

The importance and role of main factors of density and evaporation on the process of Precipitation and amount of extraction KCl, MgCl₂, CaCl₂ and NaCl from Iran playas brine.

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Abstract:

Preliminary density of lakes and playas brine and amount of evaporation are considered as two important factors in extracting valuable mineral from brine.

- 1- Density: According to the results of studying and surveying the different analysis of our country playas brine can demonstrate the density out lining as follows:
 - a) Brine density less than 1.200 (gr/cm³). Which contains a lot of salt, a little KCl, MgCl₂ and CaCl₂ (It doesn't have great economical values, except salt).
 - b) Brine density from 1.215 to 1.200 (gr/cm³). Which contains the average amounts of MgCl₂, KCl and NaCl.
 - c) Brine density more than 1.220 (gr/cm³). Which has got a little salt and high amount of KCl, MgCl₂ and CaCl₂ with economical value. Then we can extract Carnallite, Bischofite, Tachyhydrite and salt. According to the results of brine analysis it is confirm that while brine density increases from 1.220 to 1.345 gr/cm³ salt precipitation diagram decreases and K, Mg, and Ca precipitation diagram increases. On the other hand, when the amount of density changes from 1.345 to 1.470gr/cm³ KCl precipitation diagram comes down and Ca, Mg, Precipitation diagram goes up.
- 2- Evaporation: Simultaneously, besides increasing the climate temperature and intensive wind blowing the amount of evaporation rate increases. Then, precipitation of minerals starts. Sequences of precipitation of minerals along with the increasing the density and evaporation are as follows:
 - a) From density 1.220 to 1.340 (gr/cm³). The continuous salt precipitation is going to be done and % 85 of brine evaporates.
 - b) From Density 1.340 to 1.450 (gr/cm³). Salt and carnallite precipitates, 90 percent of brine is going to evaporate.
 - c) From density 1.450 to 1.470 (gr/cm³). Tachyhydrite and Bischofite are precipitated.There is a close relationship between density, evaporation and mineral grade. Increasing and decreasing each of these factors effect on the other parameters. In average, from each square meter of brine evaporation with 1.220 density about 200 kilogram of salt and 20 kilogram of Carnallite can be extracted.

Key words: Density, Evaporation, Brine, MgCl₂, KCl, Playa.

Introduction

Having done the exploration activities by geological survey specialists of Iran along with the detail exploration activities and investigations by exploration and equipment specialists of potash deposit have been showed that Iran evaporation deposit especially in

central Iran playas brine and salt domes can be explored and extracted to use as a huge source of potassium chloride, sholphate, magnesium, calcium, brome, lithium, and salt deposit. In spite of suitable condition of forming this