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The role of the capillary force in the liquid distribution in porous media BOJAN MARKICEVIC, Pall Corp — The dynamics of the liquid spreading in porous media occupied by gas is investigated numerically using the capillary network models. In the numerical solution, the flow at the free interface is fully resolved from the force balance at each pore along the interface allowing for local flows to fill or empty the pores. The flow is transient and the interface shape is determined at each time step. The liquid/solid interactions are investigated for whole range from fully wetting to fully non-wetting cases, and the spread of neutral fluid is also solved. For the neutral fluid, the interface irregularity are caused by pore varying volume with the interface of specific thickness separating fully saturated and gas occupied parts of porous medium. For the capillary interactions present, the interface thickness increases and due to the gas entrapment by spreading liquid, the saturation profiles develop in the direction of the liquid flow. The profiles depend on the capillary force as liquid spreads along the paths consisting of smaller pores for wetting, and larger pores for non-wetting interactions. Finally, the influence of the capillary force is counteracted by viscous force, where for faster flows, the saturation profiles vanish and the interface of limited thickness develops.

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