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Multi-stage process of the Bulqiza chromitites, Eastern Ophiolitic Belt, Albania

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The ultramafic massif of Bulqiza, which belongs to the eastern ophiolitic belt of Albania, is the most important area for metallurgical chromitite ores. The massif consists of a thick (>4 km) rock sequence, with a generalized profile from the bottom to the top as follows. The tectonite sequence composed mainly of harzburgites with subordinate intercalations of dunites, where only scarce refractory chromitites occur within basal clinopyroxene-bearing harzburgites, while abundant podiform chromitites of metallurgical type are hosted by middle-upper harzburgites. The transitional zone entirely composed of dunites with layered metallurgical chromitites; and, finally, the magmatic sequence composed of wehrlites, pyroxenites, troctolites and gabbros with scarce refractory chromitite occurrence. Several authors carried out studies of the petrological, mineralogical and structural features of the Bulqiza chromite deposits. The upper mantle and crustal units of the Bulqiza Ophiolite show major changes in thickness, rock types, and chemical compositions from west to east as a result of its complex evolution in a suprasubduction zone (SSZ) environment. These peridotites display numerous evidences of mantle metasomatism at various scales. Mineralogy of olivine, clinopyroxene, orthopyroxene and spinel show that they are formed as forearc peridotite. The composition of the melts gradually changed toward boninite due to melt–peridotite reaction. Both the massive and disseminated chromitites are high – Cr number (cr#=70-80), with diamond. Disseminated chromitites show systematic changes in olivine and magnesiochromite compositions from the dunite envelope to the massive ore, indicating melt–rock reaction without UHP minerals. Composition of orthopyroxene change between core and rim indicate melt interaction with cr and al element. Textural features such as the incongruent melting of orthopyroxenes and interstitial spinels, olivines and pyroxenes suggest that mantle metasomatism has affected the Bulqiza massif. These processes produced the chromite deposits and their dunitic envelopes in the upper levels of the mantle. These events suggest that the Bulqiza peridotites and chromitites were formed in a Multi-stage process.

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