

Genesis and geochronology of the Bayanteeg LCT pegmatite in the Idermeg terrane, Central Mongolia

BOLORCHIMEG N TUNNELL^{1,2}, KHASHBAT DASHTSEREN², ENKHJARGAL BOLDBAATAR², MAREK LOCMELIS¹, YUEHENG YANG³, NOBUHIKO NAKANO⁴, TATSURO ADACHI⁴, WILLIS HAMES⁵ AND ANTONIO ARRIBAS⁶

¹Missouri University of Science and Technology

²Mongolian University of Science and Technology

³Institute of Geology and Geophysics, Chinese Academy of Sciences

⁴Kyushu University

⁵Auburn University

⁶The University of Texas at El Paso

Presenting Author: bn6xf@mst.edu

Lithium is an important component for renewable energy technologies. Significant amounts of lithium are extracted from Li-, Cs-, and Ta-rich pegmatites, i.e., LCT pegmatites around the world. Here we present petrographic and geochronological results of ongoing research into the Bayanteeg LCT pegmatite located in the Idermeg terrane of Central Mongolia and interpret the results within the framework of tectonic setting of the terrane that facilitated the LCT pegmatite formation. The pegmatite body occurs within metasedimentary rocks of the Neoproterozoic Oortsog Formation and extends over 140 m with a width of up to 1.3 m. Lithogeochemical analysis indicate that the pegmatite contains 1.48-2.15% LiO₂, 0.1% BeO, 200 ppm Ta₂O₃ and 100 ppm Nb₂O₅. Pegmatite samples from Bayanteeg contains medium- to coarse-grained plagioclase, quartz, lepidolite, K-feldspar, and muscovite with medium- to fine-grained accessory amblygonite, cassiterite, topaz, beryl, columbite-tantalite, monazite, zircon, apatite, and fluorite. Minor secondary albite and quartz are locally observed interstitially between primary plagioclase and quartz, while secondary lepidolite occurs locally along the edges of primary lepidolite indicating late-stage hydrothermal influence. Six monazite grains with homogeneous textures were analyzed using field emission (FE) EMPA and fifteen cassiterite grains were dated using LA-ICP-MS to determine the pegmatite formation age. The weighted mean age of 41 total measurements on monazite grains is determined as 144.0±3.3 Ma with MSWD=0.65 while the cassiterite geochronology yielded a U-Pb age of 135.3±2.4 Ma with MSWD=0.42. Additionally, ⁴⁰Ar/³⁹Ar plateau age for lepidolite is defined to be 131.25±0.28 Ma with MSWD=1.4 as a mean of two different measurements. These age results indicate that the Bayanteeg deposit formed during an episode of crustal thinning in the Idermeg terrane and eastern Mongolia that occurred between 145 Ma and 135 Ma following the crustal thickening that occurred from 165 Ma to 145 Ma due to the Mongol-Okhotsk Ocean closure. Because of the timing of the pegmatite emplacement, we argue that the Bayanteeg LCT pegmatite was