



Chalk-microfluidic: flooding microsystems with reactive fluids

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Experiments on core scale and field tests that have been carried out the last decade have clearly shown that water chemistry affects the final oil recovery. However, there is generally no consensus in the scientific community of why additional oil is released. Part of the reason for this is that there are very few in-situ observations of how the water chemistry affects fluid distributions on the pore scale, and/or the pore surface characteristics. In this work, as a first step, our aim is to focus on in-situ observations of single phase flow and interactions at the pore scale. In order to work at this small scale, we first investigate how to control the flow location. We propose to use the same principle as "paper-microfluidic": some areas of the chalk are chemically treated so that no fluid flows inside while other areas let the fluids flow in the chalk pores. Since chalk and paper obviously has different mechanical behavior, we need to adapt this technique. Custom-made microsystems with chalk and calcite will be presented. We will then show experiments with reacting fluids in these microsystems. These experiments are observed using wide field fluorescence microscopy and white light vertical/phase shift interferometric microscopy.