

Petrology and Origin of the Chromite Deposits in the Mantle Section of the Northern Oman Ophiolites

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Small and large elongated podiform chromitites occur in the mantle section of the northern Oman ophiolites at a different levels below the layered gabbro complex. The differences in ore types, textures and the interstitial silicate matrix from the shallow level to the deeper ones in the mantle section may be attributed to the difference in the origin of the corresponding chromitite pods.

Podiform chromitites in the northern Oman ophiolites occur either in a shallow level just at the transition zone between mantle and crust, or at a deeper level within the mantle sequence. Most deposits in the transition zone are characterised by tabular characters that forms dikes crosscutting the surrounding dunites as in Wadi Farfar, or as lenticular bodies surrounded by dunite envelopes within the host harzburgite as in Wadi Rajmi. Chromitite bodies and surrounding peridotites cut by a network of gabbroic rocks at Wadi Rajmi. The massive chromitite parts of these pods are characterised by clinopyroxene and plagioclase as interstitial silicate matrix in addition to small amounts of olivine, whereas the disseminated part has only olivine as interstitial silicate matrix. On the other hand, podiform chromitites from the deeper part within the mantle section, such as in Wadi Hilti and Wadi Fizh, are very large in size relative to the transition-zone ones. Some of them (as in Wadi Hilti) are extended to orthopyroxenite bands (less than 6m thick), which are partly converted into dunite with Cr-spinel concentrations or with chromitite pods.

One or more of the following mechanisms may have responsible for the formation of podiform chromitites in the northern Oman ophiolites:

- i)- Assimilation of the lower crustal layered gabbros or injection of evolved gabbroic melt to form the transition-zone chromitite with clinopyroxene and plagioclase in the interstitial matrix.
- ii)- Interaction between primitive basaltic melt and Cr-rich orthopyroxenites to produce the large chromitite pods in the deeper part of the mantle section.