



Metamorphic history of LP/HT migmatites from the Bavarian Unit (Bohemian Massif)

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Granulite facies migmatites are commonly observed in the Bavarian Unit which were formed during a late Variscan (post 330 Ma) LP-HT overprint. This event is related to a delamination of mantle lithosphere and subsequent asthenospheric upwelling. Most of these rocks underwent high degrees of melting forming meta- and diatexites. Former work in the Sauwald area, Upper Austria, by Tropper et al. (2006) determined metamorphic conditions of 700–800°C and 0.4–0.5 Gpa. In this study samples were taken along the (1) Danube valley (west of Linz), from the (2) Lichtenberg area (north of Linz), the (3) Bad Leonfelden area (west of the Rodl Fault) and the (4) Sauwald area (south of the river Danube). Biotite and plagioclase bearing migmatite is very common and occurs all over the investigated area. These rocks are the product of intensive melting (anatexite) and formed at conditions of ~650–700°C and 0.25–0.45 Gpa.

Scarce outcrops of garnet bearing Al-rich migmatitic metapelites occur along the Danube valley. The formation of the migmatitic texture with well-developed leucosomes (K-feldspar, plagioclase, quartz) and melanosomes (garnet, cordierite, sillimanite, spinel, ilmenite, ± biotite) indicate high temperature metamorphism. Most of the garnet grains show a homogenous iron-rich composition and form generally an almandine-pyrope ($X_{alm}=0.78-0.80$, $X_{prp}=0.16-0.18$) solid solution with minor contents of grossular and spessartine ($X_{grs}=0.028-0.032$, $X_{sps}=0.020-0.024$). Large garnet porphyroblasts (up to 1cm in size) display a distinct chemical zoning, especially in grossular component. Elevated homogeneous grossular content in the core is followed discontinuously by low grossular content at the rim indicating a two stage growth. Garnet core and rim also display different mineral inclusions. Thermobarometric calculations using garnet core compositions with inclusions and garnet rim compositions with matrix phases as well as pseudosection calculations allow the reconstruction of a P-T path. A first HP-HT stage (740–825°C and 1.1–1.3 Gpa) is indicated by the garnet core which is followed by decompression and cooling to 580–610°C and 0.44–0.54 GPa. The main LP-HT metamorphic event gives 830–910°C and 0.60–0.66 GPa using the garnet rims and matrix minerals.

TROPPER, P., DEIBL, I., FINGER, F., KAINDL, R. (2006): International Journal of Earth Sciences: Geologische Rundschau 95.6, 1019-1037.