

**MINERAL NEEDLES AND MELT INCLUSIONS IN GARNET FROM THE
CHEPELARE AREA, CENTRAL RHODOPE, BULGARIA**

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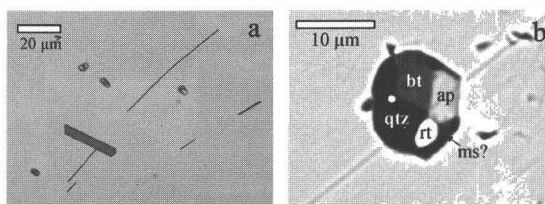
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The garnet-kyanite schists from the Chepelare area, Central Rhodope, Bulgaria, were recently reported as ultrahigh-pressure metamorphism locality. In virtue of high-silica content in garnet and exsolution lamellae of rutile and thick quartz prisms, maximum pressure of 6.8 GPa and temperature up to 1000 °C at 4 GPa were suggested (KOSTOPOULOS et al., 2003). A detailed petrographic work on the same rocks revealed the presence of significant amount of tiny needles and rods of quartz, biotite, white mica, apatite and rutile (1 to 5 µm in width and up to 20 µm in length) (Fig. 1a). Quartz and apatite grains have usually euhedral shape, similar to those reported by MPOSKOS & KOSTOPOULOS (2001) in garnets from UHP localities in Greek Rhodope and they were supposed to exsolve from a garnet precursor richer in Si, K and P.

In same garnets small polyphase melt inclusions (5–15 µm in diameter) of quartz, biotite, white mica, potassic feldspar, apatite, rutile and zircon were detected. In some inclusions, just one single crystal of each mineral is exposed at the surface (Fig. 1b), whereas in others, intergrowths of different phases are documented. The inclusions shape is euhedral and many of them have faceted boundaries with the host garnet. Similar shape of polyphase melt inclusions from Erzgebirge were interpreted by STÖCKHERT et al. (2001) to be a result of brittle failure of the host garnet due to the overpressure in the inclusion and subsequent crack healing. In Erzgebirge garnet gneiss the polyphase inclusions are systematically associated with microdiamonds. However in our case no diamonds have been yet detected although graphite is found in the matrix assemblages and rarely in the porphyroblasts. The reason could be that microdiamonds (if present) are not so abundant or that the kyanite-bearing schists from the Chepelare area did not reach pressures high enough for diamond formation. Retrograde graphite in association with the melt inclusions was not detected either.

Our preliminary data supports the idea that the rocks from the deepest structural level of the Central Rhodope, Bulgaria, experienced higher pressure and temperature, than estimated by conventional thermobarometry.

*Fig. 1. BSF images of:
a) biotite needles in garnet
b) biotite - quartz - apatite -
rutile - white mica? melt
inclusion in garnet*



References

- KOSTOPOULOS, D., GERDIKOV, I., GAUTIER, P., REISCHMANN, T. & CHERNEVA, Z. (2003): Geophysical Research Abstracts, 5, 08327
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STÖCKHERT, B., DUYSSTER, J., TREPMANN, C. & MASSONNE, H.-J. (2001): Geology, 29, 391-394.