

Mineralogical characteristics and metallogenic indication of tourmaline in the Baiyanghe Be-U-Mo deposit, Xinjiang, China

Y.T. ZHU^{1,2,3}, X.F. LI^{1,2,3*}, L. ZHANG^{1,2,3}

¹ *Key Laboratory of Mineral Resources, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing, 100029, China*

² *Institutions of Earth Science, Chinese Academy of Sciences, Beijing 100029, China*

(* correspondence: zhuyiting18@mails.ucas.ac.cn)

³ *College of Earth Science, University of Chinese Academy of Sciences, Beijing 100049, China*

The Baiyanghe Be-U-Mo deposit is located in the Late Paleozoic Xuemisitan–Kulankazi island arc of the northwestern margin of the Junggar plate, Northwest China. It is the largest Be deposit (2.2M tons of ore with grades ranging from 0.2% to 1.4%) in Asia. Orebodies in the deposit occur as veins along contact zones between the Yangzhuang granite porphyry intrusion and Devonian pyroclastic country rocks and within the porphyry itself. Three types tourmaline were identified by their occurrences, e.g. hosted in basalt, in tuff and in granite in Baiyanghe Be-U-Mo deposit. Tourmaline occurred as spherical aggregate in basalt and tuff, some of which as fractures, whereas tourmaline hosted in granite occurred as veins. Tourmaline in Baiyanghe Be-U-Mo deposit belongs to the alkali schorl, but much differences exist by their occurrence. All of the tourmaline show the high F (0.343~1.117 apfu) and Al (5.648~7.351apfu) concentration. The variation of chemical composition in tourmaline suggests the interactions of exchange vector might exist, such as $Al^Y X_{\square}(Y^+Na)_{.1}$ 、 $Al^Y X_{\square}(Y^+OH)_{.1}$ 、 $FeMg_{.1}$ 、 $Fe^{3+}Al_{.1}$ 、 $AlO(Mg(OH)_{.1})$ and $Fe^{3+}O(MgOH)_{.1}$. Tourmaline chemical composition indicates that the fluid which precipitated tourmaline rich in Al and F, and the tourmaline in basalt and tuff may be hydrothermal, and tourmaline in granite may be magmatic. The precipitation of tourmaline or fluorite results in the instability of fluoride or fluorine complexes which containing U and Be, leading to Beryllium and uranium separated from the hydrothermal solution.

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