



Mineralogical composition of Oravita calcic skarns as a function of the high-temperature contact

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Insignificant in terms of mineralization, the skarns of Oravita are scientifically interested because of their mineralogical associations. The higher crystallinity and good natural conditions (they are generally barren) are two characteristics of this rocks that can provide the ideally system to understand the behavior of the mineralogical components in certain conditions of temperature and pressure, but also for the hydrated carbonate phases whose forming understanding may be useful in the applied mineralogy.

The occurrence of skarns from Oravița includes, as representative species, gehlenite, calcic garnet, monticellite, ellestadite-(OH), vesuvianite, that means in the geochemically terms $\text{CaO} - \text{SiO}_2 - \text{H}_2\text{O} - \text{Al}_2\text{O}_3$ system, usually described as C-S-H-A phases by the cement researches, difficult to study because of the small dimensions of the compounds crystals.

The inner skarn zone is dominated by the presence of the gehlenite, an aluminum calcium silicate whose formation involves, as conditions, high temperature ($\sim 750^\circ\text{C}$) and low pressure (up to 1kbar). Typically, it is associated with monticellite, ellestadite-(OH), wollastonite 2M, diopside and calcic garnets.

As it is expected, the intensity of the contact metamorphism decreases from the innermost to the outermost parts of the aureole, reflected in the chemical activity of the cations that participated at the chemical reactions. In this respect, the observed garnets are zoned, being characterized by a peripheral rich in Al, while the centers of the crystals are characterized by a high content of Fe and Ti.

The replacement of gehlenite with vesuvianite along the metasomatic front, a process that was observed at the optical microscope, indicates the existence of late stage metasomatic mineral phases. The presence of the vesuvianite, frequently including partially chloritized clintonite slides, and its main associated minerals as wollastonite 2M and calcium garnet with an andradite composition, points out the existence of a retrograde stage with temperatures that are not exceed 600°C . If in the pro-grade stage took place iso-chemical reactions, the broad development of the vesuvianitic skarns may indicate only post-magmatic processes, more complex in terms of a thermodynamically open system. This is confirmed by the identification of cracks systems of mineral phases such as zeolites, secondary calcite, aragonite, tobermorite and allofan.

Given the above considerations, we can state that the Oravita skarns have been developed in the contact aureole of an alkaline intrusion with a limestone sequence, which implies the existence of magma with a crystallization temperature around 900°C . The existence of the calcareous bedrock favored the formation of high temperature phases such as the calcium silicate named gehlenite, which places the Oravița skarn occurrence in the very high temperature calcic skarns occurrences from Romania.