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Some features of inner structure of ultramafite bodies from results of study of rock-forming minerals (Kun-Manie Paleoproterozoic Intrusive Complex)

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The Kun-Manie intrusive complex (the Aldan granulite-gneiss area) is represented by small-size tabular and lens-shaped bodies composed of lerzolites, websterites, gabbronorites and other rocks. These bodies have transverse contacts with host metamorphic rocks. As a rule, intrusives are built up of different rocks having gradual transitions between them and lacking visible stratification. The regularities in variation of chemical compositions of basic rock-forming minerals were revealed during detailed study of core sampled from Hole No. 21 drilled across the Watershed body (more than 60 m thick in the central part) composed of different websterite and lerzolite types.

From bottom to top schematic the drill hole section is represented by a-websterites (10.5 m thick), a-lerzolites (30 m thick), b-websterites (4.5 m thick), b-lerzolites (1.5 m thick) and c-websterites (15.5 m thick).

Forsterite minal content in olivine rocks of the Watershed body ranges from 73 to 85 %, predominantly 84–81 %. A small amount of (to 0.27 %) is found in ferrous varieties of olivine. At the hole section (from bottom to top), it is observed the following pattern of variation of olivine composition. Magnesium number increase in mineral is detected in a-websterites (from 81 to 85 %) and its insignificant decrease is further found in mineral of a-lerzolite "interlayer" (to 83 %). In the next b-websterite "interlayer" magnesium number of olivine continues to decrease (from 85 to 78 %), in b-lerzolites it is stable and persists at 77–78 %, varying at the section top (c-websterites) from 83 to 81 %. Rhombic pyroxene is represented by bronzite, small amounts of Cr203 (0.1–0.37 %) are constantly present in it. Mineral varieties with the highest magnesium number are determined in a-lerzolites. More ferrous pyroxenes are discovered in a- and c-websterites. Mineral varieties with less magnesium number are found in b-lerzolites and b-websterites. Magnesian (f – 11–19) clinopyroxenes are detected in -lerzolites of the Watershed body; and increased contents of Cr23 (to 0.98 mass %) are also defined in them. Mineral varieties with less magnesium number are compositional parts of a- and c-websterites, whereas more ferrous ones are constituents of b-websterites and b-lerzolites. Clinopyroxenes with the maximum sodium content are found in a-lerzolites. The contents of chermakite and jadeite minals increase consecutively in clinopyroxenes of c-websterites, b-websterites and a-websterites. Alterations in the compositions of other minerals (spinel, pargasite and phlogopite) are less clearly manifested.

The considered variations in chemical compositions of rock-forming minerals of the Watershed body of the Kun-Manie Intrusive Complex give a concept of crystallization of mafite-ultramafite liquids in small magmatic chambers. Low contents of CaO in olivines and close values of jadeite minal in clinopyroxenes of the investigated rocks and xenolites of spinel peridotites suggest that crystallization processes occur at significant depths > 25 km.