



Contribution ID: 757

Type: Oral Presentation

## A Phase-Filed-Based Formulation for Chemically-Assisted Fracture

Wednesday, 2 June 2021 20:20 (15 minutes)

Predicting and controlling fractures in porous materials has posed many challenges in understanding the long-term performance of such complex systems. Geological systems such as CO<sub>2</sub> sequestration, geothermal, waste repositories, oil and gas recoveries, are examples of natural porous materials, where fracture and damage play significant roles. In many of these systems, chemical alterations lead to change in the properties of fracture as well as the mechanics of the intact porous material. This presentation focuses on fracture initiation and propagation and shows how the state-of-the-art phase-field fracture can be used to model chemically-driven fracture in porous systems. We introduce a chemical damage parameter which is coupled with mechanical damage parameter obtained from the phase-field equation. The chemical damage parameter is also coupled with the change in porosity due to dissolution occurring in the porous material. We will demonstrate how this coupled formulation enables us to gain an understanding of fracture behavior in various geological porous systems. We also discuss how chemical dissolution impacts the crack speed and directionality.

### Time Block Preference

Time Block C (18:00-21:00 CET)

### References

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### Newsletter

### Student Poster Award

**Primary authors:** NEWELL, Pania (The University of Utah); Mr LOUIS, Schuler (Ecole Normale Supérieure Paris-Saclay)

**Presenter:** NEWELL, Pania (The University of Utah)

**Session Classification:** MS3

**Track Classification:** (MS3) Flow, transport and mechanics in fractured porous media