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Numerical Simulation of the Microbial Induced Calcite Precipitation (MICP) Process in Darcy-scale and Pore-scale

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Microbial Induced Calcite Precipitation (MICP) technique is a “green” bio-grouting method developed in recent years, which has been applied in many engineering fields. The MICP technique has attracted extensive attention due to its high reinforcement strength and environment-friendly properties. However, MICP reinforcement often faces the problem of non-uniformity precipitation, which happens in different spatial scales and is one of the bottleneck problems restricting the further development of this technology. In this study, the uniformity of calcium carbonate precipitation in the MICP process has been studied numerically in both the Darcy-scale and the pore-scale. The influence of grouting injection strategy, non-uniform distribution of soil material properties, and pore characteristics on the uniformity of MICP reinforcement have been preliminarily investigated.

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