Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

SCG65-02 Room:423 Time:May 2 09:15-09:30

Capability of calcite twin for estimating stress magnitudes and orientations

YAMAJI, Atsushi[1*]

[1]Kyoto University

Calcite has three e-twin planes, each of which has a critical resolved shear stress at ˜10 MPa along the twin gliding direction; and the planes and direction have certain crystallographic orientations (e.g., Lacombe, 2010). We quantified the tightness of the constraints from twin and untwin data on stress conditions. It is shown that twin and untwin data place tight constraints if differential stress is low and large, respectively. Their tightness converges to the same value with increasing differential stress. The constraint from a calcite grain becomes tighter with increasing number of twin sets in the grain. It is also shown to be important to cope with sampling bias to utilize untwin data: The number of twin data compared to the total of twin and untwin ones tend to be underestimated by ˜25%. It is found that calcite e-twin loses resolution in determining stress magnitudes and orientations if differential stress is greater than ˜200 MPa.

Keywords: twin, calcite aggregate, stress