

REDOX STATE OF ILMENITES AND OLIVINES FROM KIMBTRILITE PROVINCE OF YAKUTIA

Zharkova E.V. (GEOCHI, RAS), Kadik A.A. (GEOCHI, RAS), Senin V.G. (GEOCHI, RAS), Genshaft Y.S. (IPE, RAS), Saltikovskii A.Ya. (IPE, RAS)
kadik@geocyi.ru; fax: (095)-938-20-54; phone (095) 39-70-78

We took seven samples of ilmenites and two olivines of the 1-st and the 2-d generations from kimberlite province of Yakutia, and one sample of Libyan glass from the collection of dr. Nazarov M.A. for our investigation.

The experiments of determination of intrinsic oxygen fugacity (f_{O_2}) were carried out on high temperature furnace based on two solid electrolytes. The description of the samples and the results of the experiments are in the table.

	Sample	A	B	r	n
Ilm-811	Daldinskoe field, Udachnaya-west pipe	34.073	57469.2	0.986	9
Ilm-836	Daldinskoe field, Udachnaya-east pipe	43.421	67214.7	0.989	9
Ilm-1142	Daldinskoe field, Zarnitca pipe	21.700	43795.7	0.990	8
Ilm-782	Daldinskoe field, Dalnaya pipe, schurf 52	25.075	48272.6	0.985	8
Ilm-792	East Ukukitskoe field, Kubanskaya pipe	12.832	32093.2	0.990	8
Ilm-539	Merchimdenskoe field, Operatorskaya south pipe	21.529	41860.9	0.983	6
Ilm-543	Merchimdenskoe field, Operatorskaya north pipe	14.580	32924.2	0.980	9
Ol - 1	Udachnaya pipe, 1-st generation	6.913	27181.9	0.994	9
Ol - 2	Udachnaya pipe, 2-d generation	14.327	35567.0	0.991	9
Gl-790	Libyan glass	17.735	36783.2	0.864	13

The results of experiments describes by linear dependence $\log f_{O_2} = A - B/T^{\circ}K$ (table, where “r” – correlation coefficient, and “n” the quantity of experimental points).

We can make the conclusion that the intrinsic oxygen fugacity for the most of ilmenites and the glass is between WM and QFM buffer equilibria at 800°C-1050°C. The intrinsic oxygen fugacity for the ilmenites from the Udachnaya pipe lay in the field of QFI at 800°C and in the field of QFM at 1050°C. The f_{O_2} for the olivine of the 1-st generation practically coincide with the WM buffer equilibrium and the intrinsic oxygen fugacity of the olivine of the 2-d generation lays in the field between IW and WM buffer equilibria. The temperature of the equilibrium for the olivine and the ilmenite of Udachnaya pipe is between 814°C - 858°C.

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