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Investigation of waterflooding with surfactants of ash'alchinskoye oil-field sandstones using X-ray ct

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Abstract

© SGEM 2017. All Rights Reserved. The study deals with the features of using surfactants during waterflooding of an oilsaturated porous medium in the pore-scale. As an example of the study, we use natural sandstone from Ash'alchinskoye oil-field. For calculations the digital image of this sample is received with high resolution X-ray computer tomography use. The mathematical modeling of multiphase flow in porous medium is made on the base of Lattice Boltzmann equations and Color-field model. Numerical experiments are held for different values of surface tension and contact angle of wetting. It was found that at very low values of the capillary pressure in comparison with the hydrodynamic drop, the viscous "fingers" are formed in the porous medium. At comparable values of capillary and hydrodynamic pressures, the surfactant solution fills the pore space uniformly and more efficiently. A volume of produced oil increases with decreasing of surface tension and wetting angle with the same volume of injected solution after its breakthrough from outlet section, but before breakthrough it was observed an opposite effect.

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Keywords

Lattice Boltzmann equations, Modelling, Surfactants, X-ray CT

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