Goldschmidt 2000
September 3rd–8th, 2000
Oxford, UK.

Journal of Conference Abstracts
Volume 5(2), 821

The Effect of Pore Size on Salt Cementation in Porous Rocks

Andrew Putnis (putnis@nwz.uni-muenster.de)[1] & **Gabriele Mauthe** (gabriele.mauthe@beb.de)[2]

[1] Institut für Mineralogie, University of Münster, Corrensstrasse 24, 48149 Münster, Germany
[2] BEB Erdgas Erdöl, 30659, Hannover, Germany

Crystallisation in porous rocks is of considerable interest in a wide variety of geological environments and is implicated in virtually every type of process which involves fluid-rock interaction, reactive transport, cementation, diagenesis and ultimately metamorphism. The key issue is whether the thermodynamics of crystallisation within small pores is different from that in a free solution (i.e. whether a confined fluid can become more highly supersaturated with respect to crystallisation than a free fluid of the same composition), and if so, what consequences this may have for the supersaturation of fluids in rocks and their behaviour on crystallisation.

We describe natural halite (NaCl) cementation in sandstones of the Lower Triassic Bunter Formation in NW Germany. These fluvial and aeolian sandstones have been extensively studied with respect to natural gas exploration and production and also as potential reservoir rocks for gas storage after depletion. Salt cementation clearly deteriorates the reservoir quality and the conditions under which halite crystallisation take place is of fundamental importance.

Porosity and permeability measurements before and after salt extraction, in cemented and non-cemented sandstones from part of a 2.6 km cored section of one well, together with mercury porosimetry measurements and observations of petrographic thin sections show that there is a clear preference for diagenetic cementation in large pores relative to smaller pores. The observations in terms of the general principles regarding the relationship between supersaturation and pore size and the implications to fluid/cement ratios, and deviations from equilibrium in confined fluids will be discussed.