

Genesis and tectonic setting of peridotitic spinels from the Divriği-Sivas region, eastern Turkey

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The majority of the metallic ore deposits in Turkey, which hosts a series of complex tectono-magmatic process including subduction, collision, rifting and magmatism, are formed along the suture zones and associated with ophiolite complexes. The Divriği area is one of such unique districts in Anatolia. In this study, we examine whole rock and spinel chemistry of ultramafic rocks in the Divriği-Sivas region. Most of studied samples consist of wherlites and are represented by compositions varying from chromite at the core to ferritchromite and Cr-magnetite at the rims. Spinel samples have rather high Cr_2O_3 (46.50-56.24 wt. %) and very low TiO_2 contents (<0.3 wt. %). Cr# values of spinels are between 0.71 and 0.84 while Mg# values are significantly low in the range of 0.26 to 0.46. When compared to selected high Cr chromites in Turkey, Divriği spinels are found to have slightly lower Fe_2O_3 and Al_2O_3 contents and Fe+2/Fe+3 ratios. Like spinels in some other ophiolite complexes in Turkey, compositions of all spinel samples are within the range of supra-subduction zone peridotites which display high degree partial melting (>35 %). Experimentally determined parental melt compositions of Divriği spinels (0.32-1.89 wt. % for FeO/MgO), (8.69-11.71 wt % for Al_2O_3) and (0.1-0.37 wt. % for TiO_2) point out an arc setting with boninite composition. Prism diagrams constructed for the measured spinel compositions reveal that chromite is the most abundant phase comprising 50 % of the core. In consequence of alteration, mineral composition at the rims is varied and chromite content is lowered to nearly 20% and magnetite becomes the main phase with an abundance of about 90%.

Keywords: Divriği-Sivas region, chromite, spinel, microprobe, geochemistry