ZHAMANSHIN ASTROBLEME GLASSES: THE DISCOVERY OF STABLE LIQUID IMMISCIBILITY AND MINIRAL UNUSUAL FOR MAGMATIC ROCKS. L. V. Sazonova, N. N. Korotaeva. Moscow State University, 119899, Moscow, USSR.

Al-rich, Fe-rich (Al_2O_3 = 18,99%, FeO = 24,35%) glassy inclusions with the phenomenon of stable liquid immiscibility (table 1) have been found in high-silicions ($SiO_2 \sim 73\%$) and verihigh-silicions ($SiO_2 \sim 83\%$) Zhamanshin Astrobleme glasses. As it has seen from the calculations in reference to Predovsky diagram [1] inclusions of such composition might have been formed at impact fragment melting of bauxite (laterite) or mixture of different minerals characteristic of metapelites.

The resalts of investigations of glassy inclusions formed at hardening of shock melts appearing at the place of such fragments show a phenomenon two stage of liquid decomposition.

At the first stage the initial melt decomposition into silicate melt (more viscous, hardening in the form of glassy spheroids, table 1) and Fe-silicate melt took place. The decomposition at this stage might have taken place at very high temperatures as glassy spheroids (selicate melts) are enriched with Al and Ti besides Si. These elements are known to be glass structure forming only at high temperatures.

Fe-silicate melt enriched with Mg, Mn remained unstable then decomposed in its turn making the second stage of decomposition. At this stage of decomposition partly crystalline spheroids and a matrix were formed (table 1, fig1).

The decrease of temperature might result in greater oxidation conditions which causes change of Fe-valency, eqiulibrium distorsion of the melt and its division into two melts one of which is enriched with Fe^{+2} and the other with Fe^{+3}. The melt enriched with Fe^{+2} contains greater quantity of Si, K as well as Ca und Mn (in comparison with the matrix one), it is more viscous and hardens in the form of partly crystalline spheroids. The melt enriched with Fe^{+3} in the whole richer with ferrum forms a matrix. At the second stage of liquid immiscibility Ti is a component of Fe-rich phase being a modificator but not a lattice maker.

Partly decrystallized spheroids (the initial melt is enriched with Fe^{+2}) are composed of glass and a mineral (20-40%) having a lath-like skeletal form. The composition of this mineral varies in different inclusions in the folloving ranges:

$(Fe_{0.74-0.89}Mn_{0.25-0.60}Mg_{0.23-0.49}Ca_{0.04-0.07}Na_{0-0.06}Al_{0.13-0.41})_{1.86-2.03}Si_{1.82-2.00}O_6$

This mineral is Fe-rich pyroxenoid. Up to now no data have been known about crystallization of such minerals from magmatic melts. Mn-Fe pyroxenoid-pyroxmangite is found in metamorphic and metasomatic Mn-rich rocks. Natural pyroxmangite is Fe-poor (fig.2) as it is formed at high fO_2 at which a greater part of Fe^{+2} is oxidized to Fe^{+3}.. The latter forms oxides in natural assosiations and pyroxmangite is formed of Mn^{+2} and a small

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quantity of Fe^{+2} [2]. This the described pyroxmangites (?) judging by Fe-content (which might be mainly two-valent) were formed at sufficiently high reduction contions. Spheroid matrix contains mainly Fe-oxides, glass and a small quantity of pyroxmangite.

The phenomenon of metastable liquid immiscibility in Fe-rich Mg-poor shock melt microvolumes (appearing at the small fragments) shows that they follow general laws of melt formation and development. The latter do not depend on the conditions of melt forming and melt volumes. The compositions of the initial melts (Mn-rich content) and high reductions of the melt resulted in crystallization of Fe-rich pyroxmangite a mineral which has not been observed in natural magnetic volumes up to the present time.

Table 1

Spheroid and Matrix Chemical Compositions (mass %) of Glassy Inclusions with the Phenomenon of Two-stage Liquid Immiscibility.

Sample Zh-110-1

		I stage of the impact melt decomposition					II stage		
	initial composition	glassy spheroids			matrix I		partly cristall. spheroids	matrix II	
SiO_2	47.94	55.64	57.11	52.39	40.31	40.20	57.25	35.82	36.49
TiO_2	0.85	1.07	1.31	1.15	0.51	0.52	-	0.45	0.29
Al_2O_3	18.99	28.57	26.57	27.16	12.80	13.57	12.79	12.03	11.82
FeO	24.35	9.61	9.94	12.81	37.10	35.69	18.48	42.14	41.04
MnO	2.39	0.37	0.62	1.62	3.79	4.49	4.80	4.33	6.64
MgO	1.51	1.14	0.87	0.97	1.62	1.84	1.99	1.73	1.84
CaO	1.38	0.21	0.52	0.94	1.69	1.76	2.35	1.57	1.80
Na_2O	1.17	1.26	1.27	0.78	1.10	0.83	0.86	1.02	1.26
K_2O	1.41	2.13	1.80	2.17	1.09	1.10	1.43	0.90	0.82

[1] Predovsky A.A. Reconsruczia uslovi sedimentogeneza i vulkanizma rannego docembria.-Z.,"Nauka",1980,[in Russian]. [2] Banerjee H., Miura H., Hariya Y.A.-Mineralogical Journal,v14,N13,1988,p.83-91

fig. 1. II Stage of the impact melt decomposition.
①- partly crystalline spheroid (with glass and pyroxmangite).
② matrix II (with glass, oxides and pyroxmangite)

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