

# The Malkhan granite-pegmatite system: intrusion of chemically heterogeneous pegmatite magma

V.YE. ZAGORSKY AND I.S. PERETYAZHKO

Institute of Geochemistry SB RAS, Irkutsk, Russia;  
victzag@igc.irk.ru

It is commonly believed that each magmatic impulse in a pegmatite field is characterized by constant composition of melt intrusions. Available data on the Malkhan field of the gem tourmaline-rich pegmatites in Transbaikalia, Russia, contradict with this viewpoint. Within this field not only neighboring bodies but even large parts of long pegmatite veins differ greatly in mineral and chemical (K, Na, Li, Rb, Cs, Ta, Nb, Be, Sn, Ba, Sr, B, F) compositions, so that they can refer to different pegmatite types. Pegmatites of the Malkhan field are undoubtedly magmatic formations. This is confirmed by geological observations and data on the melt inclusions. Pegmatites of different composition can join via apophyses, but they never cross each other. All pegmatites of at least a single vein series were emplaced in one stage. Crystallization evolved from the contact zones to the center of pegmatite bodies. This is indicated by their inner structure and chemical evolution trends of minerals. Such conditions are very unfavorable for the transportation of any component over many tens or hundreds of meters along the strike of pegmatite bodies while crystallizing. Drastic composition discrepancies between the adjacent pegmatite bodies and different parts of long veins of rather small thickness are possible only in the case of injection of chemically heterogeneous magma and the autonomous evolution of each magma portion after its emplacement in the pegmatite-enclosing chamber.

Possible mechanisms of the chemical heterogenization of pegmatite magma are controversial. Some of them are as follows [1]: (a) formation of chemically zonal columns in melt as a result of fluid-melt interaction in metamagmatic regime when fluid flow penetrates magma ("metasomatism" in magma by analogy with metasomatism in solid medium); (b) liquation (liquid immiscibility); (c) formation of clusters or cybotaxises (protomatrixes of crystalline phases in melt) and their segregation in above-liquidus conditions. Chemical heterogenization processes may occur in the chambers of pegmatite magma formation and/or on the ways of its transportation to the place of solidification. The possibility of injection of chemically heterogeneous magma should be taken into account in the construction of petrogenetic models for granite-pegmatite systems, ongonites-elvanites and some other vein formations. *The study was supported by RFBR (projects 04-05-64109 and 04-05-64389).*

## References

[1] Zagorsky, V.Ye, Peretyazhko, I.S. (2006). *Transactions (Doklady) of Russian Academy of Science*, **406**, N1, 132-135.