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On Chemical Composition of Jadeite

Jade is a semi-precious stone, highly valued because of its high strength and decorative appeal. It includes (along with the jadeite mineral itself and similar in composition clinopyroxenes and intermediate composition between jadeite, diopside and aegirine albite) quartz, chromite, and magnetite. Translucent "jade - Imperial" of the premium grade with uniform emerald-green color, which is very rare and highly valued, is an aggregate of pure monomineralic jadeite with a small isomorphic admixture of chromium (cosmochronologic mineral).

More widespread spotted "commercial-jadeite" of bluish-green color is a multimineral rock consisting mainly of jadeite containing isomorphic admixture of diopside aegirine mineral and containing veins and the inclusions of "jadeite-imperial". "Utility-jadeite" with a wide color palette from dark green, light green, light gray and white to yellowish-green, yellow, brown and red color with a distinctive mottled veinlet uneven pattern is quite common. The composition of this variety of jadeite along with clinopyroxenes of intermediate composition, including omphacite, comprises significant amounts of albite and quartz.

The brightness of color is determined primarily by the iron at the expense of aegirine and hedenbergite mineral as well as isomorphic admixtures of chromium in aluminum positions. Mineral composition of jadeite rocks, chemical composition of its constituent clinopyroxenes and, therefore, its decorative properties are determined by the formation conditions.

Analysis of the chemical composition of rocks and jadeite rocks and jade, and the results of studies of the composition of clinopyroxene jadeite rocks show wide variety of clinopyroxene within a series of jadeite - diopside, not only within one field, but even for a single sample. Clinopyroxene prevails in jadeite rocks (more than 60% of analyses) as for composition from almost pure jadeite (25% of analyses up to 10% and 45% analyses to 20% of diopside mineral) and up to jadeite to diopside mineral containing no more than 33%.

The rest of the analyses refer to the omphacite, the composition of which varies according to the data obtained from 33 to 66%. The limits being established on the basis of composition of clinopyroxene are stipulated by genetic factors jadeite formation. On the one hand, they may reflect metasomatic zoning in jadeite rock formation, and on the other they may indicate the heterogeneity of the mineral composition of the substrate subjected to the processes of metamorphism.