

Problems and Solutions of Natural Gas Purification from Acidic Components

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ABSTRACT

Natural, organo mineral, synthetic and composite sorbents are used all over the world to purify oil and gases from acidic components, and their production increases every year. 55% of them are used for cleaning natural and industrial gases from sulfur-containing organic compounds, mercaptans, carbonyl sulfide, carbon disulfide, carbon dioxide and other sulfur-containing compounds.

KEYWORDS: industrial gases, sulfur-containing organic compounds, mercaptans, carbonyl sulfide, carbon disulfide, carbon dioxide

INTRODUCTION

Today in the world developed technology of synthesis of new types of nanostructured sorbents, their use for the purification of acid gas mixtures produced in the processing of oil and gas, stability of the physico-chemical properties of sorbents and improve environmental conditions in processing factories, scientific research recycling of sorbents[1]. In recent years, our country has focused on methods for cleaning natural and exhaust gases from sulfur-containing organic compounds, mercaptans, carbonyl sulfide (COS), carbon monoxide, carbon disulfide (CS₂) and sulfide esters (RSR), as well as in the oil and gas processing industry [2-4]. Certain results are being achieved in the development of new high-performance composite absorbers for gas purification and in the improvement of purification technologies. The strategy of actions for further development of the Republic of Uzbekistan defines the tasks "to raise the industry to a qualitatively new level, deep processing of local raw materials, acceleration of production of finished products, development of new types of products and technologies". In this regard, scientific research is aimed at creating new composite absorbers with different functional groups intended for cleaning gases from high-sulfur components in natural gas processing and chemical industries. Decree of the President of the Republic of Uzbekistan dated February 7, 2017 №.PD-4947 "On the strategy of actions for the development of Uzbekistan for 2017-2021", №. PD-4891 dated April 6, 2017 "on critical analysis of the volume and composition of goods (works, services), deepening localization of import-substituting production", №. PD-3689 dated may 21, 2018. "On additional measures to improve mechanisms for introducing innovations in industries and sectors of the economy", September 21, 2018 №. PD-5544 "on approval of the strategy for innovative development of the Republic of Uzbekistan for 2019-2021", 2018 №. PD-3983 dated October 25 of the Republic of Uzbekistan. The implementation of the

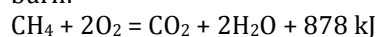
above-mentioned resolutions and the resolution "on measures to accelerate the development of the chemical industry", as well as other regulations related to this activity, is an urgent task today[5-6]. Many scientists have carried out research on improving technologies for cleaning natural and secondary gases from sulfur compounds with composite sorbents. Y. Axelrod, S. Blank, A. Cole, H. Man, A. Afanasiev, D. Kemplbel, V. Rogozin, V. Mastek, A. Lunin, E. Dillon, Yu. g. Frolov, A.A. Alimov, B. N. Khamidov, M. P. Yunusov, V. P. Guro, S. M. Turobzhonov, G. Rakhmatkariev and others. At the same time, scientific research is currently underway to obtain new effective additives based on secondary resources and production waste for the synthesis of composite sorbents, as well as the use of these additives to improve the anticorrosion of equipment with a high absorption volume, low absorption and desorption temperature, low foaming, low consumption of absorbents, ensuring a longer service life, technological, practical, environmental and economic aspects of new composite sorbents based on diethanolamine and methyl diethanolamine have been studied.

METHOD

However, in all cases, the main focus is on cleaning up sulfur compounds, and little attention is paid to cleaning up natural gas from gas deposits with high levels of carbon monoxide. MDEA was selected as the most suitable absorbent for natural gases that together contain sulfur compounds and carbon monoxide. The best way to solve this problem is to chemically absorb carbon monoxide before natural gas enters the absorbent. This, in turn, not only reduces corrosion, but also reduces the consumption of MDEA by 2 times. In this work, the physical and chemical properties of sorbents were used, and their structure was studied by IR spectroscopy, potentiometry, photocolometry, gas chromatography, thermogravimetry, and other modern methods of analysis.

RESULT

It is also possible to reduce the carbon monoxide content of gas supplied to the population to 0.1-0.3% instead of the current 1.6%. If 1 million m³ of gas is produced per day in gas fields, the amount of carbon monoxide in it will be 16,000 m³. If this amount of methane gas is used instead of carbon monoxide, the same amount of methane gas will burn:



In this case, you can get 627142 kJ of heat. It is not difficult to understand how long it will last for a car, apartment or other room. If 16,000 m³ of carbon monoxide is converted to the

form of calcium carbonate, in addition to producing 71 tons of deposited chalk, a local product for the construction and pharmaceutical industries can be obtained. Most importantly, the creation of about 50 new jobs will contribute to the well-being of our people.

Under production conditions, sedimentary chalk is effectively produced from industrial waste, imports are stopped, and products are produced for export instead. It uses acid gases from natural gas. Under factory conditions, increasing the amount of carbon dioxide in natural gas not only increases the consumption of MDEA in the adsorber, but also leads to a very high rate of corrosion of the adsorber. By reducing the amount of carbon dioxide in natural gas, the adsorber increases productivity by reducing the consumption of MDEA imported into the currency, and also dramatically reduces corrosion. This situation is not only beneficial in this regard, but also allows you to turn imports into exports by producing new products and creating new jobs.

The scientific novelty of the research is as follows: the influence of bulk quantities of H_2S/CO_2 absorbent temperature and process pressure, and time of technological process on the physico-chemical properties of developed composite absorbent;

it is determined that the corrosion properties of composite absorbers in plants, in addition to the temperature and degree of saturation of their H_2S and CO_2 , depend on the ratio of H_2S/CO_2 in gas, diethanolamine and methyldiethanolamine;

improved technology for cleaning natural and secondary gases from acidic components with composite sorbents.

CONCLUSION

Also, carbon dioxide released into the atmosphere creates a greenhouse effect in the Bukhara region, which in turn solves this problem. This also makes it possible to set up a chalk production workshop for the education system based on the resulting deposited chalk. The resulting precipitated boron increases the level of purity, which makes it possible to

establish a workshop for the production of chalk for the medical, pharmaceutical industry and for the production of toothpaste. The practical significance of the research results lies in the synthesis of highly effective composite sorbents used in the process of cleaning natural and waste gases. Their use in the process of cleaning natural and waste gases is justified by improving the absorption capacity, the temperature of absorption and desorption, the content of acidic components in the regenerated solution, foaming, reducing the loss of the absorbent, increasing the service life of the absorbers, as well as improving the environmental condition.

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