

## **Incipient eclogite facies metamorphism in the Moldanubian granulite recorded by inclusion patterns in garnet**

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### **Incipient eclogite facies metamorphism in the Moldanubian granulite recorded by inclusion patterns in garnet**

We investigated different varieties of mineral inclusions or their replacement products in garnet from felsic and mafic granulites of the Gföhl Unit in the Moldanubian zone. The granulites associate with eclogite or contain lenses or layer of eclogite and garnet peridotite for that pressure about 3.6 GPa were calculated (Faryad, 2008). In addition to granulite-facies overprint, some eclogites show evidence of prograde metamorphism characterized by the presence of zoning garnet with decrease of Mn and increase of Mg and  $X_{Mg}$  from core towards rim of grains. Two varieties of garnet, the first rich in Ca and forming core and the second having lower Ca but higher Mg and rimming the first garnet, were found in granulites. The second garnet is assumed to be formed during granulite facies equilibrium. In one case, a Ca-rich garnet showing weak prograde zoning was also found. Similar to eclogite, this garnet may record a pre-granulite facies prograde metamorphism.

The most important mineral inclusions in garnet from granulite are Ti-rich muscovite ( $TiO_2 = 3.0-3.1$  wt %) in felsic granulite and omphacite ( $Jd_{28}$ ) in mafic granulite. They form inclusions in relatively Ca-rich garnet ( $Grs_{42-37}$ ,  $Py_{7-9}$ ,  $Alm_{49-54}$ ,  $Sps_1$ ). Columnar-shaped inclusions, mostly formed by K-feldspar or plagioclase-albite, were also found in type of garnet. The inclusions are probably reaction products after former phases (mica or amphibole, Na-clinopyroxene?) that transformed during high-temperature granulite facies metamorphism and partial melting. The Ti-rich muscovite was preserved due to its high Ti content which stabilize this mineral to very high-temperature. PT conditions derived from the mineral assemblages in granulite and estimated based on the inclusions suggest a prograde metamorphism from amphibolite through eclogite facies conditions with subsequent granulite facies overprint. Such PT-path is confirmed by pseudosection method applied to felsic granulite. The estimated pressure condition for granulites and the presence of garnet peridotite and eclogite boudins in granulite support the interpretation that these rocks were formed along a subduction zone rather than exhumed from lower crust segments.

#### Reference:

Faryad, S.W., The Kutná Hora Complex (Moldanubian zone, Bohemian Massif): A composite of crustal and mantle rocks subducted to HP/UHP conditions, *Lithos* (2008), doi:10.1016/j.lithos.2008.03.005

Abs. No. **5**  
Meeting: **DMG 2008**  
submitted by: **Faryad, Shah Wali**  
email: **faryad@natur.cuni.cz**  
date: **0000-00-00**  
Req. presentation: **Vortrag**  
Req. session: **S07**