зменшуючи вуглецевий слід, підвищуючи його репутацію в очах інвесторів та фінансових установ.

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STUDY OF CORROSION PROPERTIES OF MODEL SOLUTIONS OF WATER-OIL MIXTURES

ВИВЧЕННЯ КОРОЗІЙНИХ ВЛАСТИВОСТЕЙ МОДЕЛЬНИХ РОЗЧИНІВ ВОДНО-НАФТОВИХ СУМІШЕЙ

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The protection of metal structures from corrosion is relevant not only in Ukraine, but throughout the world. And the intensive development of the most metal-intensive industries is accompanied by economic and environmental damage caused by corrosion of metal structures, equipment and products themselves.

Annual loss of metals due to corrosion in it a accounts for up to 12% of the total mass of the metal fund.

Thus, taking effective technical and economic measures to extend the residual life and increase the reliability of the operated structures and metal structures is a priority.

One of the most problematic industries in terms of corrosion processes is oil production and oil refining. The aggressive properties of the media in oil production are due to the presence of a large amount of mineralized water. Especially suffers from corrosion of the equipment of old or low-power fields, as well as in order to increase oil production, highly mineralized water is pumped into the reservoir, and even acid treatment is used intensification of oil production from low-permeable carbonate and mixed collectors. But this leads to intense corrosion of the metal equipment used. It is known that no less serious corrosive problems arise in the technological processes for oil refining. Although during the initial preparation of oil measures are applied thatbefore its deep desalting and dehydration, water and chlorides still enter the oil. During further oil refining due to the hydrolysis of magnesium and calcium chlorides that enter the oil from reservoir water, hydrogen chloride appears in the system, which is characterized by strong aggressive properties. Corrosive activity of oilfield media is often characterized by high water content extracted products and mineralization of reservoir and pumped waters. The greatest and lowest corrosion activity is determined by the physicochemical properties of the aqueous phase, which is separated from the oil (pH, temperature, salt composition, etc.) and the presence of both hydrogen sulfide and carbon dioxide and oxygen. High aggressiveness of operating environments is one of the main reasons for the failure of well equipment, its premature failure [1–3].

The purpose of our study was to determine the composition and corrosion aggressiveness of the concomitant reservoir water GZ-3 of the Struten field, PJSC UkrNafta and the composition of model solutions for the selection of corrosion inhibitors [4].

Table 1

Characteristics of the accompanying water GZ-3 of the Struten field, PJSC UkrNafta

Name of the indicator	Unit of measure	The actual value of the indicator
pH	pH units	6,9
Alkalinity total	mg-eq/dm^3	10,0
Hardness total	mg-eq/dm^3	110,0
Calcium	mg-eq/dm^3	80,0
Magnesium	mg-eq/dm^3	30,0
Chlorides	mg/dm^3	17750,0
Sulphates	mg/dm^3	20,0
Common iron	mg/dm^3	10,0
Dry residue	mg/dm^3	52320,0

Corrosion rate indicators were determined for three types of model solutions that simulated water-oil mixtures and that differed in the oil:acetic acid ratio. In addition, research was conducted for various types of metals. The results of the research are presented in Table 2.

Table 2

The rate of corrosion of metals in water-oil mixtures of different composition

Metal	Oil concentration, cm^3/dm^3	Concentration of acetic acid, g/dm^3	Corrosion rate, W, g/(m^2·h)
Copper	10	0	0,009
Brass			0,0006
St3			0,007
St20			0,001
Copper	10	5	0,08
Brass			0,06
St3			0,20
St20			0,16
Copper	10	10	0,05
Brass			0,11
St3			0,20
St20			0,19

The first type of solution, which contained only an emulsion of water with oil, predictably did not have pronounced corrosive properties for all types of metals, the corrosion rate was noted at the level of 0.0006–0.009 g/(m^2·h). When adding acetic acid, which simulated the presence of carboxyl substances in petroleum mixtures, the corrosion aggressiveness of the media increased in 10–200 times, depending on the type of metal. For copper, the corrosion rate values had the highest values – 0.05 g/(m^2·h), the highest values of the corrosion rate were characteristic of steel – up to 0.2 g/(m^2·h).

Therefore, for further research on the selection and determination of the effectiveness of corrosion inhibitors, water-oil emulsions with the addition of acetic acid were used as aggressive media to create the most rigorous conditions for research.

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