

SYNTHESIS OF REAGENTS FOR THE EXTRACTION OF POTASSIUM CHLORIDE FROM KHOJAIKON SYLVINITE VIA FLOTATION

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This study highlights the synthesis of new organic-based flotation reagents for the extraction of potassium chloride (KCl) from raw sylvinit samples obtained from the Khojaikon deposit. Amide compounds synthesized from stearic acid demonstrated high selectivity and efficiency in the flotation process. Laboratory experiments showed that at a reagent concentration of 0.5% and a pH of 6.5, KCl with a purity of 89–92% was successfully extracted. IR spectroscopy and thermal analysis confirmed the structure and stability of the synthesized reagents. The newly synthesized reagents stand out for their environmental safety and cost-effectiveness. The results of this research offer promising directions for future industrial applications.

1. Introduction

Potassium chloride (KCl) is one of the main products of the fertilizer and chemical industries. Due to its high global demand, it is mainly obtained from sylvinit and other natural minerals. The Khojaikon sylvinit deposits in Uzbekistan offer significant potential in this area. However, existing technologies are often dependent on foreign reagents, which limits economic and technological independence. Therefore, it is crucial to synthesize efficient and cost-effective flotation reagents tailored to local conditions. This study aims to synthesize new organic flotation reagents for extracting potassium chloride from Khojaikon sylvinit and to evaluate their effectiveness.

2. Methodology

- 2.1. Raw Materials: Sylvinit samples were collected from the Khojaikon deposit.
- 2.2. Reagent Synthesis: Amide compounds were synthesized based on stearic acid.
- 2.3. Flotation Experiments: Conducted using laboratory flotation equipment.
- 2.4. Analytical Methods: DTG-60, IR spectroscopy, and a Shimadzu universal testing machine were employed.

3. Results

The synthesized amide reagents showed high selectivity in separating potassium chloride particles during flotation. The obtained flotation product contained 89–92% pure potassium chloride. The highest efficiency was observed at a 0.5% reagent concentration and pH = 6.5. IR spectroscopy confirmed the presence of amide groups in the reagents. Thermal stability was observed within the range of 210–230 °C.

4. Discussion

Compared to existing industrial flotation reagents, the synthesized organic reagents are environmentally safe and economically efficient. High-purity KCl was obtained using these reagents. Further work will involve pilot-scale testing and implementation in industrial production.

5. Conclusion

As a result of the study, new flotation reagents were synthesized and successfully tested for the extraction of potassium chloride from Khojaikon sylvinite. These reagents enabled the production of high-purity KCl. Future plans include scaling up the technology for industrial application.

References

1. Jenkins, H.D. (2002). Potassium chloride production and flotation methods. J. Chem. Eng. Sci.
2. Abdullaev, R.A. (2019). Silvinit konlarini boyitish usullari. Uzbek Chem. J.
3. ISO 8858-1:2004 – Flotation principles and reagent application.
4. "O'zbekistonning jahon kaliyli o'g'it bozoridagi imkoniyatlari qanday?" – Daryo.uz.
5. O'zbekiston Respublikasi Investitsiya dasturi to'g'risidagi hujjatlar – Lex.uz.
6. "O'zbekistonda mineral o'g'itlar ishlab chiqarish ko'rsatkichlari" – Daryo.uz.
7. "Kaliy xloriddan xlorisiz kaliyli o'g'itlar olish texnologiyasini ishlab chiqish". - Tursunov Sarvarbek Anvar o'g'li, Normurotov Jahongir Boymurodovich.
8. Yakovlev VA, "Flotatsion protsessy v rudnoy promyshlennosti", Metallurgiya,
9. Ostrovskiy A., "Dlya flotatsii reagenti: novye tendentsi i perspekti"
10. Mixaylov AG, "Flotatsiya va foydali qazilmalarni", Naukova Dumka, 2020.
11. Tursunov Sarvarbek Anvar o'g'li, Normurotov Jahongir Boymurodovich., "Kaliy xloriddan xlorisiz kaliyli o'g'itlar olish texnologiyasini ishlab chiqish".
12. [KALIY XLORIDINI SILVINITDAN AYRISHDA FLOTATION REAGENTLARINING AHAMIYATI](#). S. Tursunov, S. Xojamqulov - Universum: texnicheskie nauki, 2024
13. [SURXONDARYO VILOYATIDA KALIY XLORID ISHLAB CHIQRISHNI YO'LGA QO'YISHNING AHAMIYATI](#) S.A. Tursunov, S.Z. Xodjamkulov - Technical science research in Uzbekistan, 2024