



Changes of petrophysical properties of Sandstone samples from the CO₂ storage pilot site at Ketzin, Germany due to interaction with supercritical CO₂

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29 Sandstone samples from the CO₂ storage pilot site at Ketzin, Germany were studied within the framework of the COORETEC project. In batch experiments the pressure and temperature conditions of a saline aquifer of the Ketzin drilling (about 630m in depth) were realized. The petrophysical properties porosity, permeability and electric conductivity and the mineralogical composition were studied before and after each experiment to check for changes due to interaction of the partial saturated sandstones (3M NaCl) with water-saturated supercritical CO₂ (scCO₂). The experiments were performed in a temperature range between 70 to 90 C° and pressure range from 9 to 12 MPa to simulate the typical temperature and pressure conditions of a saline aquifer. The total experimental duration was one month, all samples were analyzed for changes of the petrophysical properties every two weeks. Blank tests were made with Argon and fully saturated samples.

The mineralogical composition of the untreated samples were analyzed with XRD an XRF. (Quartz 32 wt% to 41.5wt%, Anhydrite 0wt% to 14wt%, Hematite 0wt% to 36wt% and Feldspars 8wt% to 31wt%.) The samples are very heterogenic in composition and easily break parallel to natural ravines.

The porosity ranges from 7% to 33%, permeability ranges from 9,57E-17m² up to 1.18E-13m² and density ranges from 2,64g/cm³ to 2,75g/cm³ for untreated samples.

Most samples, that were intact after the first experimental cycle, they showed a slight increase in both porosity and permeability, while density remained unchanged within the experimental error.