THE TRENDS OF VARIABILITY OF GARNET MEGACRYST COMPOSITION FROM DIAMOND-BEARING AND DIAMOND-DEVOID KIMBERLITE PIPES (YAKUTIA, RUSSIA)

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The compositions of garnet megacrysts have been defined in representative collections obtained for some years from kimberlite pipes of the Yakutian province. The garnet megacrysts from diamond-bearing pipes Mir, Udachnaya-Vostochnaya, Udachnaya-Zapadnaya, Zarnitsa, Dalnyaya, and a cluster of pipes Vesely show close intervals of variability of contents of main oxides, similar trends of variability (SiO_2-MgO, SiO_2-FeO, SiO_2-CaO, FeO-MgO, Cr_2O_3-Al_2O_3, TiO_2-Al_2O_3, Mg/Mg+Fe)-Cr_2O_3).

On the other hand, the compositions of megacrysts from every pipe have their own features (Table 1), which is particularly evident from average contents of Cr_2O_3, different location on the diagrams of linear trends.

The megacrysts of garnet from diamond-devoid pipe Pyatnitsa (Kuoisky field, northern margin of Yakutian province) significantly differ from megacrysts of diamond- bearing pipes in increased iron and low contents of TiO_2 and Cr_2O_3. On the triangular diagram Mg-Fe-Ca the figurative points of the garnet composition make up a trend parallel to the Mg-Ca axis with relatively constant contents of iron. The diamond-bearing kimberlites are characterized by Mg-Fe trend with relatively constant Ca.

The wide variations of magnesium and chromium contents of garnet megacrysts up to the emergence, when calculating the knorringite minal, variations of SiO_2 to the emergence when calculating for formula quantities of excessive silica indicate that crystallization of garnet proceeded at a noticeable variation of pressure. The comparison of composition of garnet from megacrysts and polycrystalline aggregates with diamonds (data for Mir pipe by N. V. Sobolev (1974) suggest the possibility of existence of a single crystallization trend of garnets starting from a joint crystallization of diamonds and completing with a joint crystallization of picroilmenites.

The features of trends of garnet megacryst compositions agree with their genetic relation with kimberlite melts starting ascending from the depth of asthenospheric layer.

AVERAGE COMPOSITION AND CONTENT RANGE OF GARNET MEGACRYSTS

FROM KIMBERLITE PIPES OF YAKUTIAN PROVINCE

	Udachnaya-vostochnay	Mir (27)	Dalnaya (15)	Veselaya (64)	Pyatnits (24)
SiO2	41.07-42.31	41.23-42.3	40.78-41.9	41.12-42.56	40.78-41.7
	41.73	41.84	41.53	41.77	41.23
TiO2	0.53-1.58	0.63-1.16	0.52-1.37	0.42-1.67	0.29-0.94
	1.11	0.88	0.95	1.09	0.66
Al2O3	18.57-22.01	19.88-22.01	18.57-21.94	19.07-22.43	21.05-22.7
	20.23	20.85	20.18	20.32	21.96
Cr2O3	0.63-4.89	0.1-2.26	0.43-4.43	0.41-3.57	0.0-0.79
	1.77	1.13	2.39	1.80	0.11
FeO	7.77-11.77	7.55-12.49	7.63-10.74	7.62-11.92	9.46-13.9
	9.63	9.89	9.40	9.64	12.43
MnO	0.13-0.5	0.22-0.42	0.22-0.52	0.17-0.52	0.28-0.52
	0.33	0.33	0.37	0.35	0.43
MgO	18.94-21.69	18.52-22.38	18.48-20.82	18.62-21.52	16.27-20.0
	20.10	20.13	19.70	20.06	17.74
CaO	3.72-5.3	3.64-4.78	4.52-5.62	3.73-6.51	4.35-6.07
	4.68	4.50	4.97	4.63	5.09
Mg#	0.74-0.83	0.72-0.82	0.75-0.83	0.74-0.83	0.68-0.79
	0.78	0.77	0.79	0.79	0.72
Py	60.71-74.83	64.10-71.43	60.45-71.85	61.66-74.67	56.69-69.1
	66.79	67.52	65.69	66.88	61.99
Alm	14.94-22.68	14.79-24.36	14.89-21.17	14.75-23.08	18.51-27.0
	18.54	19.94	18.34	18.68	24.38
Spess	0.31-0.97	0.32-0.97	0.32-0.99	0.32-0.98	0.64-0.98
	0.65	0.67	0.73	0.67	0.85
Gross	0.00-2.93	0.00-3.07	0.00-6.19	0.00-4.14	3.9-7.9
	0.11	0.83	1.28	0.26	6.22
And	0.99-8.52	3.43-7.99	2.46-7.59	0.99-8.57	0.93-6.23
	5.95	5.68	4.93	5.74	0.50
TiAn	1.46-4.26	1.93-2.91	1.46-3.82	0.98-4.34	0.97-2.43
	2.92	2.49	2.42	2.86	0.74
Uv	0.16-4.47	0-5.23	0.98-7.92	0.00-7.45	0.00-1.95
	2.61	2.17	3.76	2.62	0.32
Knor	0.00-8.94	0-1.92	0.00-6.64	0.00-6.43	0.0-0.00
	2.44	0.65	2.85	2.29	0.00