

MORPHOGENESIS OF PYROPES, PICROILMENITES AND CHROMIAN SPINELS FROM KIMBERLITES, KIMBERLITE-LIKE ROCKS AND ALKALINE BASALTOIDS.

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The endogenous history of formation of kimberlites, kimberlite-like rocks and alkaline basaltoids is rich in events, which have left its marks on the minerals, making up these rocks. A great variety of macroforms, microsculptures and diverse microstructures on the minerals reflect the influence of mineral formation and alteration conditions from mantle to near-surface depths. It is promising to use onthogenetic approach, as well as the macro- and microcriystallomorphological analysis methods during their studies.

The author has studied some West Jakutian kimberlites and kimberlite-like rocks in Krasnojarsk District as well as alkaline basaltoids from Transbaikalian Cenozoic volcanos and also the mineralogy of some ultrabasic massiffs in Krasnojarsk, Irkutsk and Amurian Districts. Besides, for comparison, garnets, ilmenites and spinels, their shapes and surface topography, from pegmatites, scarns, hydrothermolites and various metamorphic and sedimentary rocks were studied. The aim of this research was to establish typomorphic properties of the mineral growth and change depending on various formation conditions.

The most attention was paid to kimberlite indicator minerals. Collection of specimens and minerals from kimberlites with diverse thermodynamic and physico-chemical conditions of formation and with different erosion shear were examined including "blind" Odintsov pipe and diatreme with crater bowls filled by volcano-sedimentary deposits in Alakit- Markhinsky kimberlite area and some diatremes with considerable erosion shear from the Malaya Botuobiya field.

Research methods include macroobservation of specimens and minerals, their study under binocular microscope and detailed exploration of mineral surface under metallographic and electron microscopes (REM and TEM). As a result the Atlases for all 3 types of rocks were created. They contain common and rare mineral macroforms, such as oval, irregular-rounded, ball-like, 'dog-tooth'-shaped grains and also crystallographic forms, reflecting, in some cases, the character of the mineralogenetic environment, in others the character of interaction of xenogenetic minerals with the melt, transporting them as well as with hydrothermal solutions.

The kelyphytic rims, formed on the pyropes at different levels of the magmatic column under unequilibrated conditions, have preserved the sculptures which may show evidence of physico-chemical and thermodynamical parameters of this interaction. The results of examination of these and other sculptures are presented in the Atlases. There are the photographs of melting cones, corrosion sculptures of thermochemical etching such as pits, ducts, 'stars', drop-like ones, as well as dislocative loops and margins, microcracking, aggregative structures and other photo-traces of fragile, elastic and plastic deformations. There are also photos of mineral

inclusions in xenoliths and groundmass from kimberlites and also microphotos of pyrites, magnetites and perowskites overgrown the indicator kimberlite minerals.

Experimental investigations such as the thermochemical dissolving of minerals by alkalis and dissolution by cold acids were carried out and unique photographs were obtained. They may be used for better understanding of the nature of hydrothermal and hypergenetic sculptures.

Deciphering the obtained information from position of theories of growth and solution, melting, deformation, defectology and other modern theories will make it possible to contribute to knowledge on the conditions of the formation and alteration indicator kimberlite minerals from above-mentioned types of rocks, to determine the signs of deep and near-surface melting, hydrothermal solution and regeneration, fragile and plastic deformation etc.

Morphogenetic classifications were made up using the generalized available data.

An attempt was made to define the unified logical sequence of events on the basis of sculpture age correlation and to develop a mineralogenetic models both of each diatreme and an ideal kimberlite column.

Specific morphosculptures of pyrops, magnesium ilmenites and chrome-spinelids typical for kimberlites, kimberlite-like rocks and alkali basaltoids were determined.

The author tried to connect the morphological properties of diamond indicative minerals with the productivity of kimberlite bodies.

There were found the mineralogical signs of 'blind' kimberlite bodies. They are primary perovskite haloes in enclosing rocks.

The morphological classifications and Atlases can be used to determine both the genetic origin of the indicative minerals, and their relation to discovered kimberlite pipes and those to be prospected as well as to help in determining the preservation degree of the diamond indicator minerals from concentric haloes and thereby to facilitate more effective diamond prospecting by concentration mineralogical method.