



APPLICATION OF AROMATIC ACETYLENE ALCOHOLS SYNTHESIZED IN DIFFERENT CATALYTIC SYSTEMS AS INHIBITORS IN THE OIL AND GAS INDUSTRY

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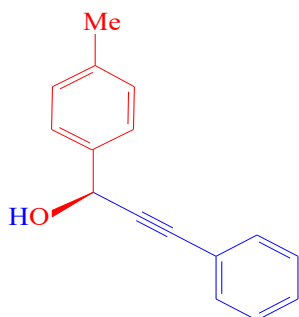
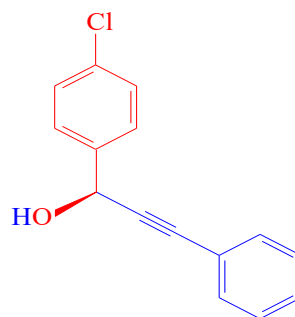
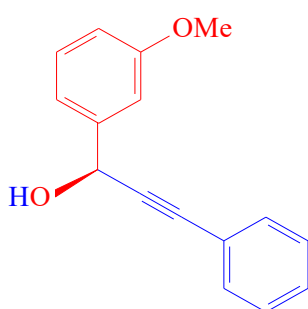
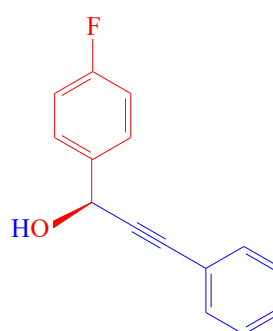
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Wastewater generated as a result of production processes in the oil and gas industry contains various types of compounds with chemically complex structures and properties. This situation causes a number of economic, environmental and technological problems [1, 2]. In the oil and gas industry, the presence of salt layer-forming components in wastewater generated during the extraction, transportation and processing of raw materials is an aspect that negatively affects the quality and cost of finished products [3]. The chemical industry, depending on the industry, produces wastewater of different composition. For example, if the wastewater of a caustic soda and mineral fertilizer production plant contains a large amount of inorganic substances (oxides, salts, acids, alkalis, etc.), then the wastewater of a plant producing synthetic rubber, plastics, artificial fiber, varnishes and paints contains more organic compounds, polymer substances, solvent waste, and the wastewater of oil and gas industry plants contains more ions of alkali and alkaline earth metals, sulfate, carbonate, hydrocarbonate, hydrophosphate, chloride, cyanide and phosphate ions.

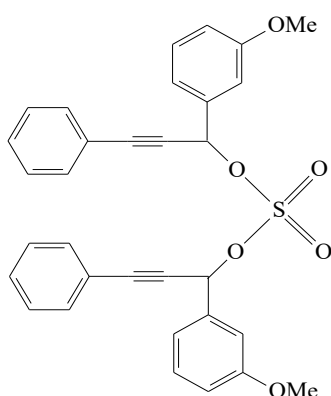
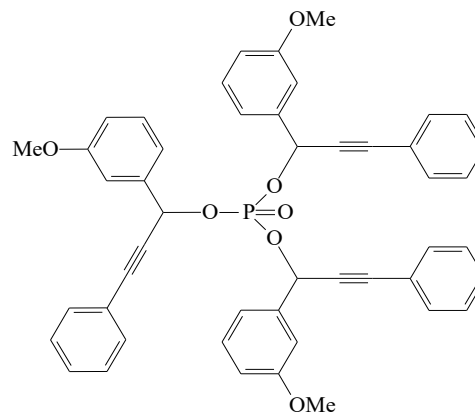
Taking into account the above problems, the field of chemical synthesis is rapidly developing the synthesis of highly effective substances from local raw materials and the creation of new types of preparations based on them. In particular, a special place in the synthesis of new compounds for the oil and gas industry is occupied by acetylene alcohols obtained on the basis of acetylene chemistry and their various derivatives. Therefore, world scientists pay special attention to the production of new generation preparations and materials based on components that form a layer in metal and steel structures used in the chemical, food, oil and gas industries.

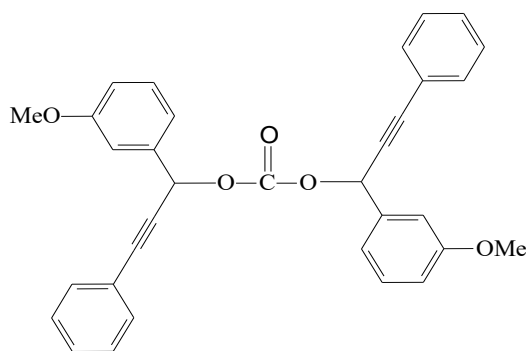
In this work, benzaldehyde-based acetylenic alcohols synthesized in different catalytic systems were used as inhibitors of layer-forming components in wastewater from the oil and gas industry. The following acetylenic alcohols were used in the study: 1-(4-methylphenyl)-3-phenylpropyn-2-ol-1 (1), 1-(4-chlorophenyl)-3-phenylpropyn-2-ol-1 (2), 1-(3-methoxyphenylheptynyl)-3-phenylpropyn-2-ol-1 (3) and 1-(4-fluorophenyl)-3-phenylpropyn-2-ol-1 (4).

It has been established that these acetylenic alcohols combine with sulfate, carbonate and phosphate ions in wastewater to form water-soluble esters (1-3) and reduce salt formation by up to 88%.

**1****2****3****4**

An example is the esters 1-(3-methoxyphenylheptynyl)-3-phenylpropyn-2-ol-1.

**1****2**



3

Samples of the recycled wastewater of Gissarneftgaz LLC, selected as the object of study, were taken and their hardness was studied. The water hardness of the selected regions was determined. The studies were conducted based on solutions of the selected inhibitors with a concentration of 25.0 mg/l (see Table 1). The high selectivity of the proposed inhibitors for the retention of layer-forming ions in wastewater is due to the formation of complexes and esters with calcium, magnesium, barium, sodium cations and sulfate, carbonate, phosphate, hydrophosphate and hydrocarbonate anions.

Table 1

Ions forming a salt layer in circulating wastewater and their complexation*

| Layer-forming ions | Number of ions in 1 l of water, g | Number of neutralized ions, g | Number of ions formed by the layer, g | Efficiency, % |
|--------------------|-----------------------------------|-------------------------------|---------------------------------------|---------------|
| Calcium | 26,2 | 19,39 | 6,81 | 74 |
| Magnesium | 6,3 | 3,91 | 2,39 | 62 |
| Barium | 17,2 | 12,04 | 5,16 | 70 |
| Sodium | 1,4 | 0,78 | 0,62 | 56 |
| Sulfate | 4,2 | 3,15 | 1,05 | 75 |
| Carbonate | 7,9 | 6,95 | 0,95 | 88 |
| Phosphate | 2,3 | 1,47 | 0,83 | 64 |
| Hydrophosphate | 1,2 | 0,96 | 0,24 | 80 |
| Hydrocarbonate | 0,86 | 0,46 | 0,40 | 54 |

**(in the example of 1-(3-methoxyphenylheptynyl)-3-phenylpropyn-2-ol-1 (25.0 mg/l.))*

Based on the obtained results, the effectiveness of the selected preparations against the formation of complex salts, layers and sediments in industrial wastewater was determined. According to him, the order of effectiveness is as follows: 1-(4-methylphenyl)-3-phenylpropyn-2-ol-1 < 1-(4-chlorophenyl)-3-phenylpropyn-2-ol-1 < 1-(4-fluorophenyl)-3-phenylpropyn-2-ol-1 < 1-(3-methoxyphenylheptynyl)-3-phenylpropyn-2-ol-1. In particular, it was found that 1-(3-methoxyphenylheptynyl)-3-phenylpropyn-2-ol-1 can neutralize an average of 70% of layer-forming components as a result of binding metal ions and acid residue anions in wastewater, and salt layer in metal devices of chemical industry enterprises it was concluded that it can be used as an inhibitor against the forming components. Low-temperature fractions of natural gas products have a low sulfur content, the heavier the fractions, the higher the sulfur

content. And hydrogen sulfide is found in any fractions of natural gas, that is, some unstable sulfur compounds turn into hydrogen sulfide from decomposition under the influence of heat during natural gas processing.

Natural gas products contain elemental sulfur, sulfides, disulfides, mercaptans, which have a negative impact on the management and control of technological processes in gas processing and the production of high-quality natural gas products. In addition, sulfur and its compounds have a negative effect on the operational properties of technological devices, the quality and purity of natural gas products, and a number of technical indicators.

Taking into account these aspects, the use of benzaldehyde-based acetylene alcohols synthesized in different catalytic systems and their various derivatives as inhibitors in gas processing plants became the next goal of the research.

In order to achieve the set goal, the task of extracting the amount of elemental sulfur, hydrogen sulfide, mercaptans, sulfides, and disulfides in natural gas products by the method of complex formation was determined in further research works by using inhibitors based on synthesized acetylene alcohols. In addition, the tasks of improving the quality of natural gas products by using inhibitors and reducing the amount of toxic sulfur gases released into the environment from the combustion of fuel products were also determined.

Литературы:

1. Абдурахманова С.С., Зиядуллаев О.Э., Отамухамедова Г.Қ., Тиркашева С.И., Саматов С.Б. Юқори асосли каталитик система ёрдамида нефт саноати биокоррозисига қарши ингибиторлар синтези. Ташкент, 2019. – С. 323-328.

2. Зиядуллаев О.Э., Мавлоний М.И., Нурмонов С.Э., Абдурахманова С.С., Юсупова И.Ш. Синтез противокоррозионных ингибиторов для нефтегазового отрасли. ДАН, 2017, №3. – С. 60-64 б.

3. Отамухамедова Г.Қ., Зиядуллаев О.Э. Мавлоний М.Э., Туробжонов С.М., Саматов С.Б. Нефт таркибидаги микроорганизмларига қарши курашувчи биоцидларни синтез қилиш химизми ва уларнинг биологик фаолликлари. ДАН, 2018, 2018, №6. 60-66 б.