

XIANG Jun, CHENG Penggao, ZHANG Lei, TANG Na and WANG Xuekui, 2014. Study on the Production Technology of Sulfate—Potassium Magnesium from Jinaier Salt Lake Brine in Qinghai. *Acta Geologica Sinica* (English Edition), 88(supp. 1): 384-385.

Study on the Production Technology of Sulfate — Potassium Magnesium from Jinaier Salt Lake Brine in Qinghai

XIANG Jun¹, CHENG Penggao¹, ZHANG Lei¹, TANG Na^{1,2*} and WANG Xuekui¹

¹ College of Marine Science and Engineering, Tianjin University of Science & Technology, Tianjin 300457, China

² Tianjin Key Laboratory of Marine Resources and Chemistry, Tianjin 300457, China

As a natural mineral, Potash Magnesium Sulphate fertilizer has a quite high nutrient utilization rate without affecting soil pH in long time running related to Potassium Sulphate. And to displace Potassium Sulphate with Potash Magnesium Sulphate fertilizer, the utilization efficiency of nutrient increases. This study established a production process of fertilize which is lower chloride and higher potassium using the potassium resource of Jinaier salt lake in Qinghai. According to the conditions of chemical components in Jinaier salt lake in Qinghai, phase diagram theory of Na^+ , K^+ , $\text{Mg}^{2+} // \text{Cl}^-$, $\text{SO}_4^{2-} - \text{H}_2\text{O}$ and local atmosphere temperature and pressure, the evaporated processes under 50°C and 25°C were studied. To eliminate chloride, Two steps transformation experiments were adopted. The result showed that the recovery ratio of potassium is up to 77.17% at the first transformation, operated under the condition of 50°C , the mixing time is 120 min and the mixing rate is 600r/min. Using the solid

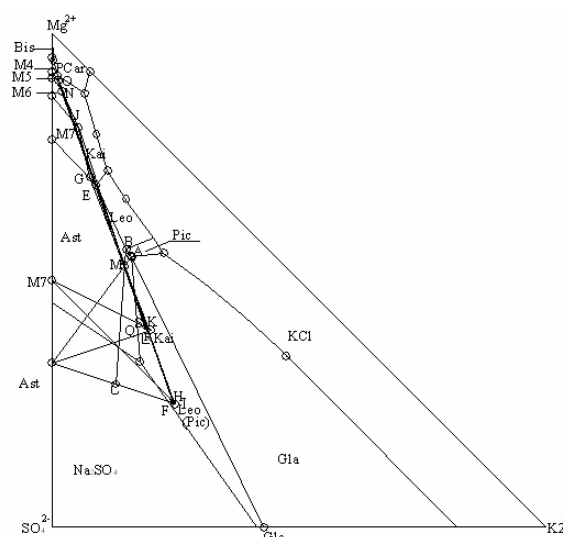


Fig. 2. Na^+ , K^+ , $\text{Mg}^{2+} // \text{Cl}^-$, $\text{SO}_4^{2-} - \text{H}_2\text{O}$ phase diagram of the first transformation under 25°C .

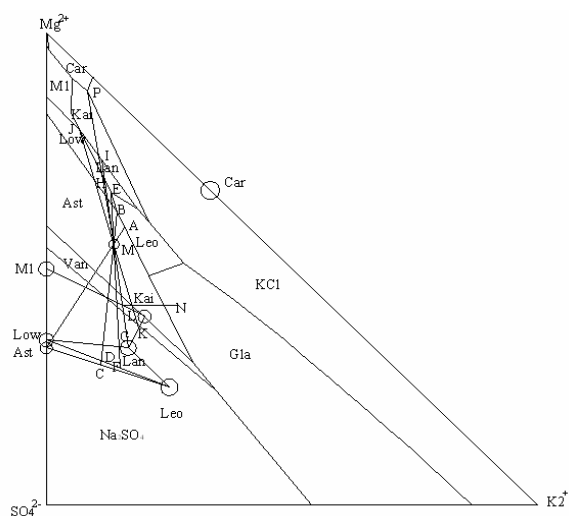


Fig. 1. Na^+ , K^+ , $\text{Mg}^{2+} // \text{Cl}^-$, $\text{SO}_4^{2-} - \text{H}_2\text{O}$ phase diagram of the first transformation under 50°C .

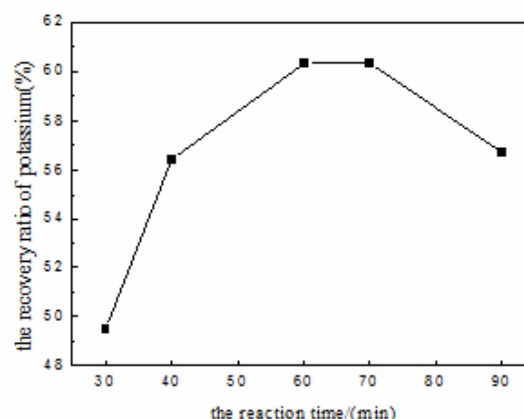


Fig. 3. The effect of reaction time on the recovery ratio of potassium of the second transformation.

phase of the first transformation as the second transformation raw material, the experiment was carried out at 25°C , the mixing time is 60min and the mixing rate

* Corresponding author. E-mail: tjtangna@tust.edu.cn

is 600r/min, the recovery of the solid phase production is more than 60.36% and chloride eliminating ratio is 67.42%.

Key words: potash magnesium sulphate, production technology, phase diagram

Acknowledgement

The authors thank for the financial support of National Nature Science Foundation (21376178), TIDA giant growth plan (2011-XJR13020), Tianjin Science and technology support program (12ZCDZSF06900), Tianjin University of Science and Technology fund for scientific research (20120119), Tianjin education commission program (20130509) and Research fund for the doctoral program of higher education of China(20131208120001).

References

- Xu Peizhi, Chen Jiansheng, 2000. Effects of magnesium fertilizer on banana, litchi and longan. *Guangdong Agricultural Science*, 6: 35–37 (in Chinese).
- Zhou Xiuchong, Sam Portch, 2001. Nutritional characteristics and effects of S, K, Mg fertilizers on high-quality litchi. *Guangdong Agricultural Science*, 5: 31–33 (in Chinese).
- He Hongli, 2003. Present situation and trend of production of potassium sulphate in china and its prospect. *Journal of Salt Lake Research*, 3: 1–11 (in Chinese).
- Tang Hongwei, 2000. Effect of magnesium fertilizer on SUS—taning upland agricultural development in Guangxi province. *Better Crops International*, 14: 13–15.
- Villarias, J.L., et. al, 2001. Magnesium and sulfur fertilizers for culti—vation of beet. *CABI soils and fertilizers*, 64: 18–25.
- Fertilize industrial*, 1988. Chemical Industry Press (In Chinese).
- Ren Shijue, et al., 1993. *Development of industrial mine handbook*. University of Wuhan industry Press (in Chinese).