

## **Occurrence and late re-equilibration of pollucite from the Koptokay no. 3 pegmatite, Altai, northwestern China**

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### **ABSTRACT**

The Koptokay no. 3 pegmatite, Altai, NW China, is a strongly zoned spodumene-subtype pegmatite. Pollucite is the unique ore mineral exploited for Cs in this pegmatite. It occurs in internal textural zones of the pegmatite in different abundances. Primary pollucite is largely homogeneous, but it displays a broad range of composition between different textural zones with  $CRK [=100(Cs + Rb + K)/(Na + K + Rb + Cs + Mg + Ca)] = 74\text{--}86$  and  $Si/Al = 2.20\text{--}2.51$ . Four principal types of pollucite were distinguished. (1) First is pollucite with blebby mosaic texture consisting of Na-enriched and Cs-enriched phases, which clearly resulted from local exsolution of primary pollucite in the sub-solidus state. (2) The second type is nearly end-member pollucite ( $CRK > 90$ ) that occurs as an aureole of primary pollucite in contact with lepidolite or feldspar clusters. This is formed by dissolution/re-precipitation of primary pollucite. (3) Symplectic pollucite is associated with quartz, observed in sub-parallel veinlets penetrating surrounding albite crystals; compositionally, this pollucite attains a CRK ratio of up to 96 and resulted from replacement of albite by Cs-rich fluids. (4) Oscillatory-zoned pollucite is the fourth type, typically restricted to the contact of pollucite with small miarolitic cavities. The zonation compositionally oscillates about the Cs/Na variations, and is simply related to locally changing fluid composition.

**Keywords:** Pollucite, compositional heterogeneity, re-equilibration, pegmatite, Altai