Contribution ID: **686** Type: **Poster (+) Presentation**

The evolution of preferential flow paths during Enzymatically Induced Calcite Precipitation and its effect on the permeability

Friday, 4 June 2021 09:40 (1 hour)

Enzymatically Induced Calcite Precipitation (EICP) in porous media can be used as an engineering option to achieve targeted precipitation in the pore space. It is associated with an alteration of porosity and, consequently, permeability. A major source of uncertainty in modelling EICP is in the quantitative description of permeability alteration due to precipitation, based on commonly applied porosity-permeability relations [1]. To improve these relations for REV-scale models, we investigate the effect of EICP on hydraulic properties in microfluidic experiments by measuring the pressure drop to calculate the permeability and by observing the pore-space alterations with optical microscopy. The experimental setup and procedure is described in [2]. The results of the current study show that under continuous flow conditions and ongoing precipitation preferential flow paths are forming. Our aim is to analyze this effect of strong local inhomogeneity for REV-scale permeability. We expect to quantify this as anisotropy also in pore-scale numerical investigations based on the images obtained from optical microscopy.

[1] Hommel, J., Coltman, E., Class, H.: Porosity-Permeability Relations for Evolving Pore Space: A Review with a Focus on (Bio-)geochemically Altered Porous Media. *Transport in Porous Media* (2018), 124 (2), 589-629.
[2] Weinhardt, F., Class, H., Vahid Dastjerdi, S., Karadimitriou, N., Lee, D., Steeb, H. Experimental Methods and Imaging for Enzymatically Induced Calcite Precipitation in a microfluidic cell. *Accepted in Water Resources Research* (2021).

Time Block Preference

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

References

Hommel, J., Coltman, E., Class, H.: Porosity-Permeability Relations for Evolving Pore Space: A Review with a Focus on (Bio-)geochemically Altered Porous Media. Transport in Porous Media (2018), 124 (2), 589-629.

Weinhardt, F., Class, H., Vahid Dastjerdi, S., Karadimitriou, N., Lee, D., Steeb, H. Experimental Methods and Imaging for Enzymatically Induced Calcite Precipitation in a microfluidic cell. Accepted in Water Resources Research (2021).

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Presenter: WEINHARDT, Felix

Session Classification: Poster +

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