

## **Modeling Enhanced Geothermal Systems using the Massively Parallel Sub-surface Reactive Flow and Transport Simulator PFLOTRAN**

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Enhanced Geothermal Systems (EGS) have the potential for improving the extraction of Earth's geothermal energy. For the optimal design of such large-scale systems to function for several decades, one must understand the various physical and chemical interactions that take place between the reservoir rock and the working fluid. In this study, we model EGS using the computer code PFLOTRAN, a massively parallel 3-D reservoir simulator that is based on continuum scale mass and energy conservation. The mass and energy equations are sequentially coupled to reactive transport equations describing multi-component chemical reactions that include mineral dissolution and precipitation occurring in a typical EGS. Parallelization in PFLOTRAN is carried out using the toolkit PETSc, thereby allowing simulation of large-scale systems such as EGS coupled to multicomponent chemical processes.