



Modelling the chemical degradation of hydrolysable fracking constituents

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Hydraulic fracturing has been extensively applied to develop resources of natural gas and crude oil. Environmental concern arises, besides the extraction of formation solutes, from the chemicals injected into the reservoir to facilitate the fracturing processes, such as polymerizers, clay stabilizers, friction reducers and biocides. Therefore environmental risk assessment requires predictive measures of the fate of these chemical once introduced into the subsurface. The purely chemical process of hydrolysis enables to model the degradation of solutes if reaction rate constants and activation energies are available from chemical databases. The numerical code MIN3P is an excellent tool to simulate such processes in the heterogeneous subsurface with a temperature gradient and was enhanced for reservoir conditions of elevated pressure and temperature. Results of environmental risk assessment are presented. Especially zones that have a potential of rapid vertical transport into lower temperated areas such as faults or abandoned wells are of concern.