

Vesuvianite from the high-temperature skarn occurrences from Romania

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Vesuvianite is a relatively common mineral in the metasomatic systems with calcium dominance, being reported in 13 of the 33 skarn occurrences of the Banatitic Magmatic and Metallogenetic Belt in Romania, where the contact metamorphism is related to intrusive bodies of Upper Cretaceous age, at the very contact with carbonaceous sequences of Mesozoic age. In the protolith, calcite limestones or marbles were the main reactants to form vesuvianite-bearing skarns. The vesuvianite samples studied here were collected from the Romanian's four high-temperature, gehlenite-bearing, skarn occurrences: Dealul Cornet, Măgureaua Văței, Ciclova and Oravița. The temperature range and the chemical evolution between prograde and retrograde stages were favorable to the formation of vesuvianite generations with optical zoning. In all four skarn areas, the mineral is present both as prograde and hydrothermal phase, associated with diopside, grossular, calcite and wollastonite. The macroscopic color ranges from yellowish green in endoskarn to brown in exoskarn. In most situations, the mineral is uniaxial negative and it has a low or even anomalous birefringence, going to Prussia blue, purple or brown hues. Deviations from the ideal stoichiometry of the analyzed vesuvianites, obtained after calculating the chemical-structural formulas with reference to 50 cations and 76 (O, OH, F, Cl) per formula unit (*pfu*), namely $\text{Si} < 18$ apfu and $\text{Ti} + \text{Al} + \text{Fe} + \text{Mg} > 13$ apfu were recorded in all of the analyzed samples. Some analyzed samples show, however, an anomalous biaxiality and are optically positive, probably correlative with the higher B content in the mineral structure. The structural refinements on representative vesuvianite samples based on X-ray diffractometry using a four-circle diffractometer led to the confirmation of the tetragonal symmetry, space group $P4/nnc$ of the mineral. The unit-cell parameters are: $a = 15.595(4)$ and $c = 11.824(4)$ Å at Dealul Cornet; $a = 15.602(3)$ and $c = 11.812(4)$ Å at Măgureaua Văței; $a = 15.605(3)$ and $c = 11.333(5)$ Å at Ciclova; and $a = 15.577(3)$ and $c = 11.830(4)$ Å at Oravița.