

EXCHANGE TRANSFORMATION BETWEEN ALLANITE AND MONAZITE MINERAL PHASES ON THE EXAMPLE OF THE WEST CARPATHIAN ORTHOGNEISSES

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Accessory monazite and allanite are two the most frequent primary magmatic LREE accessory mineral phases in the granites and orthogneisses in the Western Carpathians (PETRIK, 1999). Total breakdown of monazite was observed in metagranites of the Veporic Superunit in the Western Carpathians, while only slight alteration of monazite occurs in non-metamorphosed Tatric granites (BROSKA & SIMAN, 1998).

Monazite breakdown reactions have been observed in granites from a wide region of Central Europe including the Western Carpathians, the Tauern Window and the southern Bohemian Massif (FINGER *et al.*, 1998). The process always results in the mantling of monazite crystals by concentric coronas of apatite, allanite and REE bearing epidote. In extreme cases monazite cores are fully consumed by apatite which occupies the place of the former monazite. Upto this date, such total breakdown of monazite was described in the world only in the Veporic Superunit. However, it appears that the reaction kinetics is so sluggish that monazite relicts usually remain in the center of the grains. It was proven that no significant disturbing of the the U–Pb system in the breakdown monazite grains is recorded (FINGER *et al.*, 1998). Monazite alteration to apatite, allanite and REE bearing epidote was always observed in amphibolite facies.

The orthogneisses on the southern slope of the Low Tatra Mountains contain metamorphic monazite, evident from their U–Th microprobe monazite dating. These indicate an age coincident with the main Variscan collision stage between Europe and Gondwana (paper in preparation). Metamorphic monazite in these orthogneisses contain allanite inclusions that show their possible origin from allanite by transformation reactions during Variscan metamorphic events. The formation of monazite by breakdown of allanite was described already from the Swedish–Norwegian province (BINGEN *et al.*, 1996).

Both of the above described transformations (monazite-to-allanite and allanite-to-monazite) clearly indicate the mobility of the rare earth elements during metamorphic processes and that this mobility increases between amphibolite facies conditions.

References

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