

Asociácia biotit - granát - sillimanit v granitoch S-typu: *P-T* podmienky kryštalizácie granitov Malej Magury bratislavského masívu a Považského Inovca (Slovenská republika)

Association of biotite - garnet - sillimanite in S-type granites: *P-T* conditions
of granite crystallization in the Malá Magura, Malé Karpaty and Považský Inovec Mts.
(Slovak Republic)

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Abstract

The S-type granitic rocks that contain informative mineral assemblages, e.g. biotite + garnet ± aluminosilicate may be used for calculation of *P-T* conditions. In the Western Carpathians such assemblages occur in several cores of Strážovské vrchy (Malá Magura core), Považský Inovec and Malé Karpaty (Bratislava massif) Mts. In this work we present results of *P-T* calculations obtained from these granites. The first two contain biotite + garnet + sillimanite, in the Malé Karpaty granites sillimanite is absent. By application of the thermodynamic database and principle of equilibrium reactions (Holland, Powell 1998, 2011, Thermocalc) we have calculated intersections of equilibrium reactions among the above phases. The results gave $T = 727 - 777$ °C at $P = 570 - 680$ MPa (Malá Magura). Univariant curves for the Malé Karpaty and Považský Inovec granites yielded ca 690 - 730 and 650 - 680 °C, respectively, for the pressure range obtained from Malá Magura granites. All temperatures obtained reached the muscovite dehydration melting interval, the highest values reached also the lower *T* boundary for biotite dehydration melting. Muscovite dehydration produced peritectic sillimanite abundant in metatectites (melanosomes) and diatectites. Garnet present in granites is probably magmatic due to its homogeneity and relatively high MnO (up to 18 mol. % spessartine). A pervasive retrogression produced ubiquitous muscovite (± quartz) replacing sillimanite. The lack of garnet in migmatite neosomes prevents calculation of *P-T* conditions, however, muscovite dehydration melting is documented by sillimanite-rich melanosomes. Another metatectite type without sillimanite, garnet and muscovite suggests that fluid-present melting may have been operative at the same conditions.

Keywords: granite, garnet, biotite, sillimanite, *P-T* conditions, Thermocalc, Malé Karpaty Mts., Malá Magura Mts., Považský Inovec Mts., Západné Karpaty

Použité skratky minerálov: Ab - albit, Alm - almandín, An - anortit, Ann - annit, Bt - biotit, Cel - celadonit, Eas - eastonit, Fe-cel - fero-celadonit, Grs - grossulár, Grt - granát, Kfs - K-živec, L - tavenina, Ms - muskovit, Pg - paragonit, Phl - flogopit, Pl - plagioklas, Prp - pyrop, Qtz - kremeň, Sill - sillimanit, spessartin - Sps.