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## Selective mineral dissolution and permeability enhancement of fractured volcanic rocks by chelating agent flooding in geothermal environments

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Chemical stimulation using high-concentration hydrofluoric and hydrochloric acids has been a classic method to enhance the permeability of a geothermal reservoir. Our research group has recently proposed a new chemical stimulation using a weakly acidic (moderate-reactivity) aqueous solution containing an environmentally friendly chelating agent to create voids, which are sustained under crustal stress, by selective mineral dissolution with preventing precipitation by chelation of metal ions. In the present study, we have conducted chelating agent flooding experiments using an aqueous solution of pH 4 containing readily biodegradable chelating agent (GLDA) on various types of fractured volcanic rocks at 200 °C and effective confining stress of 15 MPa. The experiments have revealed fast permeability enhancement of up to approximately four times, from the initial value, in two hours. Further analyses have revealed phenocrysts of Fe-bearing minerals (ex. Hematite) dissolved faster than the groundmass of the rocks to create the voids. These results show the possibility of the new chemical stimulation.

Keywords: Chemical stimulation, Chelating agents, Geothermal energy, EGS