Targeting the hidden chromitite using geochemical vectoring for Bophivum area, northwestern Myanmar

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Harzburgite are the rocks that make up the mantle and consist of olivine, orthopyroxene, and clinopyroxene (<5 %). Clinopyroxene contain Ca, Al, and Ti, while orthopyroxene contain Al. On the other hand, olivine contains almost zero contents of Ca, Al and Ti. When the rising melt from the lower mantle passes through the mantle harzburgite, the clinopyroxene and orthopyroxene with lower melting points compared with olivine are fused into the melt, and the olivine is crystallized from the melt. In this genetic process, harzburgite gradually change into dunite consisting of only olivine, and Ca, Al and Ti of pyroxene in harzburgite will escape into the melt. And, as the melting point of clinopyroxene is lower than that of orthopyroxene, the Ca, Al, and Ti in clinopyroxene are escaped into the melt earlier than those in orthopyroxene. The melt with changed composition formed by melting the pyroxene are mixed with the newly rising melt with pyroxene, so that the chromian spinel in the melt becomes saturated and the chromitite are formed. By the above-mentioned mechanism, chromite occurs with dunite and pyroxene-deficient harzburgite formed by the reaction result between melt and harzburgite. In other words, in the genetic process of high Cr chromitite, the presence of melt that fused the pyroxene within harzburgite is essential. And, in order to make high Cr chromitite, the melt must have been fused more pyroxene in harzburgite. As a result, the Ti, Ca, and Al content of harzburgite will be decreased. Therefore, considering the representative chemical composition of podiform chromitite(Robinson et al., 1997), we assumed that as we approached into harzburgite bearing high Cr chromitite(probably hidden ore body), the Ti, Ca and Al content within harzburgite will be likely to converge toward the specific contents(Ti<180ppm, Ca<0.9%, Al<0.7%). In case of Bophivum chromitite in northwestern Myanmar, it corresponds well with the representative chemical composition of high Cr chromitite in terms of the above-mentioned data. Therefore, we monitored to see whether Ti, Ca, and Al contents systematically change by the distance from the center with chromitite outcrop or high Cr anomaly zone confirmed through soil and rock geochemical exploration toward the surrounding harzburgite outcrop or not and tried to select the target element for geochemical vectoring using portable XRF. Conclusively, Ca is considered to be a more meaningful geochemical vectoring indicator than Al in terms of portable XRF measurements in the survey area.

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