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Microscopic Simulations of the Dissolution of Rock Fractures

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The results of numerical simulations of dissolution in fractured rocks are reported. The model is microscopic, with a detailed representation of the topography of the fracture. The velocity field in the fracture is assumed to be Stokes flow and is efficiently calculated with an implicit lattice-Boltzmann technique. The transport of dissolved species in the pore spaces is modelled by an innovative random walk algorithm that incorporates the chemical kinetics at the solid surfaces. The simulated morphological changes in a complex fracture are compared with laboratory experiments.

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