THE POPIGAI "FLUIDIZITE" DYKES: A NEW DATA ON THEIR MINERALOGY AND PETROLOGY.

S. A. Vishnevsky[1], J. Raitala[2], N. A. Gibsher[1], T. Öhman[2] and N. A. Palchik[1]. [1]Institute of Mineralogy & Petrology, 630090, Novosibirsk-90, Russia <nadezhda@uiggm.nsc.ru>; [2]University of Oulu, Oulu, Finland, <jouko.raitala@oulu.fi>.

Introduction: Earlier [1] we reported the first description of tuff-like volatile-rich melt injections into the low/non-shocked target gneisses of the Popigai astrobleme. The dykes of these "fluidizites" are made up of highly-porous strongly-altered fluidal glass particles welded with cryptograin matrix and fragments of host gneiss. Sometimes, there are relatively fresh porous and massive glasses. In terms of bulk geochemistry, all the glasses are similar both to the Popigai impact melt rocks (tagamites) and the source target gneisses. Lechateli-erite schlierens in the dykes contain a great number of dense (up to wholly liquid at 20°C) fluid inclusions. This fact is of particular concern. In case of a water fluid, these inclusions indicate that the confining pressure was up to ~0.8-3.3 GPa at the lechatelierite solidification point (~1700°C) [2].

New data. Alteration and porosity of the melt fraction is controlled by its amount in respect to the matrix of the rock and it is related to quenching: 1) within the glass-enriched zones (commonly, <10-15 vol. % of matrix) the glass schlierens are pumice and strongly-altered; 2) within the transition zones (commonly, 30 to 50 vol. % of matrix), the glass schlierens (or their fragments) are of various porosity and alteration; 3) within the zones with the dominating matrix (>80-90 vol. %), the film-like glass schlierens (or their fragments) are fresh and poorly-porous. All low-porous glasses exhibit perlite cracks. General fabric of the "fluidizite" shows traces of intensive turbulent mixing. Sometimes, the matrix contains fine bands of opaque mylonite. Coesite and traces of stishovite are detected by X-ray in some lechatelierites. In addition to the lechatelierite and molten zircon thermometers (>1700°C and ~1800°C, respectively), spherules of magnetite (T >1590°C) are found in this study. No traces of shock metamorphism (except rare and weak kink-bands in biotite) are found in fragments of gneiss minerals from the matrix. While injecting into the gneiss, the hot and very mobile melt+fluid jets were thus unloaded to the shock pressures <7-10 GPa (the lower occurrence limit of PFs and PDFs in quartz, [3]), but ~3-4 GPa confining pressure was still present until the dense fluid inclusions were conserved in lechatelierite.

Conclusion: The origin of the dykes is rather specific. Melt+fluid injections into the low-shocked gneisses at least 12-15 km away from the impact melting zone show that the volatile-rich melt was still very mobile and not completely unloaded. We suppose that water buffer delayed the rarefaction of the "wet" melts [2]. We also suppose that conservation of dense fluid inclusions in lechatelierite is an exclusive feature of largest astroblemes only, where the quenching of high-temperature products could take place before the complete unloading. Detailed study of these fluid inclusions in the lechatelierite is in progress.

References: [1] Vishnevsky S. et al. 2003. Abstract # 4034. Large Meteorite Impacts, LPI Contr. # 1167. [2] Vishnevsky S. and Pospelova L. 1988. The fluid regime of impactites: dense fluid inclusions in high silica glasses and their petrologic significance. Novosibirsk, 53 p.p. (in Russian). [3] Stoffler D. and Langenhorst F. 1994. *Meteoritics* 29: 155-181.

This study was supported by the RFBR grant #04-05-64127 and by the Academy of Finland grant #207759.