

ZIRCON STUDY FROM THE RHODOPE METAMORPHIC PROVINCE, GREECE

BAUER, C. ¹, PROYER, A. ¹, KRENN, K. ¹, PERRAKI, M. ² & HOINKES, G. ¹

¹Institute of Earth Sciences, Department of Mineralogy and Petrology, Karl Franzens University of Graz, Austria

²National Technical University of Athens, 9 Heroon Politechniou St., GR-15780, Zografou, Athens, Greece
e-mail: chrbauer@gmx.at

The Kimi complex of the northern Rhodope Metamorphic Province, Greece, is considered to be a proven ultrahigh-pressure unit since the presence of tiny (3 – 9 µm) microdiamond inclusions in metapelitic garnets was proven by Micro Raman Spectroscopy (PERRAKI et al., 2004). Zircons, known as containers of UHP minerals, were investigated from this area with Micro Raman Spectroscopy and Scanning Electron Microscopy to obtain information about the growth history and the petrogenesis of their host rocks. More than 1500 grains were separated from orthogneisses and kyanite-bearing garnet micaschists.

The first part of the work was an inclusion study using Micro Raman Spectroscopy. The grains were separated, handpicked and put on glass plates as loose grain mounts. This method allows the non-destructive investigation of the rare inclusions in the whole volume of the grains. Furthermore, fluorescence effects caused by the embedding material are prevented.

The zircons separated from the orthogneisses show characteristics of magmatic formation, which are idiomorphic shape and typical magmatic inclusions like quartz, feldspar, apatite or xenotime. The roundish, metamorphic zircons from kyanite-bearing garnet micaschists bear fewer inclusions than the magmatic grains. They enclose carbon phases (carbonates, CO₂, graphite and disordered graphite) as well as rutile, quartz, feldspar or apatite.

A second step was a SEM study using BSE- and CL – imaging. The grains were embedded maintaining their position to enable the correlation of the different information gained from Raman and SEM investigations. The zircons from orthogneisses are about 100 to 200 µm in size. They show oscillatory zoning, a metamorphic rim of variable thickness and zones of recrystallization. Numerous inclusions of biotite or ilmenite were detected, which could not be proven by Raman because of strong fluorescence. The zircons from metapelites are about 40 to 70 µm in size. They show metamorphic characteristics like xenomorphic, chubby shape and simple growth zoning, while magmatic cores are rare.

Despite the expectation that zircons from UHP rocks contain characteristic indicators of these extreme conditions, it was not possible to find typical (U)HP mineral inclusions, like in other UHP regions, where indicative mineral inclusions are hosted by zircons (e.g. KORSKOV et al., 2002). Inclusion mineralogy suggests that growth of metamorphic zircon in the investigated samples occurred after the UHP event.

References

- KORSKOV, A.I., SHATSKY V.S., SOBOLEV, N.V. & ZAYACHOKOVSKY, A.A. (2002): Garnet-biotite-clinozoisite gneiss: a new type of diamondiferous metamorphic rock from the Kokchetav Massif. *Eur. J. Mineral.* 14, 915-928.
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