O, C AND Sr ISOTOPIC COMPOSITION OF CALCITES IN GARNET MEGACRYSTS AND CARBONATIZATED GRANULITIC XENOLITHS FROM THE UDACHNAYA KIMBERLITE PIPE, YAKUTIA.

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Calcite in megacrysts of Cr-low garnet (TiO_2=1-2%, Cr_2O_3= 0,6-3,15%, mg=0,73-0,81) from the Udachnaya and the Mir kimberlite pipes occurs within particular fine-grained polymineral inclusions. The latters consist of red-brown phlogopite (20-30%), dotted spinel (3-7%), amphibole (0-30%) and serpentine (10-40%). In some cases small grains of ilmenite and a dotted perovskite are observed. Inclusions fill the rounded cavities which dimensions vary from 0,5 up to 3 mm. Their texture is a typical microporphyric in which small euhedral and subhedral crystals of phlogopite, amphibole and calcite are enclosed in the interstitial material composed of serpentine, probably replaced the former glass. Crystals of amphibole and phlogopite rim the deeply corroded garnet boundary replaced by an ultrafine-grained dark-brown material typical of kelyphite rimming the garnets. Shulze (1985), Hops(1986) assume similar polymineral inclusions to be due to crystallization of kimberlite-related melts entrapped by megacrysts. The initial $^{87}Sr/^{86}Sr$ ratios in calcites of similar polymineral inclusions from the Udachnaya pipe are higher than 0.706.

O, C and Sr isotopic studies of totally or partially carbonatizated xenoliths representing almost monomineral medium- or coarse-grained rocks consisting of semi-transparent grains of calcite as well as of a small amount of bluish serpentine have been carried out. In contrast to calcite, serpentine exhibits a zonned distribution thus increasing its content in xenolith rims. Relict minerals in different samples are represented by garnet, biotite

and pyroxene.The isotopic-geochemical characteristics of the core carbonate component for three xenoliths are as follow: $\delta^{18}O=27,1+20,4^{o}/oo$; $\delta^{13}C=-4+-5^{o}/oo$ and Sr=9500+10000 ppm. The carbonate constituent of the kimberlite which includes one xenolith snows $\delta^{18}O=15,2^{o}/oo$ and $\delta^{13}C=-4,2^{o}/oo$; that of seven kimberlite samples from the Udachnaya pipe shows the following variations: $\delta^{18}O = 17,9+22,6^{o}/oo$ and $\delta^{13}C=-2,9+-7,2^{o}/oo$. The carbonate extract from the Precambrian fine-grained marble with magnetite shows the $\delta^{18}O$ and $\delta^{13}C$ values to be $25,1^{o}/oo$ and $1,37^{o}/oo$, respectively. Carbonates from the Paleozoic terrigene-sedimentary rocks containing kimberlites yield the mean values of $\delta^{18}O=25,3\%$ and of $\delta^{13}C=-1,5^{o}/oo$.

The authors suggest the metasomatic replacement of crust granulites by calcite to be due to gas-fluid phases related to kimberlite systems. These fluids appear to be the main source of carbon and strontium. The oxygen source in carbonatizated granulites is probably of more complex origin and it seems to be related to ancient metacarbonate rocks.