PETROLOGY OF METAPELITES AND METABASITES OF THE UHP-KIMI COMPLEX NEAR KIMI, RHODOPES, NE GREECE

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Evidence of a former ultrahigh-pressure metamorphism has been found in metapelites and metabasites from several locations in the Kimi complex of the Rhodope Metamorphic Province (RMP), NE Greece (MPOSKOS & KOSTOPOULOS, 2001, PERRAKI et al., 2004).
The Kimi complex is dominated by granitic to tonalitic orthogneisses, amphibolites and marbles, with intercalated metapelites, metabasic granulites and eclogites, pegmatites and late subvolcanic intrusives. The orthogneisses in particular host large boudins of ultramafic rocks, amphibolites and granulitic rocks.
The metapelites that contain mircodiamond-bearing garnet are now garnet-kyanite gneisses and schists with two generations of kyanite (prograde ky_1 and retrograde ky_2), retrograde growth of biotite from muscovite and matrix plagioclase, quartz and rutile. Garnet is xenomorphic, with flat zoning profiles, indicating diffusional homogenization. The assumed former (U)HP-paragenesis has been obliterated, by a medium to low pressure overprint, which is reflected in the P-T conditions derived of about 12 - 14 kbar and 720 – 800 °C. Relicts of crystallographically oriented rutile needles as well as rare µm-sized quartz and apatite crystals in garnet indicate an extraordinary prior garnet composition. A significant phosphorus-content of a few wt% up to now is the only repeatedly confirmed possibly UHP trace element characteristic of these garnets.
The metabasites are mainly amphibolites, more rarely granulites and - in exceptional cases - still eclogites. Many of the basic granulites show medium- to coarse-grained symplectite textures, indicating a prior eclogite stage, but now also contain coarse grained amphibole, plagioclase, biotite and often kyanite. Pyroxene in the granulites often contains amphibole lamellae oriented along the cleavage planes, sometimes accompanied by minor quartz. Minor chemical zoning with decreasing Na from core to rim is common, as well as marginal replacement by plagioclase and amphibole. Garnets are usually small, clear and subidiomorphic, with no chemical zoning. Eclogitic pyroxenes contain up to 40 % jadeite component and are continuously zoned with decreasing X_{jd} towards the rims. Based on kyanite inclusions in omphacite, high, but not ultrahigh pressures can be calculated. Eclogite garnets ($Pyr_{43}Gro_{15}Alm_{42}$) have a flat zoning profile.
Granulite- and amphibolite-facies overprint is so predominant in the region, that high- or even ultrahigh-pressure minerals or parageneses are very rarely preserved.

References

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