Characteristics of chromium ore occurrences near the village of Trnava, Raška municipality, Serbia

Характеристика на рудопроявленията на хром при с. Трнава, община Рашка, Сърбия

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The central part of the Balkan Peninsula is geo-terminally very complex. In Serbia, the main tectonic units generally trend NNW-SSE, except in its eastern parts. Tethys was closed during the Late Mesozoic. Ophiolites in the west and ophiolites in the Vardar Zone represent relics of the former ocean and can be traced from Bosnia and Herzegovina, across Serbia and the FYR of Macedonia, through to Greece.

Ophiolites are represented as parts of the oceanic crust, originating in the mid-oceanic ridge or supra-subduction zone regime and tectonically placed at the continental margin. The placement of ophiolites occurred during closure of the ocean (Tethys in this case) or due to exhumation, when deep material was transported to the surface (Petrović, 2015). In the mafic-serpentinite assemblage at Trnava village, there are harzburgite, dunite, rare Iherzolite and pyroxenite (enstatite and diopside). Serpentinite is the most widespread. Numerous occurrences of chromite ore have been identified in the ultramafic-serpentinite complexes of this area (Urošević et al., 1973). These have been explored and locally exploited. The main occurrences are in the area of Trnava–Milatkovici (Fig. 1). To the west, the explored zone is in contact with the potential area of Golija Mt., which can be defined as built up by a complex package of Paleozoic metamorphic rocks with numerous Tertiary extrusions and breakthroughs of generally intermediate to acid igneous rocks. To the east, the area of interest is in contact with pyroclastic rocks and lava flows of dacite-andesite composition, which are widely developed and can be followed along a distance of 10 km. There are numerous occurrences of chromite ore within the framework of the ophiolite formations (Fig. 2). During recent exploration, geochemical sampling, slick prospecting, and ore and petrology microscopic examination have been undertaken (Figs. 3 and 4). Forty samples were collected for chemical assaying (Krućić, 2017). The results show that the Cr grade varies from 0.06% to 24.1%, with a geochemical background of 0.16%. More than 20% of Cr was found in 14 samples. Chromite ore was detected in 5 of 10 polish-section samples. The sam-

Fig. 1. Topographic map of the studied area near Trnava village
samples were tested on an XRF Niton Xl3t analyzer. The main results are given in Table 1.

The descriptions of polished and thin sections show that ophiolite-chromite carrying blocks are widespread and altered by hydrothermal solutions due to volcanic events in the Early Neogene age. This terrain experienced intensive volcanic activity, both extrusive and intrusive, but mainly intermediate with dacite-andesite pyroclastics and lava flows.

From a mineral deposits perspective, the Cr occurrences at Trnava village are of minor significance. However, it would be of interest in the future to explore the contacts, genesis of alteration and sulfide occurrences related to Neogene volcanic events, with the objective of better understanding the geological history of the central parts of the Balkan Peninsula.

References


Table 1. Main elements content of chromite ore (from polished sections)

<table>
<thead>
<tr>
<th>Cr (%)</th>
<th>Fe (%)</th>
<th>V (ppm)</th>
<th>Ni (%)</th>
<th>Mg (%)</th>
<th>Ti (ppm)</th>
<th>Al (%)</th>
<th>Mn (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.4–28.8</td>
<td>9.4–11.7</td>
<td>491–805</td>
<td>0.13–0.25</td>
<td>10.5–14.3</td>
<td>838–1804</td>
<td>10–17</td>
<td>1200–2182</td>
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</tbody>
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