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CHEMICAL TECHNOLOGY INDUSTRY DEVELOPMENT AND RELATIONSHIP TO ECONOMIC SECTORS

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Abstract
This article describes the most necessary raw materials for the chemical industry of Uzbekistan, the wide use of ore minerals in metallurgy and light industries, and their impact on the economy. In addition, in the article, it is necessary to enrich the raw materials to increase the amount of useful elements in the raw materials, to get rid of unnecessary rocks. It was also said that the use of enriched raw materials in production leads to a reduction in transportation costs and the amount of energy consumed, as well as the efficient use of energy released in certain reactions. Integrated use of raw materials is a high direction of the chemical industry, and it is an issue directly related to the increase of raw materials resources and the improvement of the economic efficiency of the national economy. If the problem of integrated use of raw materials in the chemical industry is solved, the production of products without waste will be achieved, the cost of products will be reduced, the damage of chemicals to the environment will be reduced, and ecology will be improved.

Keywords: chemical industry, mineral raw materials, national economy, minerals, chemistry, raw materials, resource.

Introduction

Currently, 400 types of mineral raw materials are mined from the earth. Of these, 85% correspond to fuels (oil, gas, coal), 12% to ferrous and non-ferrous metals, 3% to construction materials, mineral fertilizers and non-metallic raw materials.

There are more than 80 types of mineral raw materials in our republic. Uzbekistan occupies a leading position among the CIS countries in terms of copper, lead, zinc, tungsten, gold, uranium, kaolin, aluminum (alunite), and gas. More than 500 enterprises (producing cement, brick, fertilizer, porcelain, gravel, concrete) are working on the account of mines that have been opened. At the expense of underground resources, new sectors - non-ferrous metallurgy, ferrous metallurgy, fuel (oil, gas, coal), energy, mining, and construction materials industry - were created and developed in our country.

One of the most necessary raw materials for the chemical industry of Uzbekistan is natural gas. More than 20 mines (Gazli, Uchkur, Mubarak, Qarovulbazar, Shortan and Hakozo) were opened in Bukhara-Khiva and Surkhandarya. On the basis of organic synthesis, it is possible to produce synthetic rubber and alcohols, solvents, medicines, etc. needed for the national economy from gas. 1 mln. 2400 m of artificial silk fabrics, 240-400 kg of plastic from m3 of gas. 320-400 kg of synthetic rubber and other things can be obtained. Chirchiqelektrokymyosanoat and Navoiazot, the main giants of

Uzbekistan's chemical industry, as well as nitrogen fertilizer production plants in Fergana, use natural gas as the main raw material.

Oil extraction in our republic began in 1886 in Fergana. In 1913, 13 thousand tons of oil were obtained. Oil fields are found mainly in Fergana, Surkhandarya and Bukhara regions. Coal mining was not organized in Uzbekistan until 1917. A large reserve of coal was found in Angren. By 1941-45, the Angren mine was put into operation. In 1975, 5 million 71 thousand tons of fuel were extracted from this mine.

After 1960, gold deposits of ore minerals were found in Tashkent, Bukhara, Samarkand and Namangan regions. Lead-zinc ores began to be extracted from the Kumushkon, Korgoshinkon, Cholota (Tashkent region), Uchkuloch (Jizzakh region) and Khandiza (Surkhandarya region) mines. Pure copper metal is obtained on the basis of Almalyk mine (Tashkent region). Tungsten and molybdenum mines are mined in Langar, Koytash and Ingichka mines in Samarkand region. Non-ore minerals: potassium salts, phosphate raw materials and sulfur are used as chemical raw materials in the production of mineral fertilizers.

Potassium salts were found in mines in the south-western branch of the Hisar mountain system, phosphates were found in Bukhara, Surkhandarya regions and lower Amudarya mines, and sulfur in Surkhandarya, Fergana regions and Ustyurt mines. These mines are not yet exploited. Sulfur is extracted from gas at the plant built in Mubarak (1974).

Large deposits of sodium chloride and sodium sulfate, ore raw materials widely used in food, chemical, paper and glass production, metallurgy and light industries, were found in Bukhara, Hisar and lower Amudarya regions. A large reserve of $3MgO \cdot 4SiO2 \cdot N2O$, a technical raw material used in the chemical, rubber, paper industry, as well as in the production of ceramics and construction materials, is found in the lower Amudarya and Sultan Uvais mountains.

There is a large reserve of kaolin raw material for the porcelain and coating tile factory in Angren, and bentonite mines in Akmozor (Bukhara) and Kattakorgan (Samarkand). There are 12 marble mines (Rozgon, Kitab, Aghalik, Jom and Hakozo) and 8 granite mines in Uzbekistan.

Method and Recommendation

Raw materials are enriched in order to increase the amount of useful elements in raw materials and to get rid of unnecessary rocks. The use of enriched raw materials in production leads to a reduction in transport costs and the amount of consumed energy, as well as efficient use of the energy released in some reactions. Currently, there are several types of enrichment of raw materials. The most important of them are: mechanical, thermal, chemical, electromagnetic, flotation or physico-chemical enrichment.

In the mechanical method, mainly solid minerals are enriched by sieving and gravity separation. The sieving method is used for the enrichment of minerals consisting of hard and soft rocks. Under the influence of mechanical force, brittle and soft rocks are easily crushed and separated from the necessary rocks by passing through the holes of the sieve. For example, phosphorite can be separated from unwanted rocks by sieving. Gravitational enrichment is carried out by wet and dry methods. This method is based on the sedimentation of particles of different density and size in the flow of gas and water at different speeds. Gravitational methods are widely used in the production of silicate materials, mineral salts, and in the enrichment of raw materials used in the metallurgical industry.

Grinded raw materials are mixed with water using a mixer and sent in the form of pulp (mixture of solid material with liquid) to a clarifier consisting of vertical sedimentation chambers. The speed of movement of the pulp along the chamber decreases. As a result, sedimentation of solid particles becomes easier. Large particles settle in chamber I, medium and light particles settle in chambers II and III. Raw materials can be divided into different fractions by increasing the number of cooling chambers. Often, in one of the sedimentation chambers, unnecessary rocks (soil, silt) are deposited in the raw material, and the concentrated mineral is separated in the next chambers.

The second method of wet enrichment is carried out using an apparatus called a hydrocyclone. With the help of this apparatus, the pulp is separated into two streams. The first is a heavy fraction consisting of large particles, and the second is a light fraction consisting of small particles. Hydrocyclone consists of cylindrical and conical parts. The mixture of crushed mineral with water is sent under pressure to the cylinder part of the hydrocyclone in the form of a trial. As a result of the rotation of the flow in the hydrocyclone, under the influence of centrifugal force, heavy particles move towards the wall of the apparatus and are collected in the form of dense pulp in its lower part.

Small, light particles in the liquid move in an internal spiral flow, rise up through the central tube (spout) and go out. The efficiency of the hydrocyclone is much higher than that of gravity sedimentation. Air separators are used for dry sorting of raw materials. For example, in separators based on centrifugal force, raw material particles are sent to a disk moving at high speed on a horizontal plane. Under the influence of centrifugal force, large and heavy particles are thrown farther than light and small particles, and thus the raw materials are sorted into large and small particles.

Magnetic and non-magnetic materials can be separated from each other using an electromagnetic separator. For example, this method is mainly used to separate magnetic ironstone (Fe_3O_4) from unnecessary rocks. The diagram of the principle of operation of the electromagnetic separator is presented in the album. Crushed raw material enters the conveyor belt (1) moving on the drum (2) with an electromagnetic (3). When the conveyor belt passes over the surface of the drum, the non-magnetized particles fall into the 4th bunker, and the magnetized ones are slightly caught on the belt and after the belt passes over the surface of the drum, they are collected in the 5th bunker.

Thermal enrichment is based on liquefaction of the components included in the raw material at different temperatures. For example, pure sulfur is extracted from sulphurous ores in this way. Sulfur is liquefied at a much lower temperature (113-119°C), and unnecessary ores are liquefied at a higher temperature.

Chemical enrichment is based on the dissolution of some of the components of the raw materials under the influence of reagents or the formation of compounds that are easily separated from each other. Chemical beneficiation also involves burning minerals at high temperatures. Due to the decomposition of carbonates and organic compounds and the loss of moisture, the amount of the necessary component in the raw material increases.

Flotation is the most common method of beneficiation of raw materials and is used on a large scale. Polymetallic sulfide ores are separated into several fractions, apatite is separated from nepheline, and coal and various minerals are enriched using the flotation method in enrichment plants. Flotation is based on different wetting of minerals with water. Water-absorbable (hydrophilic) crystals settle, i.e. collect at the bottom of the flotation machine, and non-water-absorbable (hydrophobic) crystals cling to the air bubbles sent through the pulp and rise to the top, where the concentrate is collected.

Various flotation reagents (surfactants) are added to the aqueous suspension to efficiently carry out the flotation process. Pine oil and some fractions of coal tar are mainly used as float reagents. They increase the stability of the foam and adsorb to the necessary minerals in the suspension, forming a hydrophobic shell on their surface. As a result, such hydrophobic particles containing minerals are collected on the surface in the form of foam. From 50 to 500 g of flotation reagents are used for 1 ton of ore.

Conclusions

One of the main problems in the chemical industry is the integrated use of raw materials, as it eliminates the accumulation of waste that pollutes the environment and requires additional costs to transport it to lands far from inhabited areas. The main way of complex use of raw materials is to turn raw materials with complex composition into necessary products by successive processing. Industrial wastes are considered untapped opportunities and require their use as cheap raw materials for the production of new chemical products.

As a result of the complex use of raw materials, it is possible to produce several products within one enterprise. For example, the "Chirchikelektrokimyosanoat" production association used to produce mainly saltpeter fertilizer. The hydrogen required for the synthesis of ammonia is obtained by conversion of natural gas (SN4). In this case, the technology of obtaining urea (urea) from CO2 gas produced in addition to hydrogen is applied to production.

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2NH3QCO2→CO(NH2)2 QH2O

The use of secondary raw materials saves primary raw materials and reduces environmental pollution. For example, phosphogypsum, which is a waste product of superphosphate plants, can be used to produce sulfuric acid and cement.

About 25 tons of waste is generated at the Caprolactam factory in Chirchik. Its composition consists mainly of organic compounds. Currently, it is mainly disposed of by burning. As a result of scientific research conducted by chemical scientists of the Republic, it was determined that 40-50% of this waste is benzoic acid, which is necessary for the chemical industry, and the technology for its extraction was developed. It has been shown that the remaining 50-60% of the waste can be used to produce automotive resins and dyes. However, this waste has not yet been processed on an industrial scale based on the above-mentioned technology.

Therefore, the integrated use of raw materials is a high direction of the chemical industry, and it is an issue that is directly related to the increase of raw materials resources and the economic efficiency of the national economy. If the problem of integrated use of raw materials in the chemical industry is solved, production of waste-free products will be achieved, the cost of products will be reduced, damage to the environment by chemicals will be reduced and ecology will be improved.

In addition, in the current period of human development and in the near future, the qualitative development of economic sectors, the social sphere, and the state management system is directly related to the widespread introduction of digital technologies. The prospect of our country's development also depends on the development of the digital economy and the level of coverage of digital technologies. To achieve this, it is appropriate to list the following basic conditions and priorities for the development of the digital economy:

Creating an institutional environment and digital infrastructure for the stable operation of digital technologies, providing public services, wide implementation of digital technologies in the real sector of the economy, healthcare, state cadastre and other areas, as well as developing the territory of the Republic of Uzbekistan step by step to ensure as complete coverage as possible with the possibilities of connecting to the global Internet network at the level of countries;

Organization of modern research and production laboratories for innovative developments.

International experience shows that today digital technologies are rapidly developing mainly in the scientific community and the private sector. Therefore, the state should create a favorable ecosystem by supporting innovative projects and IT companies in these areas.

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