Petrogenesis and geochemical characteristics of autochthonous-parautochthonous granitic batholithes in Eastern Qinling Caledonian orogenic belt, Central China

J. GUO, J. LI, X. ZHANG AND S. HU

Department of Earth Sciences, Nanjing University, Nanjing 210093, P.R.CHINA (Lijg@nju.edu.cn)

Many granitic batholithes such as Huichizi batholith, situated in Eastern Qinling Caledonian orogenic belt, belong to the autochthonous-parautochthonous transformation-type granites. These granites are rich in Na, Sr, Cr, Co, Ni and poor in granophile elements such as K, Rb, Cs, W, Sn, Be, Nb and Ta. Their petrogenesis is discussed in this paper as follows:

During the late Caledonian period, the closure of the Eastern Qinling trench-arc-basin system resulted in the formation of a series of northward thrusts in the belt. The down-going microlithons were overthrusted and superimposed by the up-going microlithons with the temperature rising, resulting in strong dehydration, degasification, dealkalization and desilication of the down-going microlithons and the formation of hydrothermal fluids rich in K, Na, Si and the like. As the hydrothermal fluids rose, the up-going microlithons were metasomated and remelted, leading to the formation of the autochthonous-parautochthonous transformation-type granite. The geochemical characteristics of the granite are controlled by the down-going and up-going microlithons.

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Magmatic-hydrothermal evolution of pollucite from No.3 rare metal pegmatite dyke, Koktokay, China

H. HU, R.C. WANG, A.C. ZHANG AND S.J. XU

State Key Laboratory of Mineral Deposit Research, Department of Earth Science, Nanjing University, Nanjing 210093, China (huhuan@nju.edu.cn)

The Koktokay No.3 rare mental pegmatite dyke is located in the Altai, Xinjiang Autonomous Region, West China. It is characterized by a well-developed internal zonal structure and divided into nine mineralogical textural zones from border to inward. Pollucites occur from the fifth zone to the seventh zone.

The Fifth zone (Cleavelandite-Spodumene zone) The primary homogeneous pollucite occurred in the early stage of this zone and is typically associated with elbaite and "Cs-enriched lepidolite". Chemical analysis gives Si/Al ratio from 2.26 to 2.43 and CRK(=100×(K+Rb+Cs)/Σcation) between 70.6 and 78.5. During the late stage, the primary pollucite has locally evolved into two phases: Na-enriched domains (CRK 73.4~74.8, Si/Al 2.20~2.38) and Cs-enriched vein-lets (CRK 81.5~85.8, Si/Al 2.13~2.32).

The Sixth zone (Quartz-Spodumene zone) The pollucite is associated with quartz, spodumene, elbaite, lepidolite and "Cs-enriched lepidolite". The primary pollucite has a CRK of 79.2~86.5 and Si/Al of 2.19~2.39. The Na- enriched pollucites with CRK of 76.6~83.1 and Si/Al of 2.27~2.49 are found as inclusions in the primary pollucite. But it is very interesting that the primary pollucite is always surrounded by the "Cs-enriched lepidolite" rim which has a 100- 200μm wide and W_{Cs} up to 27.68%, close to the ideal Cs end-member composition of lepidolite.

The Seventh zone (Thin slice albite-Muscovite zone) The end-member pollucite bands are up to 30μm wide and always occur at the boundary between the primary pollucite and albite. It has an average CRK of 93.4 and Si/Al ratio of 2.05. The occurrence of end-member pollucite indicates that it is formed as a replacement product of the primary pollucite.

Conclusion Primary pollucite from No.3 pegmatite closely correspond to those of pegmatite, but it is unique that the "Cs-enriched lepidolite" is the alteration product of the primary pollucite in No.3 pegmatite. In conclusion, the diversity and complexity of the pollucite suggests the evolution of late pegmatite proceeds from magmatic-hydrothermal transition to hydrothermal stage.

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