Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03933, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03933
EGU General Assembly 2008

High-strain torsion experiments on halite-muscovite synthetic aggregates

F. Ornelas Marques and L. Burlini
Geologisches Institut, ETH-Zentrum, CH-8092 Zurich, Switzerland

Torsion experiments were performed on synthetic aggregates of halite with 30% volume of coarse (0.25 to 0.5 mm) or fine ($<$ 0.03 mm) muscovite, in order to investigate: a) shear strain localization, b) mica rotational behaviour and c) formation of internal variably dipping ductile shear zones. The experiments were performed at temperatures ranging between 100 and 300˚ C, with a confining pressure of 250 MPa and constant angular displacement rates corresponding to shear strain rates of 3x10^{-4} s^{-1}. The initial sample had a mica-foliation to honeycomb structure, and the torsion experiments were conducted on cylindrical samples with the starting foliation parallel or perpendicular to the cylinder axis. Both the foliation parallel and the foliation perpendicular experiments show similar stress strain patterns, with an initial short hardening stage followed by a rather continuous plateau for low temperatures or weakening for higher temperatures. Microstructural analysis shows that: (1) shear strain concentrates, since very low strain, in narrow zones within the cylinder sample. The remainder of the sample is undeformed and works as rigid walls to the internal shear zone. (2) Very narrow shear zones of very high shear strain form parallel to the shear plane and within the wider (though narrow) shear zone. (3) Mica grains passively rotate until a stable orientation.