Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03230, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03230
EGU General Assembly 2008

Development and Application of a Gas Membrane Sensor for In-Situ Down Hole Observation of Gases During Geological Storage of Carbon Dioxide

M. Zimmer & J. Erzinger

GeoForschungsZentrum Potsdam, Telegrafenberg, D-14473 Potsdam,
weihei@gfz-potsdam.de, erz@gfz-potsdam.de

The geological storage of carbon dioxide (CO_2) in deep permeable reservoir rocks is regarded as a promising technology for a reduction of greenhouse gases entering the atmosphere from stationary point sources such as large fossil fuel power plants. However, comprehensive research is essential to characterize and map the geological storage structures and to better understand the behaviour of CO_2 during storage. Therefore we developed and applied a new, innovative geochemical monitoring tool for the real time and in-situ observation of CO_2 and other gases as well as additional physical parameters during geological sequestration.

The method uses a phase separating silicone membrane, permeable for gases, in order to extract the gases dissolved in borehole fluids, water and brines and a carrier gas to conduct the gathered gas through capillaries to the earth surface. At the surface, the gas phase is analyzed directly, e.g. in real-time with a mass spectrometer allowing for the determination of all permanent gases, and can be sampled for more detailed investigations in the laboratory.

The permeation rates of the used membrane for CO_2 and other gases at given concentrations and temperatures (bore hole conditions) have been determined in a specially developed calibration device to calculate the dissolved gas concentrations.

The concept for on-line determination of gases dissolved in brines with the gas membrane sensor technique was proved successful during tests at the Ketzin bore holes,

where the natural dissolved gas concentrations have been determined.