The occurrences of high temperatures skarns are quite rare in the world. Various authors have reported over thirty examples of such rocks, worldwide. The occurrence of skarns from Ogaşul Crişenilor, Oraviţa, circumscribes the classic mineral association of high temperature skarns and includes, as representative species, gehlenite, calcic garnet, monticellite, ellestadite-(CaOH), vesuvianite. Two other occurrences of high temperature skarn have also been described in Romania, at Mǎgureaua Vaţei and Cornet Hill. In the skarns from Ogaşul Crişenilor, Oraviţa, associated with the Upper Cretaceous magmatism in the South Carpathians of Romania, Constantinescu et al. (1988) reported a small occurrence of rocks, mainly composed of gehlenite-rich melilite. On every side and even in places inside this area, the gehlenite rocks are altered to vesuvianite and subordinately monticellite and clintonite.

The aim of this paper is to offer some preliminary geochemical data on the main mineral association from this occurrence.

The skarns of Oraviţa are developed at the expense of Cretaceous limestones and marls of the Crivina Formation, folded in a system of N–S-trending anticlines and synclines, belonging to the Reşiţa anticlinorium in the Getic nappe. At Oraviţa, this series is intruded by a small elongate body of Late Cretaceous diorite, with some variations toward quartz diorite and monzonite that belong to the “banatitic” belt. The Late Cretaceous to Paleocene “banatitic” magmatic and metallogenic belt (BMMB, Berza et al. 1998) extends from western Romania (Apuseni Mountains and Banat) to the Black Sea, through the Timok area in Serbia and Srednogorie zone in Bulgaria (Fig. 1).

At Oraviţa, the skarn cover is preserved at many places over the intrusion. Most of the skarns are barren, with a striking predominance of yellow-brown vesuvianite on the inner side of the intrusion and of some coarse grained wollastonite on the outer side, toward the metamorphosed limestone. Where the limestone is not magnesian, the vesuvianite postdated a stage characterized by an extensive development of grossular associated with diopside. In contrast, coarse clintonite, some monticellite and Al-bearing clinopyroxene occur at the contact of the intrusion with magnesian marble (Katona et al. 2003).

The occurrence from Valea Crişenilor, described by Constantinescu et al. (1988) and Ilinca et al. (1993), and recently studied by Katona et al. (2003) represents an exception to the general scheme just described. Almost monomineralic gehlenite skarn occur in a very restricted area along the contact of the dioritic intrusion (Fig. 2). The gehlenite skarn is known only in a 22 X 11 m area, limited to the north and south by other types of skarn. To the west, they disappeared by erosion, and to the east, they are covered by overlying inner endoskarn zone or by the igneous rock (Katona et al. 2003).

The determination of the chemical composition of the skarn samples from Oraviţa was performed using a JEOL J.S.M. 840 scanning electron microscope (SEM) equipped with a Tracer – Northern TN 1710 device for microanalysis. The analytical conditions were 15 kV acceleration voltage and a beam current of 40 nA.

The samples from the study have been collected from the endoskarn zone. Late-stage metasomatic replacement of gehlenite by vesuvianite is common as a result of late hydrothermal processes, although an altered surface another than vesuvianite has been identified and is probably representative for a phase (“phase x”) issued from the weathering process. Selected compositions of the most representative samples of gehlenite and vesuvianite are given in Table 1, and plotted in a ternary (Al) – (Mg+Fe) – (Si) diagram (Figure 3).
Fig. 1: Geological sketch of the Banatitic Belt (Berza et al. 1998)

Fig. 2: Geological sketch of Oravița area (after Constantinescu et al. 1988)

Figure 3. Ternary diagram (Al) – (Mg+Fe) – (Si) for the main Ca-Al phases from Oravița. Symbols represent: 1 – gehlenite, present study; 2 – gehlenite, Katona et al. (2003); 3 – gehlenite, Marinea et al. (2001); 4 – melilite, Deer et al. (1962); 5 – altered gehlenite, present study; 6 – vesuvianite, present study; 7 – vesuvianite, Katona et al. (2003); 8 – vesuvianite, Deer et al. (1962).
Table 1: Selected EDX compositions of gehlenite and vesuvianite from Ogaşul Crişenilor (wt.%)

<table>
<thead>
<tr>
<th>Sample</th>
<th>Mineral</th>
<th>CaO</th>
<th>Al₂O₃</th>
<th>SiO₂</th>
<th>MgO</th>
<th>FeO</th>
<th>Na₂O</th>
<th>K₂O</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 1-1</td>
<td>Geh</td>
<td>30.39</td>
<td>20.57</td>
<td>42.28</td>
<td>5.2</td>
<td>1.53</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>A 5-6</td>
<td>Ves</td>
<td>36.16</td>
<td>18.74</td>
<td>38.87</td>
<td>4.32</td>
<td>1.90</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>A 1-4</td>
<td>phase x</td>
<td>24.03</td>
<td>17.64</td>
<td>49.02</td>
<td>2.71</td>
<td>6.60</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Fig. 4: SEM image of altered gehlenite (‘‘phase x’’)

This present study is part from a larger one entitled ‘‘Mineral genesis of the high temperature skarns from Ciclova-Oraviţa, Banat’’ – a mainly mineralogical study which aims to bring new chemical and physical data about the mineral species of this occurrence in order to understand the complicated succession of the processes generated by the intrusion at Oraviţa.

The chemical components of the system within which the pyrometasomatic processes took place are very numerous but here were limited to the system SiO₂ – Al₂O₃ – MgO – FeO (Fig.3). The results that were obtained at the electron microscope for the main mineral species (i.e., gehlenite and vesuvianite) are in a good agreement with the data in literature (Deer et al. 1962, Marincea et al. 2001, Katona et al. 2003). Beside these two minerals, a group of minerals show a different chemical composition and probably represents an altered product on gehlenite (Fig. 4). The research will continue in order to see if this product is an intermediary phase between gehlenite and vesuvianite (OH-gehlenite?), rather than a preexistent Si-richer mineral or a weathering product.

References: