



Mobilization of Hazardous Metal Species During CO₂ Injection and Storage

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ABSTRACT

Deep brine-containing confined geological formations serve as target reservoirs for CO₂ sequestration. The solid matrix (rock) comprising the reservoir may contain hazardous components, e.g., metals like As or Pb, in equilibrium with their concentrations in the brine. In particular, Galena and Arsenopyrite soils are the main source of Pb and As in water

When CO₂ is injected into the reservoir, the brine's composition remains unchanged in those portions of the target reservoir which are not invaded by the CO₂ advancing plume. However conditions change once a portion of the reservoir is invaded by the advancing CO₂ plume. Of special interest here is the reduction in the pH level. As a consequence, the concentration of the hazardous species associated with the rock is increased. The CO₂ enriched brine may endanger water bodies which serve as recipient to the brine. Natural faults or pressure produced fractures in the caprock may also serve a conduits to the hazardous species enriched brine, e.g., to overlying aquifer.

This presentation will discuss mathematical models that describe the chemical interaction between the indigenous brine, the injected CO₂ and the host rocks. The possible migration of the hazardous species under various CO₂ storage conditions will be presented