Geophysical Research Abstracts, Vol. 7, 04110, 2005
SRef-ID: 1607-7962/gra/EGU05-A-04110

Intrakristalline Strain and Texture of an Anhydrite-Dolomite Composite (Zuckerdolomit), measured using Neutron Time-of-Flight Diffraction at the pulsed Reactor IBR-2 (Dubna)

A. Frischbutter (1), **Ch. Scheffzük** (1,2) and K. Walther (1, 3)

(1)GeoForschungsZentrum Potsdam, Germany (2) Joint Institute of Nuclear Research, Dubna, Russian Federation, (3) Forschungszentrum Rossendorf, Dresden, Germany, (fribu@gfz-potsdam.de)

At the neutron time-of-flight beam line 7A ($\sim$102 m) of the pulsed reactor IBR-2 (Joint Institute for Nuclear Research Dubna, Russian Federation) are installed behind each other the multidetector diffractometers EPSILON-MDS (for intrakristalline strain measurement) and SKAT (for texture measurement). This configuration permits rather good experimental conditions for combined studies on texture-strain relations within geological materials.

Experimental results are reported for rocks, in central Europe known as "Zuckerdolomit". The specimens were collected from a Mesozoic sequence, representing a characteristic part of the Piora-Mulde (western Alps, central Switzerland). The studied sample consist of 55 % dolomite, 36 % anhydrite, $<$ 3 % calcite and must be classified at least as medium metamorphosed (foliation probably parallel to a bedding plane).

Texture was measured by neutron diffraction using the diffractometer SKAT and additionally on the Fedorow-U-stage: Dolomite by the (0001)-polefigure and anhydrite determining the orientation of the optical axial plane, (010)-polefigure. The results of both methods, verifying each other, are: The textural patterns for the dolomite- and the anhydrite phase of the sample are distinctly different but it is possible to identified systematic relationships between them: For both minerals are established girdle-like orientation patterns. Maxima positions within the girdle of the one mineral are

in agreement with minimum positions within the girdle of the other one. Moreover, the dolomite- and anhydrite-girdles are orientated more or less perpendicular to each other. Furthermore, the anhydrite girdle pattern is parallel stretched to the foliation-(bedding) plane. The dolomite girdle is about 45° rotated regarding this plane orientation.

Intrakristalline strain was measured for the same sample using the diffractometer EPSILON-MDS. Measurements were carried out following a profile perpendicular to the foliation plane, at seven different points, each at seven mm distance regarding their centres. Intrakristalline strain values for three dolomite- and one anhydrite lattice plane could be calculated from the spectra recorded with seven detectors. In tendency, most results demonstrate anhydrite and dolomite data in opposite relation to each other. Possible modification are still to accept, because no influence of changing composition was considered regarding the different points of measurements within the sample. Nevertheless, it is demonstrated, that, using the instrumental combination of EPSILON-MDS and SKAT, any component of textural pole figure can be characterized by a distinct intrakristalline strain value.

Summarizing the results and taking into account the considerable differences between the tensor-components of anhydrite and dolomite, we suppose, that the combination of textural and intrakristalline strain characteristics of the rock are much more determine its geomechanical behaviour as so far believed.