

PŮVODNÍ PRÁCE/ORIGINAL PAPER

D distribúcia titanitových inklúzií v granáte z lokality Modra-Harmónia (Malé Karpaty, Slovensko)

3D distribution of titanite inclusions in garnet from the locality Modra-Harmónia (Malé Karpaty Mts., Slovakia)

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Abstract

The examined sample of Ca-skarn (calc-silicate rock) from the locality Dolinkovský Hill of Modra-Harmónia is geologically incorporated into Pezinok group crystalline basement of Malé Karpaty Mts. It represents a contact metamorphism product of granite intrusion Modra massif. 3D distribution of titanite inclusions was studied in 6 mm garnet porphyroblast. X-ray microtomography method and other supporting identification methods (polarized light microscopy, scanning electron microscopy, electron microprobe analysis and microRaman spectroscopy) were used for 3D visualization and volume distribution of titanite inclusions in garnet. Garnet grain has typical rhombic dodecahedron crystal shape. In terms of composition it's dominantly represented by grossular component with a lower share of andradite component. Faint chemical zoning is reflected by the increase in the share of andradite component at the expense of grossular component. Slightly variable chemical composition of titanite is affected by the substitution REE(Al, Fe³⁺) (CaTi)₋₁. From the 1800 projections in 2D virtual sections, the three orthogonal planes created 3D visualization of garnet. Visualization procedure of 3D distribution of titanite inclusions was based on the different absorption of X-ray radiation between the host garnet and titanite inclusions. Based on the higher local X-ray radiation absorption of titanite inclusions at spatial mapping it was possible to extract individual inclusions with their natural boundaries. 3D visualization provided a realistically distributed picture of the 116 identified titanite inclusions in garnet. After 3D visualization of titanite inclusions in garnet had been created, a statistics representation of inclusions was made.

Key words: X-ray microtomography, 3D distribution, titanite inclusions, garnet, Modra-Harmónia, Malé Karpaty Mts., Slovak Republic

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