



## **Isochemical garnet breakdown in lower crustal garnet granulite xenoliths from the Central Pannonian Basin: Insights from high resolution electron microbeam analyses**

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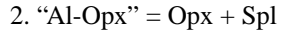
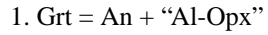
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Lower crustal garnet granulite xenoliths from the Bakony-Balaton Highland Volcanic Field, Central Pannonian Basin, were studied to reveal crustal processes during the Tertiary evolution of the Pannonian Basin. The rock-forming mineral assemblage (Grt–Cpx–Pl  $\pm$  Opx  $\pm$  Amp  $\pm$  Scp) was formed at peak metamorphic conditions of 1.0–1.6 GPa and 850–1050 °C, during the Alpine orogenesis. It was followed by 100–200 °C temperature increase and 0.3–0.8 GPa pressure decrease during the extension of the Pannonian Basin, which is indicated by mineral reactions of the rock-forming minerals.

We studied the most frequently occurring mineral reaction, the breakdown of garnet to form a symplectite of 20 to 50 nm width anorthite, orthopyroxene and spinel lamellae. According to our results, the symplectite was formed during the isochemical breakdown of garnet. Phase diagram calculations showed, that the process was initiated by the relevant decrease of pressure during the extension of the Pannonian Basin. The garnet–symplectite reaction interface was studied in 3D by high resolution element mapping on a field emission gun microprobe and by transmission electron microscopy of thin foils cut perpendicular and parallel to the reaction interface to collect information on the modeling of the symplectite formation in space and time.

According to the results, reaction products show perfect textural equilibrium on the

nanometer scale. It was shown, that spinel exsolves from the orthopyroxene, and it is never found in the plagioclase, which suggests, that the  $\text{Grt} = \text{An} + \text{Opx} + \text{Spl}$  gross reaction is built up by two reaction steps:



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