New Biocidal Compositions for Oil, Oil Products and Oilfield Fluids

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Abstract

A special feature of the forthcoming stage of development of the oil and gas industries is oilfield development of highly viscous, heavy, extra-heavy oils with the aim of increasing hydrocarbon feed resources. The creation of technologies for their extraction, routine preprocessing and transportation is a serious problem. At the moment, one of the main methods of production such oils is polymer water flooding. There are used polymers, for example, polyacrylamide (PAA), which has the ability to increase the viscosity of water, reduce its mobility, and thereby better displace not only oil, but also associated fossil water, and surface-active substances (surfactants), the composition of which must be developed for specific characteristics of oil, formation and mineralization of water. In addition, in the oil production are used different reagents, for example anticorrosive and biocides. Usage of incompatible reagents can give a negative effect.

In this regard, the aim of our work is the development on the basis of PAA and SAW of new effective compositions used in oil fields as reagents with complex action for displacement of hard-to-recover oil reserves and providing high-efficiency protection against biocorrosion in oil production.

The obtained results showed that the known and widely used conserving agent for technical products "Grotan-OX" in the composition obtained from local oil products emulsion Az-5 possesses effective bactericidal properties in relation to aerobic and anaerobic, including sulfate-reducing bacteria. Synthesized by us Biocide B, by bactericidal properties, as part of Az-5 is slightly inferior to "Grotan-OX". However, this compound is superior to it, especially by fungicidal properties as a component of the mineral oil. The following compositions were studied: "Grotan-OX" + "Biocide B" in the ratio 1:1 and 1:3 (masses). Combining of these substances leads to improved biocidal properties, which allows the use of fewer materials to provide acceptable biocidal properties, thereby reducing the consumption of materials.

In accordance with the purpose of this work, new oil-displacing compositions based on aqueous solutions of various SAW (kerosene-alkaline waste, Az-5, sulfonol, Qrotan-ox) and water-soluble polymer PAA have been developed.

The components of the compositions were investigated as an oil-displacing agent individually or as a composition thereof with a different ratio of components. While correlation of experimental data, it can be concluded that under the conditions of microbiological contamination of oilfield systems, the new multifunctional compositions (VIII-IX) possessing effective oil-displacing properties, can significantly reduce the corrosive aggressiveness of oilfield waters.