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Enhancement of Low-Grade Manganese Ores

Rakhmonov Tukhtasin Nurmamatovich
Rakhmonov.60@mail.ru 998916094263
Toychiev Abdumalik Tursunovich
Andijan Mechanical Engineering institute
Abdumaliktuychiyev1961@gmail.com
998905446714

Annotation: Using harmful gas emissions and low-grade non-required ore material, it is possible to obtain the starting material for establishing the production of manganese compounds and metallic manganese with a simultaneous invaluable environmental, economic, technological, energy, in general - a strategic effect

Key words: sulfatization, sulfur dioxide, thermal power engineering, ore materials, raw materials, ore, wash, gas chemical, mining and metallurgical, hydrocarbons, non-condensate ore

Introduction.

The intensive development of science and technology, the growth of large cities and industrial giants, the ever-increasing extraction and consumption of natural resources (oil, gas, coal, ore and non-metallic materials, etc.), inevitably leads to a huge emission of gases with harmful components and, as a result, a sharp increase in air pollution. Many researchers of this process have shown that the most massive atmospheric pollutants are sulfur dioxide, carbon oxides, nitrogen oxides, various hydrocarbons, etc.

Material and Materials.

Sulfur dioxide is one of the main air pollutants, especially in areas of specific emissions with a high concentration of this gas, near mining and smelting plants, oil refineries and gas processing plants, thermal power plants and other enterprises consuming sulfurous fuel.

Damage from the harmful effects of sulfur dioxide, a product of the emission of chemical, mining and metallurgical and other production, as well as thermal facilities around the world in the field of metal corrosion, is estimated at more than 10 billion US dollars, on the impact on biodiversity by more than 38 billion US dollars It should be noted that numerous other effects of damage from atmospheric pollution cannot be translated into the language of economics. A study of many medical institutions showed the dependence of various kinds of morbidity on air pollution with sulfur dioxide and trioxide.

Results.

On the other hand, sulfur oxides are the most valuable chemical material for the production of industrial and agricultural goods as sulfuric acid anhydride.

Until now, numerous authors in many countries of the world have been developing parallel continuous methods and technologies for cleaning gas emissions from sulfur oxides, which cannot go beyond the scope of laboratory research. Because adsorption-chemisorption methods are able to purify gas mixtures from sulfur dioxide and sulfur thorium oxide, even at very low contents in the mixture, even in a wide range of temperatures and volumetric flow rates of the gas mixture passing through the stationary layer of the gas mixture is very highly efficient. The challenge lies in the complete desorption and utilization of the desorbed sulfur dioxide and trioxide without negative environmental impacts.

The one-time use of a synthetic sorption system in all cases from the economic point of view is not only inefficient, but also unacceptable. In addition, during desorption, gas emissions, waste water and solid waste are again formed, which impede the implementation of the developed methods and technologies on a large scale. And the pollution of the atmosphere with harmful sulfur dioxide and thorium oxide not only just continues, but is intensively increasing.

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As already noted above, the chemically active and very large-scale demanded sulfur oxides could be effectively used in the synthesis of industrial and agricultural consumer goods. Based on scientific, industrial, economic and technological energy - in general, strategic interests, we conducted exploratory studies to investigate oxide sulfurs that occur as part of large-scale gas emissions from industrial enterprises and thermal power facilities with active components of low-grade manganese ores in the chemical transformations of metals in the process of sulfatization.

Discussion.

From scientific, technological and economic studies, it is known that the extraction of manganese from ores is carried out through sulfatization - the transfer of metallic manganese into a water-soluble sulfuric acid form, followed by the isolation of water-soluble manganese sulfate and further precipitation in the form of manganese carbonate, transferring the latter after precipitation, separation, drying and calcination into a form oxide and reduction of manganese oxides to a metallic state.

It should be noted that the processing of manganese-containing ores by leaching by the sulfuric acid method only at a concentration of metallic manganese exceeding 40% of the mass. justified economically. Due to the low content of metallic manganese in the ores is lower than 29% of the mass. this explored and confirmed large reserves of manganese of the Dautash deposit are not processed after development.

The latest achievements of scientific research stimulate the development of works on sulfuric acid leaching of manganese-containing ores to transfer to the mainstream of gas-chemical transformation without changing the other stages of processing.

The search part of the scientific and technological study of the chemical interaction of sulfur dioxide and trioxide with manganese compounds that occur in the manganese ores of the Dautash deposit stimulated the development of works on scientific and technological research in this area within the framework of the state applied research program, which provides for the study and determination of the education technology sulfuric acid compounds of manganese, thanks to which, if successfully implemented, it is possible to prevent further intensive pollution of the atmosphere with sulfur oxides in the areas of dislocation of large industrial facilities while simultaneously achieving the production of metallic manganese from low-grade ore in an economically profitable way, the processing of which is not economically profitable according to the old classical technology. As part of the implementation of this applied research project put forward for implementation, the optimal technological parameters for the synthesis of manganese sulfate, which take place in the composition of the Dautash deposit with sulfur dioxide sulfation as part of the technological process of cleaning gas emissions from sulfur oxides, will be studied.

The ore materials of the Dautash deposit attracted our attention as a natural sorption system for trapping sulfur dioxide, because, firstly, manganese oxides are known as oxidizers of sulfur dioxide to trioxide and sorbents, and, secondly, manganese sulfate obtained by chemisorption of trioxide sulfur can be washed out (extracted by washing out) from the spent ore and transferred to a further stage of processing.

Thus, using harmful gas emissions and low-grade non-required ore material, it is possible to obtain the starting material for establishing the production of manganese compounds and metallic manganese with a simultaneous invaluable environmental, economic, technological, energy, and, in general, strategic effect.
Successful efficient operation of reducing metallurgical units is possible only with high-quality raw materials and a reducing agent that allows creating certain gas-dynamic conditions in the layer of the charge being recovered. However, the gradual depletion of deposits that provide metallurgical production with rich naturally enriched ores forces us to pay attention to ore materials that are considered substandard precisely because of their fineness and low mechanical strength.

Conclusion.

At many mining and ore-dressing enterprises, dumps of non-condensate ore have accumulated, which cannot be used in reduction units without preliminary enrichment, while the industrial processing of this ore will provide not only an economic, but also an environmental effect due to the disposal of dumps and reducing the area of their storage. All modern enrichment technologies involve a complex technology with large-scale volumes of raw materials, as a result of which the resulting enriched product becomes more expensive by almost an order of magnitude before recovery, which prevents further processing using the

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current technology. Developed metallurgical production is almost always accompanied by the formation of finely dispersed technogenic raw materials. In connection with these circumstances, the processes of gas-thermal enrichment of natural low-grade raw materials are of particular importance, which make it possible to involve local raw materials in the processing, transferring them to proper development.

The aim of the work is to determine the optimal technological parameters of the chemical interaction of sulfur dioxide and trioxide and manganese (metal and / or chemically bound) occurring in the composition of the ore of the Dautash deposit with the development of a scheme for upgrading the ore material and obtaining manganese in a simultaneous conjugate reaction zone; purification of gas mixtures from sulfur dioxide and manganese production in the simultaneous conjugate reaction zone purification of gas mixtures from sulfur dioxide and production of commercial metal and/or manganese compounds.

Acknowledgement.

The scientific novelty lies in the study of the reaction of chemical interaction (transformation) of sulfur dioxide and trioxide of the developed Dautash field located at the same distances from the Mubarek gas processing plant and the Shurtan gas processing plant, which is about 60 km. The study and establishment of the mechanism and patterns of formation of manganese sulfate. The study of the catalytic effect of the additional oxidation of sulfur dioxide to trioxide. The study of the kinetics of catalytic post-oxidation of sulfur dioxide. Development of a technology for the upgrading of manganese ore in the associated process of cleaning gas emissions.

The practical value lies in the study of the use of natural ore as a chemisorbent in the geometrical dimensions of the Dautash deposit, which has a certain activity of sulphation with simultaneous refining of the active part of the ore material.

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