Analysis Of The Application Of Alkaline Methods Of Influence On The Bottom Of The Well

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ABSTRACT

This article provides information on general methods for studying the injection of various surfactants into oil reservoirs.

Keywords: Formation, influence, wells, alkalis, oil displacement , deposits, reagent.

Introduction

Research on the development of complex methods of influencing productive formations of oil deposits using various active substances was carried out in two directions: limiting the movement of water in the formations and the flow of water into wells and displacing oil by improving the oil-cleaning properties of water.

Main part

aluminum chloride and the following alkaline reagents were selected as reagents for the study : sodium carbonate , trisodium phosphate , sodium hydroxide, alkaline effluents from the production of caprolactam (ACS).

The methodology for studying the interaction of selected chemical products included:

1) study of the influence of the physicochemical properties of selected reagents on the formation of a water-insulating mass in reservoir conditions;

2) determination of oil-displacing properties of interaction products;

3) assessment of the influence of the degree of mineralization and chemical composition of formation waters on the processes of interaction of chemical reagents;

4) changes in the filtration characteristics of the formation as a result of the interaction of reagents injected into the formation;

5) justification of the optimal compositions of process fluids that ensure effective displacement of residual oil from the reservoir.

The choice of chemical products was based on the following considerations:

aqueous solutions of the reagents under study are well filtered in a porous medium;

aluminum chloride is successfully used to treat the bottomhole zone of wells;

Aqueous solutions of alkalis and alkaline waste have higher oil-displacing properties compared to water.

Chemical products were studied as alkaline reagents: sodium carbonate, sodium hydroxide, trisodium phosphate , alkaline wastewater from the production of caprolactam . Let us give brief characteristics of these reagents.

Hydrated form of aluminum depending on solution pH

pH interval	Predominant content of hydrated form
Less than 3	$Al(H_2O)_6)^{3+}$
3.8-4.9	$Al(H_2O)_5OH)^{2+}$
5-5.6	$Al(H_2O)_6(OH)_2)^{+}$
7.2-7.6	$Al(0H)_3)$
More than 11	$Al(OH)_4)^{-}$

Index	Norm
Appearance	Scales and crystals, capable caked
Mass fraction of total P_2O_3 % no less	18.5
pH of aqueous solution	11.5-12.5
Mass fraction of water-insoluble residue	0.03
Molecular mass	380.12
Density, kg / m^3	1640
Melting point, ^{0}C	73
TNF solubility, g/100g water	30.2
Equilibrium concentration of crystal formation, % (by mass)	23

Contact angle of wetting of aqueous solutions of alkalis

Reagent	Concentration, % (by mass)	Contact angle θ, deg	Reagent	Concentration, % (by mass)	Contact angle θ, deg
Water	-	46.4	Na_2CO_3	0,25	16,7
NaOH	0,06	6,4	Na_3CO_4	0,5	9,8
NaOH	0,1	10,0	Na_3CO_4	1,0	3,8
NaOH	0,50	14,2	ShchSPK	0.25	12.3
Na_3PO_4	0,25	18,3	ShchSPK	0.5	7.6
Na_3PO_4	0,50	5,2	ShchSPK	1.0	2.5
Na_3PO_4	1,0	1,0			

Conclusion

Based on the results of the analysis of the physicochemical properties of the above reagents, the need for more detailed studies of the interaction of compositions based on aluminum chloride with sodium carbonate and ACHSPK, which have a relatively high viscosity (up to 10 mPa · s), contains ingredients that, on the one hand, can serve as a filler, on the other hand, improve their oil-cleaning properties due to the manifestation of surface-active properties and the release of carbon dioxide.

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