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STRAIN ESTIMATION FROM TWINNING IN CALCITE CRYSTALS OF CARBONATE ROCKS FROM THE BÜKK MOUNTAINS (NORTHEAST HUNGARY)

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Most of late Palaeozoic and Triassic stratigraphic units of the Bükk Mountains are composed of limestones, mainly of platform and pelagic facies. These rocks experienced very low- and low grade Alpine regional metamorphism (Austrian and Sub-Hercynian orogeny), resulting in most of cases in the complete recrystallization of the carbonate mass.

The recrystallized limestones are mainly composed of flattened, neomorphic calcite crystals of 10-30 μm in diameter. Relics of the original texture are reduced to large (over 100 μm) calcite crystals of Crinoidea fragments and intraclasts.

A characteristic feature of the large calcite crystals is that they are twinned. Since other textural parameters of these rocks are rather weak, the morphology of the twins was investigated in detail to obtain information about the metamorphic history. Four types of twins were distinguished by their thickness and deformation (MÁDAI, 1995):

α - thin (1-2 μm in thickness), straight, undeformed twins that appear only in the very large (>250 μm) crystals. They definitely are of post-tectonic origin.

β - post- or syntectonic, thick (>4 μm), straight, undeformed twins that enclose high angle with the schistosity.

γ - pre- or syntectonic, curved, bent twins inclined into the plane of schistosity.

δ - pretectonic, intensively deformed, sheared twins transformed sometimes to chains of small, recrystallized calcite crystals.

The post- or syntectonic origin of the β-type twins can be appraised by calculation of the strain that caused the twinning. The method of calculation was contributed by GROSSHONG (1972, 1974). It requires to measure the total thickness of twin lamellas perpendicularly to the *e* plane as well as the co-ordinates of the *c* axis of the host crystal and the co-ordinates of the normal vector of the *e* plane. The co-ordinates were defined with universal stage and the thickness was measured by digital image analyser equipment.

The error of the calculated strain components was small for some samples and large for others indicating that the β-type twins had been formed by one or by multiplied tectonic events, respectively. Comparing the results with analogous measurements completed in the Northern Subalpine Belt (FERRILL, 1991), the β-type twins were formed after the metamorphism.

References

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