1 Introduction

Tinba salt factory in Wuxi county was founded in the early seventies, under the background of salt demand being in shortage in Sichuan mountain area, which were developed from utilization of underground brine. The brine in Tianba factory was mainly from the well Tian 1 and well Tian 2, which are located in the Wuxi county in eastern Sichuan basin, being part of the Tianxingqiao structure. Tianxingqiao structure is 113km length and 5.5km wide. This area exposed the Cambrian strata, containing high porosity gypsum-salt and rock salt, and abount formation water. Brine’s main component is sodium, and is rich in potassium, bromine, lithium, iodine, boron and other elements, which is suitable for comprehensive exploitation. There are two common types of genesis for brine around the deposition of rock salt, one is sedimentary brine (original brine); and the other is dissolution of salt (leaching brine). Different brines type have obvious differences in ion compositions, and indicators for finding potassium salt. So the primary task is to distinguish between leaching brine and original brine before using the water chemistry for potash salt. Previous studies were limited for the brine in Tianxingqiao structure, and didn’t point out the brine origin type. Combined with evaporation experiment of Yellow sea(Chen, 1983) and other previous results, considered the Tianxingqiao structure brine’s Br×10³/Cl is higher, most of them range between 1 and 3 and may reach a maximum of 4.68. The K×10³/Cl and K×10³/∑salt coefficient coefficients are also high (Table 1). It is thought that the brine has the possibility of dissolving salt, and even potassium salt.

K/Br coefficient is particularly sensitive for revealing brine type. Seawater’s K/Br is typically between 5.4-5.8 (Wang et al., 1982; Xiao, 1982). The value of K/Br reduces with the evaporation of seawater, while the junction reach to 0.1-0.2. Therefore, the value of K/Br for original brine impossible bigger than seawater’. In contrast, potassium leaching brine’s K/Br should be bigger than 5.8. Valyashko(1956) made a chart according to the law of contents of potassium and bromide with Cl in the process of seawater evaporation. The values of brine for well Tian 1 well Tian 2 are distributed in the top of the curve (Fig. 1), indicating that the brine is leaching brine.

The coefficient of nNa/nCl (molar ratio) is an important indicator for reflecting the concentration and halite dissolution and leaching (Chan et al., 2002). The nNa/nCl of original seawater basic between 0.85 to 0.87. The value
for leaching rock salt is generally larger than the original seawater's, about 1 (Chen, 1972). The value will be relatively low when leaching the salt with potassium, even down to about 0.5, the higher potassium content, the smaller the value, the minimum can be reduced to 0.3 (Li et al., 2006). So, according to the law of nNa/nCl with Cl-, Valyashko (1956) made a curve. The values of brine for well Tian 1 well Tian 2 are distributed in the top of the curve (Fig. 2), indicating that the brine is leaching brine. The nNa/nCl of No. 1, 2, 4, 8 samples are lower than others, It is thought that these brines have dissolving potassium salt.

The coefficient of nMg/nCl (molar ration) is valid to distinguish leaching brine and original brine. The nMg/nCl value of seawater is ~0.13 (Xiao, 1982). With brine concentration, the value is continuously gathered up, to the junction is 0.97. So, the nMg/nCl value of original brine should be greater than 0.13, and leaching brine’s is generally less than 0.13. The value of nMg/nCl in tianxingqiao structure are small, the largest of only 0.014, which is provides another evidence for leaching brine.

**Key words**: Chongqing, Tianxingqiao structure, Cambrian, brine’s origin

**Acknowledgements**

We are grateful to Tan Jixiong and Wang Xiaohui for their assistance in the data gathering and sample collection.

**References**


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