt Lake brine suitable to produce potash. Borax is precipitated in the late stage. High-grade borax can be obtained from Dangxiongcuo Salt Lake brine.

Key words: Dangxiongcuo Salt Lake, Tibet, Isothermal Evaporation, Salt Mineral, Crystallization Path

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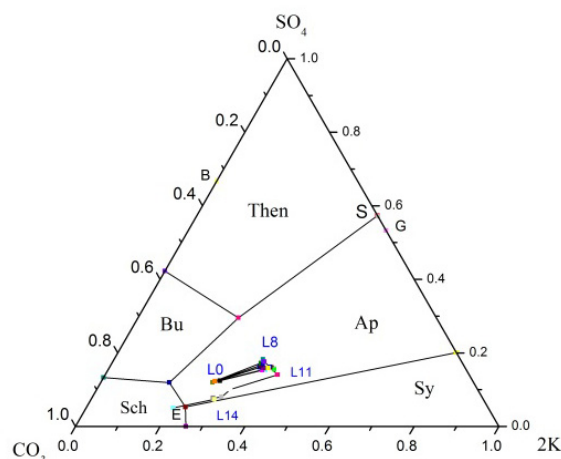


Fig. 1. Crystallization path of Dangxiongcuo brine in quinary water-salt system Na-K-CO₃-SO₄-Cl-H₂O at 298K.

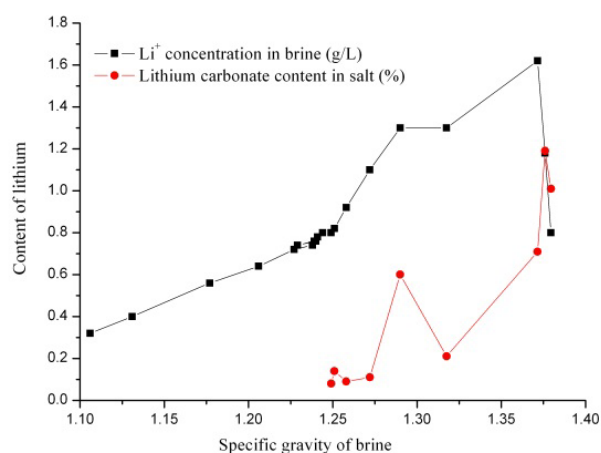


Fig. 2. Content of lithium in brine and its minerals during 25°C isothermal evaporation.

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