

## **Fluid-solid interfacial area at different wetting conditions during multiphase in a porous medium**

Wettability and wettability alteration plays a vital role in many applications to understand the hydraulic conductivity and quantify many Darcy scale flow parameters during multiphase flow in a porous medium. The wettability influences the fluid-solid and fluid-fluid interfacial areas. Ideally, the fluid-solid interfacial area in a porous medium for a non-wetting fluid can be zero when thin films of the wetting fluid quote the solid surface. Therefore, quantifying the fluid-solid interfacial area can provide a way to measure wettability at Darcy scale. The two-tracer method has been explored to quantify the fluid-solid interfacial area during the multiphase flow through a porous medium for a given wettability. Here we demonstrate the influence of the different wettability on the quantified solid-fluid interfacial area. For this, we use the two-tracer method to investigate the fluid-solid interfacial area's relationship with wettability and saturation. We prepare a proxy porous medium consisting of fractional weight of the hydrophilic (water-wet) and hydrophobic (oil-wet) glass beads in the cylindrical tube's packing. We investigate the consequences of the wettability alteration on the estimated fluid-solid interfacial area during the multiphase flow in a porous medium at various residual saturations. We report our measurements of the fluid-solid interfacial area at different saturations for varying wettability condition.