

PRECIPITATION OF CaCO₃ IN MICROCHANNELS OF VARYING WETTABILITY DEGREE IN THE PRESENCE OF SURFACTANT AND OIL-WATER INTERFACES

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ABSTRACT

Mineral scaling in porous media and tubes is encountered during several industrial and environmental processes such as Carbon Capture Utilization and Storage (CCUS), Enhanced Oil Recovery (EOR), geothermal energy utilization and membrane utilization for liquids separation[1,2]. Scaling decrease the local permeability of porous media or tubes and affects the efficiency of processes. Previous works have been focused on the effect of parameters such as temperature, pH, the presence or the absence of foreign substances, the surface wettability degree, the presence or the absence of organic phases etc[3-5]. Previous experimental studies on calcium carbonate precipitation in microchannels, showed that wall surface wettability affected the time of the first observed crystal and crystal growth as well as the morphology of precipitated crystallites [4]. Moreover, oil-water interfaces trapped in the microchannels played the role of nucleation sites and accelerated crystal nucleation and growth [5]. Surfactants are amphiphilic molecules consisted of an hydrophilic and an hydrophobic part. The hydrophobic part is consisted of one or more aliphatic chains while the hydrophilic part is consisted of ionic and nonionic polar parts. In oil and gas industry, surfactants are used for the alteration of oil-wet rocks to water-wet and the enhancement of processes [6]. In the present work, precipitation of calcium carbonate is investigated in hydrophobic and hydrophilic microchips in the presence of surfactant AOT, in the absence and in the presence of oil-water interfaces, at various supersaturation ratio values.

KEYWORDS: wettability, surfactant, microchannels, calcium carbonate, oil-water interfaces.

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