



Contribution ID: 432

Type: **Poster (+) Presentation**

Conceptual model of reactive transport incorporating with dynamic biofilm growth and multicontinuum media

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

Biofilm growth in porous media changes the hydrodynamic properties of the medium: porosity and permeability are reduced, and dispersivity increases. However, the first arrival of breakthrough curves (BTCs) is more reduced than derived from the reduction in porosity, and the BTC tail becomes heavier. These observations suggest the need of multicontinuum models (Multirate-Mass-Transfer, MRMT) that evolve dynamically with the biofilm. The MRMT model is capable of representing reactive transport in heterogeneous porous media which facilitates the simulation of localized reactions often observed within biofilms. In this work, we present a conceptual model of reactive transport with dynamic biofilm growth based on MRMT formulations. It incorporates the microbial growth according to the stoichiometry and kinetic rate laws of biological reactions. The physical, including not only porosity and permeability, but also the distribution of residence times in immobile zones, and chemical properties are updated after the reactive transport simulations at each time. This model is tested on field and laboratory data.

Time Block Preference

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

References

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