



Contribution ID: 680

Type: Oral Presentation

Investigating the Effect of Enzymatically Induced Carbonate Precipitation on Hydraulic Properties

Friday, 4 June 2021 10:40 (15 minutes)

Enzymatically Induced Carbonate Precipitation (EICP) can be used to engineer the properties of porous media in situ. By targeted precipitation within the pore space, EICP reduces porosity and, more importantly, also affects the hydraulic properties of the porous medium: its intrinsic permeability as well as its relativepermeability and capillary-pressure-saturation relations. While the change in porosity is a straight-forward result of the precipitated volume of carbonate minerals, the resulting changes of intrinsic and relative permeability as well as of capillary pressure are less trivial. However, those changes in REV-scale hydraulic properties are in the context of reservoir engineering of highest importance and interest. As a first step towards describing the impact of EICP on those properties, experiments are conducted on mineralizing sintered glass-bead columns and 2D micromodels using EICP under continuous pressure measurement. The precipitated mineral volume and its distribution are monitored by sophisticated imaging: within the column by micro X-ray computed tomography; within the micromodel by optical microscopy. The effects of the precipitates on the hydraulic properties is then approximated by conducting pore-network modeling on pore networks extracted from the obtained images. This allows for estimates of EICP-specific parameterizations for the effect of EICP on the hydraulic-properties based on the volume of precipitated carbonate.

Time Block Preference

Time Block A (09:00-12:00 CET)

References

Acceptance of Terms and Conditions

Click here to agree

Newsletter

Student Poster Award

Primary authors: HOMMEL, Johannes (University of Stuttgart); WEINHARDT, Felix; STEEB, Holger (Universität Stuttgart); Prof. CLASS, Holger (University of Stuttgart)

Presenter: HOMMEL, Johannes (University of Stuttgart)

Session Classification: MS5

Track Classification: (MS5) Biochemical processes and biofilms in porous media