



OPPORTUNITIES FOR THE PRODUCTION OF POTASSIUM SULFATE IN TURKMENISTAN

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Potassium sulfate is one of the most promising potash fertilizers today. It can be obtained by processing chennit or polyhalite. However, unique conditions have been created in Turkmenistan for the production of potassium sulfate from mirabilite and potassium chloride. Huge reserves of mirabilite are contained in the Kara-Bogaz-Gol Bay. In addition, there are large reserves of sylvinite and plants for the production of potassium chloride. Using halurgical methods, potassium sulfate can be obtained from these substances.

Figure 1 shows the phase diagram of the KCl-NaCl-K₂SO₄-Na₂SO₄ system at 25°C. This diagram shows that the K₂SO₄ crystallization region is in the lower part and the KCl-Na₂SO₄ diagonal intersects it in a small area. Therefore, it is unprofitable to immediately obtain K₂SO₄ in the precipitate due to the low yield of the product and the large amount of waste. At the same time, the region of glaserite crystallization is intersected by the KCl-Na₂SO₄ diagonal in a large area. Therefore, the process of obtaining potassium sulfate must be divided into two stages. First, glaserite (Na₂SO₄ 3K₂SO₄) is obtained. This process can be organized cyclically by mixing mother liquors obtained at 25°C and 100°C. As a result, the process will be waste-free. In the course of calculations, it was found that to obtain 1 ton of glaserite, 1940 kg of mirabilite and 675 kg of potassium chloride should be taken. In addition, the products will contain 530 kg of sodium chloride, which can be used in the production of soda.

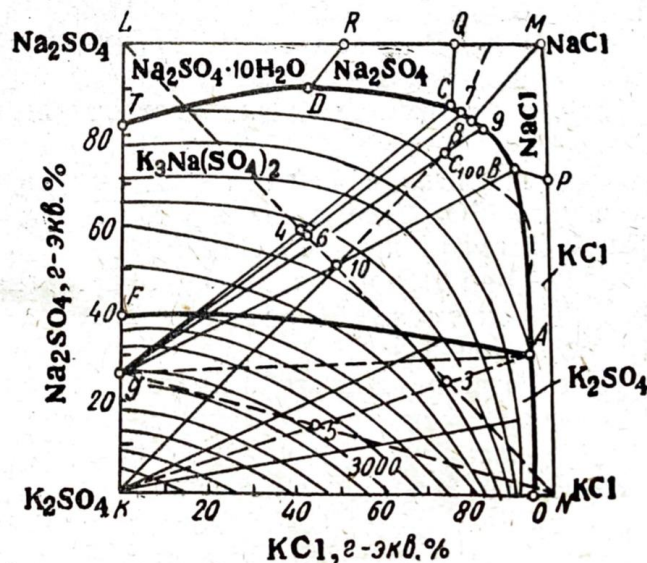


Figure 1. Phase diagram of the KCl-NaCl-K₂SO₄-Na₂SO₄ system at 25°C

At the second stage, potassium sulfate is obtained from glaserite at 75°C (figure 2). The remaining mother liquor can, when mixed with mirabilite, be used to obtain additional amounts

of glaserite. One ton of glaserite produces 1.27 tons of K_2SO_4 . If glaserite is added to the remaining mother liquor, then another 0.6 t of K_2SO_4 can be obtained.

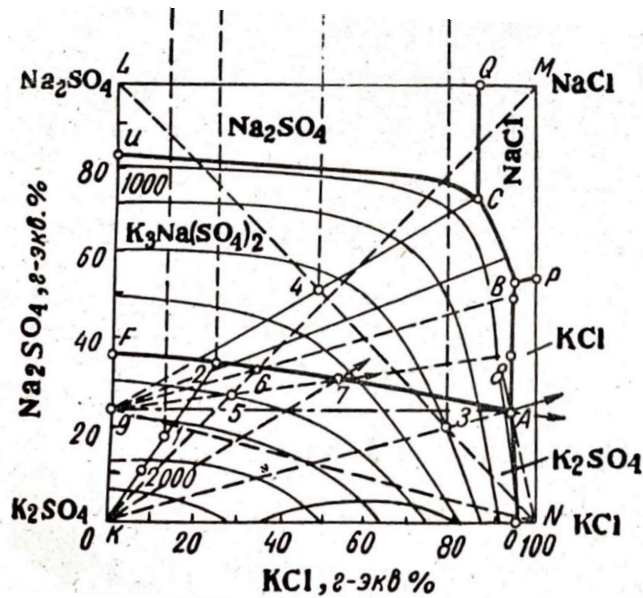


Figure 2. Phase diagram of the KCl-NaCl-K₂SO₄-Na₂SO₄ system at 75°C

Thus, efficient, waste-free production of potassium sulfate can be organized in Turkmenistan.

REFERENCES

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