ZHAMANSHIN ASTROBLEME GLASSES: TRACES OF INITIAL MELT NON-HOMOGENEITY AND DEFINITION OF FORMATION PARAMETERS. L.V.Sazonova, N.N.Korotaeva, Simakin A.G. Moscow State University, 119899, Moskow, USSR.

Zhamanshin astrobleme impact melt rocks are represented by glassy bombs, lapilli, jet fragments and splashes (thickness in first tens of cm.) of the massive and porous glasses lying inside and outside a crater in separate areals. The absence of homogeneous impact melt is a characteristic feature of this astrobleme. Very oftem flow textures (fig.1) are found in these glasses especially in the groups of high-silicions and very hingh-silicions glasses (SiO_2 content of 70-80% and 80-90%, respectively).

The thickness of separate microflows in such flow glasses ranges from fractions of mcm to some mm. Microflows are of different colour. Sometimes the boundaries between differently coloured flows are distinct, sharp but more often they are diffuse, non-distinct which is well seen with the help of SEM at large magnefication (fig.1). In such flow glasse lechatelierite -quartz glass (fig.1) is often present. It is visible only microscopically (because of its small size).

The contacts between lechatelierite grains and glass matrix, the contacts between separate microflows have been studied by the method of microprobe analysis (Camscan-4DV,Link, AN-10000). The analyses have been made every 3 mcm, then profiles of contents of different elements (fig.2) have been drawn. The profiles at the boundaries of quartz and matrix (fig.2) glasses and those at the boundaries of separate microflows (fig.3) turned out te be diffusive, which is indicated by gradual content variation of many elements.

The formation of microflows in high and very high-silicions glasses of Zhamanshin astrobleme have apparently resulted from non-homogeneity of the initial melt formed at the place of the layered rocks of the target with different quartz quantities in separate layers. At homogenization of such melts the component diffusion processes are of primary importance. These processes were not completed because of quick impact melt cooling. Mechanical convective mixturing of such melts is of secondary importance.

We have made an attempt of estimating initial temperatures, cooling velocity and hardening temperature of the portion of high-silicions Zhamanshin impact melts which had the form of small bombs and jet fragments (from first cm to first tens of cm across).

The process of diffusive mixturing of quartz and granitic melts has been simulated. Theoretical diffusion profiles at the contact of quartz and acidic glasses have been made. The character of the profiles depends on the initial melt temperature, velocity of melt cooling and hardening temperature. The comparison of these theoretical profiles with the obtained element distribution enabled us to estimate some parameters of Zhamanshin glass formation. It has been stated that the initial temperatures of the involved impact melts were very high and ranged from 2200° to 2500°C. The melt cooling velosity were

Sazonova L.V. et al.
Zhamanshin ...

approximately 200°C/sec. The melt hardening temperature (the end of diffusion) were 1600°-1700°C. The latter figure is close to the temperature of moderate silicions and high-silicons glass hardening obtained from the study of metastable liquid immiscibility which has been found in them.

Thus a history and impact melt formation conditions are reflected in petrographic and geochemical peculiarities of impact melt rocks. Zhamanshin astrobleme glasses formed at the place of the same target rocks chemically homogenious at macrolevel appear to be non nomogenious at microlevel as the processes of convective mixturing and diffusive levelling are completed in the initial impact melts because of their practically instant cooling.

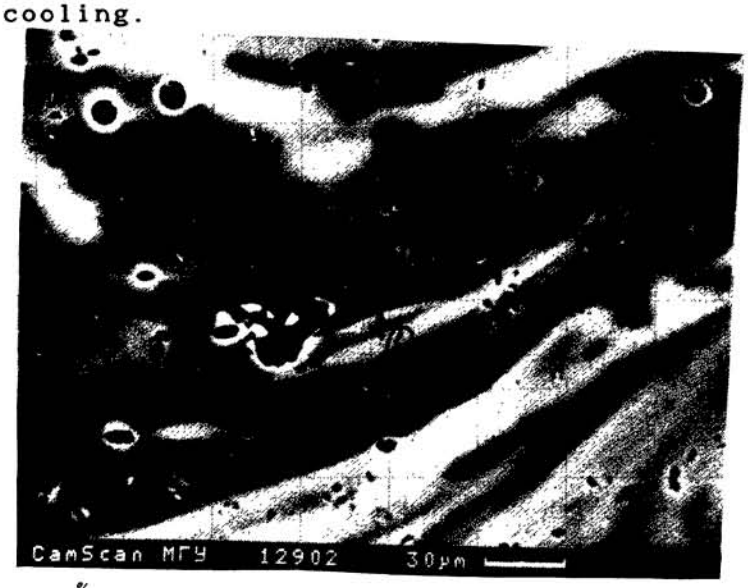

fig.1 Differently coloured flows with diffuse boundaries. ① – Lechateliérite

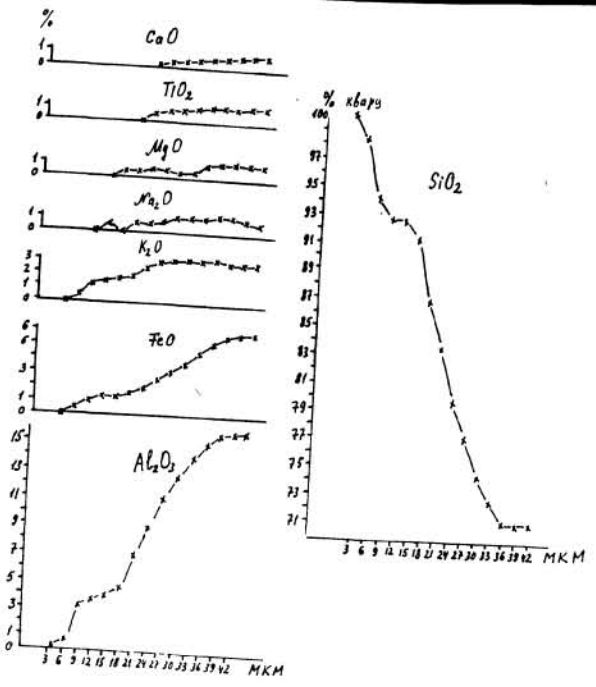

fig.2

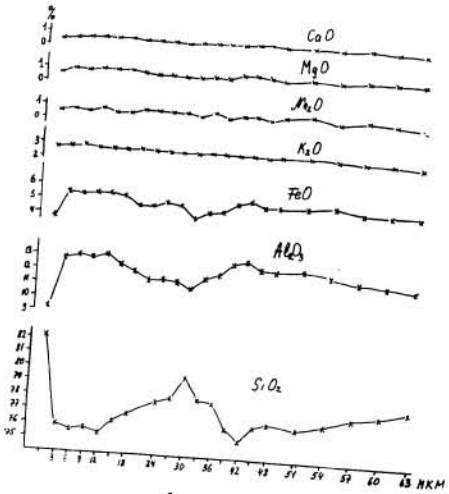

fig.3