

## MULTIPHASE CHEMICAL KINETICS MODELING FOR AQUEOUS-MINERALS REACTIVE SYSTEMS

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During the last few years, there has been a growing interest in global formulations of multi-phase reactive transport models with a special focus on the complete dissolution of minerals by kinetic reactions involving aqueous species and minerals.

In the specific case of one mineral by reaction and one reaction by mineral, we can introduce a modified model which consists in limiting the dissolution rate when the mineral amount is equal to zero. However, such a discontinuous switching may induce failures in standard implicit solvers and is not compatible with classical mathematical theories. These issues has been solved, by N. Bouillard et al. [1] and J.Hoffman et al. [2], by translating discontinuous switching in complementarity conditions and by using a differential inclusion approach.

In this talk, we will present and justify the "limited kinetics model" introduced by B. Hamlat et al. [3, 4] to extend the range of applications to general systems including any type and number of kinetic reactions. Then we will discuss the mathematical and numerical results obtained and the remaining issues in light of our recent advances.

### References

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