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KINETICS OF DEMULGATION OF WATER-OIL SYSTEMS USING REAGENTS BASED ON HUMIC ACID ESTERS

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The relevance of developing new demulsifiers adapted to the nature of the dispersion medium is justified. Complex esters based on humic acids have been proposed and tested as a promising alternative to traditional reagents. The article presents the results of a study of the kinetics of destruction of stable water-in-oil emulsions using a new demulsifier based on humic acid esters (reagent "E") in comparison with the industrial block copolymer standard "PM-1441". The model systems were stabilized with coal concentrate, which ensured high aggregate stability. The dynamics of changes in the specific interphase surface over time were studied using optical microscopy and image analysis software. It has been established that the demulsification process undergoes three consecutive stages: coalescence, cluster formation, and drainage channel formation. Calculation of the rate constants using first-order equations showed that reagent "E" provides a higher coalescence rate (k = 0.0526) at the initial stage. It was found that the use of "PM-1441" is accompanied by the formation of a secondary fraction of ultra-fine droplets that do not undergo rapid coalescence, which was not taken into account in the assessment of coalescence parameters. Despite the high initial rate of action of the new reagent, the paper emphasizes that intensive kinetics in the early stages is not an exhaustive indicator of overall technological efficiency, since "fast" demulsifiers are often limited to only primary destabilization of the system. The data obtained form the basis for further optimization of the composition of humic reagents in order to achieve maximum dehydration depth of heavy hydrocarbon raw materials.

Keywords: kinetics, coalescence, emulsion, petroleum products, coking products, microscopy.

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