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ANALYSIS OF METHODS FOR BACKFILLING MINING DURING UNDERGROUND EXCAVATION OF POTASH ORES

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Annotation. *The paper presents the problems of developing potash ores and uses of potash in various fields.*
Keywords: *Tyubegatan potash deposit, rock salt, salt waste, potassium chloride, fertilizer, conventional mechanized underground mining methods.*

Potassium, being an element of the first group of the fourth period of the periodic table of chemical elements of D.I. Mendeleev with atomic number 19, is a soft alkali metal of silver-white colour [1].
Around the world, potassium is used in the form of potassium fertilizers, in electroplating, in coolants in nuclear reactors, for the production of potassium peroxide, as a catalyst, coolant and in the thermal production of metals [2].
Potassium chloride, commonly known as potassium or KCl, is an important mineral nutrient for plants. It contains a high amount of potassium, which stimulates the growth of crops, improves fruit quality, and increases resistance to drought and diseases. Potassium chloride is widely used in agriculture to increase crop yields, improve soil fertility, and maintain plant health.
There are several ways to apply potassium chloride to agricultural land. One common method is to use it as a fertilizer. Farmers can apply it to the soil to provide essential nutrients to plants. Another method is to apply it through irrigation water, especially in arid regions where water scarcity is a concern.
Potassium chloride can be used on a variety of crops, including fruits, vegetables, grains, and nuts. This is especially beneficial for crops such as potatoes, tomatoes, bananas, and grapes that require large amounts of potassium for growth and development. In addition to stimulating plant growth, potassium chloride also improves crop quality, and increases nutrients, sugar content and color.
However, although potassium chloride is an important agricultural product, it must be used with care. Excessive use of potassium chloride causes soil acidification and reduces soil fertility. High levels of

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chloride can damage sensitive crops such as citrus and strawberries. For this reason, farmers must carefully monitor the amount of potassium chloride they apply to their fields to avoid compromising soil health or productivity.
Potassium fertilizers are obtained from natural ore and they allow high agricultural yields to be obtained by replenishing the lack of potassium in plants [3].
Potash ores are mined mainly in Canada, Russia, Belarus, Brazil, China, Germany, the USA, Turkmenistan and other countries.
Most potash is sourced from buried deposits using conventional mechanized underground mining methods, though solution mining methods also are employed. Generally these underground operations produce between 1 to 10 million tonnes of potash ore per year. The land area affected is typically confined to the immediate area of the shaft, plant and waste disposal area but may be up to several square kilometers.
Surface brine deposits are exploited using solar evaporation ponds to concentrate and precipitate the potash. The evaporation ponds are extensive, with some operations covering in excess of 90 square kilometers of land area to produce around 8 million tonnes of potash ore per year.
Conventional mechanized underground mining operations are the most widely used method for the extraction of potash ore. A variety of mining techniques and equipment may be employed depending on factors such as: the orebody depth, geometry, thickness and consistency, the geological and geotechnical conditions of the ore and surrounding rock, and the presence of overlying aquifers. Methods in widespread use include variations of room and pillar, longwall, cut and fill, and open stope techniques.
After the ore is extracted, it is generally transferred by bridge conveyor, shuttle cars or load-haul-dump units to a system of conveyors that carry it to underground storage bins, prior to haulage to the surface through a shaft by automated skips. On rare occasions shallow mines may use a decline and conveyor arrangement.
In the Republic of Uzbekistan, potash fertilizers are produced in the mining complex of the Dekhkanabad Potash Fertilizer Plant, which was commissioned in July 2010 with a production capacity of 700 thousand tons of sylvinite ore per year with a KCl content in the ore of 27% [4-23].
During the development of potassium ore deposits, several problems have been identified, the most important of which are the disruption of the geological and structural structure of the mined area when using the mine mining method and the formation of significant masses of waste as a result of the enrichment of salts and represented by water-soluble compounds [6-12]. Since the largest deposits in the world are located in areas with continental and temperate continental climates, the annual amount of precipitation exceeds possible evaporation, as a result of which excessive moisture of the deposits occurs. The complexity of developing these deposits is determined by the high water content of the rock strata overlying the salt massif and the danger of groundwater penetration into the mine workings. Also, excessive moisture creates a complex of environmental problems and has a significant impact on the chemical composition of both groundwater and surface waters

Literature:

1. Пилипенко А. Т. Натрий и калий // Справочник по элементарной химии. – 2-е изд. – Киев: Наукова думка, 1978. – С. 316-319.
2. Ахметов Н.С. Общая и неорганическая химия. – М.: Высшая школа, 2001. – 373 с.
3. Минеев В.Г. Агрохимия: учебник. – 2-е изд., перераб. и доп. – М.: Изд-во МГУ, изд-во Колоса, 2004. – 720 с.
4. Отчет по панели №1. Пояснительная записка ГДК-26-2009 17. Горнодобывающий комплекс Дехканабадского завода калийных удобрений. – Дехканабад, 2017. – 104 с.

Impact Factor: 9.9 ISSN-L: 2544-980X

5. Latipov, Z., Uzoqov, Z., & Bobomurodov, A. (2023). Development of recommendations for chemical fixation of salt waste. Universum: технические науки, (10-7 (115)), 9-11.
6. Заиров, Ш. Ш., Каримов, Ё. Л., & Латипов, З. Ё. У. (2021). Исследование химического процесса закрепления солевых отходов в горнодобывающем комплексе дехканабадского завода калийных удобрений. Проблемы недропользования, (3 (30)), 40-53.
7. Заиров, Ш. Ш., Уринов, Ш. Р., Каримов, Ё. Л., Жумаев, И. К., Латипов, З. Ё. У., & Эшкулов, О. Г. У. (2021). Повышение технологии проходки калийных пластов в условиях тюбегатанского месторождения калийных солей. Universum: технические науки, (10-2 (91)), 59-63.
8. Заиров, Ш. Ш., Уринов, Ш. Р., Каримов, Ё. Л., Латипов, З. Ё. У., & Авезова, Ф. А. (2021). Изучение экологических проблем и анализ способов снижения негативного воздействия отходов калийных руд на окружающую среду. Universum: технические науки, (4-2 (85)), 46-50.
9. Каримов, Ё. Л., Жумаев, И. К., Латипов, З. Ё. У., Шукуров, А. Ю., & Нарзуллаев, Ж. У. У. (2020). Рекомендации по применению технологии противофильтрационной защиты солеотвала и рассолосборника№ 1. Universum: технические науки, (12-2 (81)), 34-37.
10. Каримов, Ё. Л., Жумаев, И. К., Латипов, З. Ё., & Хужакулов, А. М. (2020). Повышение эффективности использования хвостохранилища для размещения солеотходов обогатительной фабрики Дехканабадского завода калийных удобрений. Горный вестник Узбекистана.–Навои, 4, 45-48.
11. Каримов, Ё. Л., Латипов, З. Ё. У., & Турдиев, Ж. Н. У. (2022). Разработка эффективных комбайновых технологий выемки сильвинитовых пластов тюбегатанского калийного месторождения. Universum: технические науки, (11-3 (104)), 54-57.
12. Каримов, Ё. Л., Латипов, З. Ё. У., Каюмов, О. А. У., & Боймуродов, Н. А. (2020). Разработка технологии закрепления солевых отходов рудника Тюбегатанского горно-добывающего комплекса. Universum: технические науки, (12-3 (81)), 59-62.
13. Каримов, Ё. Л., Латипов, З. Ё., & Хужакулов, А. М. (2019). Технология проходки выработок на Тюбегатанском месторождении калийных солей.
14. Каримов, Ё. Л., Якубов, С. И., Аликулов, Г. Н., & Латипов, З. Ё. (2018). Геодинамические активные зоны Тюбегетанского месторождения калийных солей. Горный вестник Узбекистана.–Навои, (2), 41-44.
15. Каримов, Ё. Л., Якубов, С. И., Муродов, Ш. О., Нурхонов, Х., & Латипов, З. Ё. (2018). Экологические аспекты Дехканабадского рудного комплекса по добыче калийных руд. Горный вестник Узбекистана.–Навои, (3), 23-27.
16. Каримов, Ё. Л., Хужакулов, А. М., & Латипов, З. Ё. У. (2020). Гидравлическая закладка выработанного пространства при подземной добыче калийных руд. Journal of Advances in Engineering Technology, (1), 25-28.
17. Латипов, З. Ё. (2020). Мировое производство и проблемы освоения калийных руд. In Марказий Осиё минтақасида замонавий илм-фан ва инновацияларнинг долзарб муаммолари халқаро конференция материаллари.–Жиззах (pp. 173-174).
18. Латипов, З. Ё. У., Бобомуродов, А. Й. У., & Хасанов, Ш. Р. У. (2022). Выбор параметров системы разработки при отработки панели№ 5 на горнодобывающем комплексе Дехканабадского завода калийных удобрений. Universum: технические науки, (10-3 (103)), 11-13.
19. Латипов, З. Ё. У., Бобомуродов, А. Й. У., Хасанов, Ш. Р. У., & Абдиназаров, У. Б. У. (2022). Расчет производительности комбайновых комплексов в условиях рудника Тюбегатанского месторождения калийных солей. Universum: технические науки, (1-2 (94)), 5-9.

Impact Factor: 9.9 ISSN-L: 2544-980X

20. Латипов, З. Ё. У., Каримов, Ё. Л., Шукуров, А. Ю., Худойбердиев, О. Д., & Норкулов, Н. М. У. (2021). Моделирование и установление координатов центра масс отвала и хвостов Тюбегатанского калийного месторождения. Universum: технические науки, (2-2 (83)), 25-28.
21. Латипов, З. Ё. У., Мухаммадов, А. А. У., & Исмоилов, М. И. У. (2022). К вопросу отходов добычи и переработки калийных солей тюбегатанского месторождения. Universum: технические науки, (4-6 (97)), 5-8.
22. Латипов, З. Ё., Каримов, Ё. Л., & Жумаев, И. Қ. (2021). Тепакутон калий конининг ташқи майдонидан оқилона фойдаланишни математик моделлаштириш. Инновацион технологиялар, (3 (43)), 7-11.
23. Латипов, З. Ё., Каримов, Ё. Л., Хўжақулов, А. М., Авлакулов, А. М., & Шукуров, А. Ю. (2020). Калий рудаларини ўзлаштириш ва чиқиндиларнинг атроф-муҳитга салбий таъсирини пасайтириш муаммолари. Инновацион технологиялар, (4 (40)), 18-22.