

INVESTIGATION OF EMULSION ELUTION FROM POROUS MEDIA

Emulsions appear in many subsurface applications including bioremediation, surfactant-enhanced remediation, and enhanced oil-recovery (EOR). For example, it has been shown that emulsification of the edible oils prior to injection into groundwater as a substrate for enhanced bioremediation, improves its spatial distribution in the contaminated zone. Understanding of emulsion migration process in the porous media can effectively influence on reduction of a cost connected with remediation of soils. Other minor applications, where emulsion flows through porous media include cleanup of chlorinated solvents from groundwater.

It has to be mentioned that modeling of emulsion transport in the porous media is particularly challenging because the rheological and physical properties of emulsions are different from averages of the components. As an example, during flow of two phases liquid and oil through porous media, the phenomenon of oil interception to porous structure can occur. Also it can be observed that some of the oil droplets are filtered in the area between pores. Therefore transportation and imbibition of porous media with emulsions is more complicated than with water or oil.

The analysis of literature sources shows that efforts were made to describe porous media imbibitions with emulsions, but very few works point out the elution process of emulsion from porous structure. Therefore, there is a need for experiments explaining transport phenomena of oil-in-water (O/W) emulsions in porous media.

In the conducted experiments, we examined over-pressure process of emulsion elution from the porous media. Three O/W emulsions with the dispersed phase concentrations of 50%, 60%, and 70% were used. The examined factors were the followings: influence of a flow rate of the eluting fluid, concentration of emulsions, and thickness of the porous media surface. The dispersion of droplets in different samples were also investigated.

The main purpose of the studies was to try applying of the kinetic equation to received data regarding emulsion concentration in the obtained samples.

Key words: emulsions, emulsion flow, porous media, elution of emulsions, droplets dispersion

Пахольский П., Блащик М., Сенок Э.

ИССЛЕДОВАНИЕ ЭЛЮИРОВАНИЯ ЭМУЛЬСИИ ИЗ ПОРИСТЫХ СИСТЕМ

Исследовались процессы моделирования транспорта эмульсии в пористых средах. Рассмотрены следующие факторы: влияние скорости потока жидкости в качестве элюента, концентрации эмульсии, и толщина пористой поверхности носителя. Были также исследованы дисперсия капель в различных образцах.