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Carbonatitic magmatic fluid kept in quartzite associated with carbonatite dyke in Bayan obo, China

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Introduction

Bayan Obo Fe-Nb-REE deposit in Inner mongolia, China (110°E, 42°N), is the world largest Fe-Nb-REE deposit. The deposit is hosted by a dolomite marble(Carbonatite). Within the mine areas, there occurs more than 40 carbonatite dykes, which intruded into diferent part of early proterozoic metamorphic basement (Bayan Obo Group), Geological brigade of Inner Mongolia, 1972; Zhou Z.L.,1980; Chen, H and Shao J.A.,1987; Institute of Geochemistry, 1988.

Fluid inclusion research

Till now, more works have been done on the mineralogy and petrology of carbonatite dyke. But few work was conducted on the properties of magmatic fluid of carbonatite dyke in this area. In order to understand the properties of carbonatitic magmatic fluid. Fluid inclusions in quartzite which was intruted by the carbonatite dyke were studied .

Conclusion and discussions

1.Fluid trapped in the quartzite are the magmatic fluid ejected from the carbonatitic magma intrusion, which provided a best means to study the carbonatite activities.

2. Carbonatitic fluid was very rich in ore-forming element and volatile, it has the capability to transport REE, Th, U, Zr, Hf et al. and could have played a very important role in the REE minralization of Caledonian period in Bayan Obo giant Fe-Nb-REE deposit.

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References

[1] Ni P. and Rankin A.H. (2002) *GCA* **66**, Conference Volume, A552.

[2] Ni P., Rankin A.H. and Zhou J. (2003) *Acta Petologica Sinica* **19,** 297-306.

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Origin and evolution of extremely F-rich hydrous melt fractions and hydrothermal fluids during differentiation of highly evolved tin-granite magmas

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Melt inclusions are small blebs of silicate liquid that are trapped within growing phenocrysts at magmatic temperatures and pressures. Relatively stable and incompressible hosts such as quartz and topaz in silicic magmas act as a pressure vessel, minimizing degassing of trapped melt inclusions and preventing other mass flows into or out of the melt inclusion system. So, melt inclusions are the only means, which provide detailed information on the late evolution of magmas by crystal/liquid equilibrium and the nature and amount of volatiles, such as H_2O, F, Cl, and B [1,2].

Based on modern analytical techniques (Raman spectroscopy, synchrotron radiation XRF) combined with experimental work, this study provides additional credit on the significance of B, F, and H_2O for the late-stage melt evolution and for the extraction and transport of tin in the Erzgebirge metallogenetic province in Variscan time. Studies on melt and fluid inclusions in minerals of genetically different, granite-related deposits in the Erzgebirge (e.g., Ehrenfriedersdorf, Pechtelsgrün, Zinnwald) have shown that boron and fluorine usually form common complexes such as dihydroxyfluoroboric acid $HBF_2(OH)_2$ or its derivatives (e.g., tetrafluoroborates MBF_4 (M = Na, K, Rb, Cs). These complexes allow for more efficient extraction of F from the melt into the fluid as already suggested from previous investigations of B-free granite systems.

Moreover, it is very probable that the isotopic fractionation of boron is strongly governed by melt – fluid – vapour partitioning reactions involving B-F-OH complexes.

References

[1] Lowenstern JB (2003) In: Melt inclusions in volcanic systems – methods, applications and problems (edited by De Vivo, B and Bodnar, R.J). Elsevier Science BV, 1-21.

[2] Roedder E. (1984) *Rev Mineral, Vol.* **12**, 644 p.