

YANG Jing, MA Hongwen, QI Hongbin, LUO Zheng and ZENG Cheng, 2014. Preparation of K_2CO_3 Using Potassic Syenite from East Qinling Mountains. *Acta Geologica Sinica* (English Edition), 88(supp. 1): 388.

Preparation of K_2CO_3 Using Potassic Syenite from East Qinling Mountains

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1 Introduction

Songxian at East Qinling mountains in China possesses more than 100 million tons potassic syenite with the average K_2O content of 13% and the main mineral phase of K-feldspar which is a kind of potential potassium resources(shown in Figure 1). How to utilize insoluble potassium resource such as K-feldspar is significant to settle the shortage of potash salt especially in China. However, preparation of potassium salts using K-feldspar has not been into industrial production in case of no enough importance attached by relevant organizations.

In this research, potassium carbonate was prepared successfully using potassic syenite as potassium source from Songxian dissolving K_2O by alkali-hydrothermal method with the dissolution rate of 95%.

2 Experimental and Result

95% of the K_2O was dissolved to form Na(K) silicate solution by alkali-hydrothermal treatment of potassic syenite at 260°C and 4h using NaOH solution. At the same time, zeolite or hydroxycancrinite were produced by controlling the ratio of the syenite powder, NaOH and distilled water(seen in Table 1). The K_2O and part of SiO_2 in the syenite were dissolved into the solution during the process.

Potassium carbonate with the purity of about 97% was prepared using the Na(K) silicate solution by causticization, carbonization, separation and crystallization.

Table 1 Chemical composition of the zeolite and K_2O dissolution rate

sample	zeolite/(wt.%)				Dissolution rate/%	
	SiO_2	Al_2O_3	Na_2O	K_2O	SiO_2	K_2O
TG01	41.98	26.10	20.30	1.08	56.6	94.9

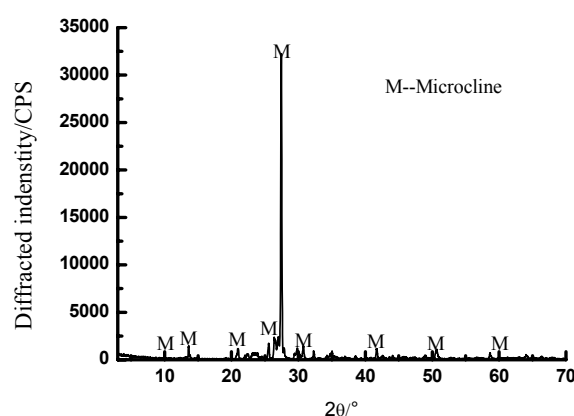


Fig. 1. XRD patterns of the syenite.

Key words: potassic syenite, potassium carbonate, alkali-hydrothermal method

Acknowledgements

Thanks for the funds from China Geological Survey Project (12120113087700) and Fundamental Research Funds for the Central Universities (2652014017).

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