

## Petrogenesis of quartz-devoid comendites and pantellerites of Nemrut volcano (eastern Turkey)

I. S. PERETYAZHKO<sup>1\*</sup> AND E. A. SAVINA<sup>1</sup>

<sup>1</sup>Institute of Geochemistry, Irkutsk, 664033, Russia

(\*correspondence: pgmigor@igc.irk.ru)

The Nemrut volcano being active in the Quaternary period (< 1 Ma) sits close to the collisional boundary of the Anatolian and Arabian plates [1,2]. The mineralogical, geochemical and phase features of quartz-devoid comendites and pantellerites of the volcano have been studied. The LA-ICP-MS method defined the compositions of matrix glasses and phenocrysts (anorthoclase, gedenbergite and fayalite). Besides, the coefficients distribution of P, B, Li, Rb, Cs, Ba, Sr, Zr, Hf, Ta, Nb, Sc, V, Cr, Ni, Cu, Pb, Th, U, Y and REE between phases were calculated. Using the mass-balance models and data on melt inclusions it was feasible to analyze alternative models of formation and conditions of alkaline melt generation, as well as relations between trachyte-comendite, comendite and pantellerite magmas.

The data on the sequence of Nemrut volcano eruptions and mass-balance calculations the composition of quartz-devoid comendites and pantellerites reject the R.Macdonald and B.Scaillet model [3] formation of residual high-Fe comendite and pantellerite magmas by fractional crystallization of low-Fe comendite melts. The formation of residual comendite and pantellerite melts is explained by variations of pressure and H<sub>2</sub>O content in the source trachyte-comendite magma at crystallization of anorthoclase (predominant phase), gedenbergite, fayalite, Fe and Ti oxides. The accessory phases (REE-, Sr-bearing F-apatite, chevkinite and zircon) also participated in melt fractionation.

Minimum parameters of crystallization in melts (without quartz) of gedenbergite, fayalite and ilmenite are calculated using the QUILF-95 program: high-Fe comendite (3 kb, 763°C,  $\Delta\text{lgfO}_2$  FMQ -1.27), pantellerite (3.3-3.8 kb, 715°C,  $\Delta\text{FMQ}$  -1.08), low-Fe comendite (2.3 kb, 748°C,  $\Delta\text{FMQ}$  -1.16). Crystallization of anorthoclase phenocrysts in comendite melts proceeded at T~750°C. Analysis of data on formation conditions for the Nemrut alkaline magmas and literature sources shows that chambers with comendite and pantellerite H<sub>2</sub>O-unsaturated melts may exist at depth from 5 to 10-15 km, pressure 1-4 kb, T<750°C and oxygen volatility  $f\text{O}_2$  below FMQ buffer. Such melts contained 1-4 wt.% H<sub>2</sub>O.

[1] Çubukçu et al. (2012) *J. Volcanol. Geotherm. Res.* **209-210**, 33-60. [2] Peretyazhko et al. (2015) *Petrology* **3**. [3] Macdonald & Scaillet (2006) *Lithos* **91**, 59-73.