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Mass transfer across fracture-matrix interface in a flowing fracture

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Mass transfer across fracture-matrix interface in a flowing fracture
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A direct numerical simulation of the Navier–Stokes equations is utilized to solve two-phase flow in simple fractured porous media [1]. We focus on understanding the impact of fracture flow on the mass transfer between the fracture and porous matrix utilizing a two-dimensional geometry consisting of a single fracture with a limited number of pores.
We illustrate different imbibition regimes during water injection through the fracture into the porous domain saturated with oil. The impacts of contact angle, viscosity ratio, and interfacial tension for variable injection rate on the mass transfer across the fracture-matrix interface are analyzed. The simulation results suggest the fracture flow rate controls the rate of fluid phase transfer between the fracture and matrix domains.

Reference:
Farhadzadeh, M., & Nick, H. M. (2023). The critical role of fracture flow on two-phase matrix–fracture transfer mechanisms. Advances in Water Resources

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