

Occurrence and Geological Features of LCT Pegmatite in the Kalba-Narym Belt, East Kazakhstan

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The Great Altai of Eastern Kazakhstan, part of the Central Asian Orogenic Belt, consists of four major metallogenic zones (Dyachkov et al., 2018) in which the Kalba-Narym Belt is famous for the occurrence of rare metals. The Great Altai accretion process is a result of the collision between the Kazakhstan and Siberian continents in the Late Carboniferous, which induced the large-scale formation of the Kalba-Narym batholith. The batholithic body is made up of several complexes, including Kunush plagiogranites and tonalites of 325 to 285 Ma, Kalguta granodiorites and leucogranites of 286 to 272 Ma, Kalba granites, aplites, and pegmatites of 300 to 275 Ma, and Monastery leucogranites and pegmatites of 285 to 271 Ma (Kotler et al., 2015). The latest fractionation stage of the Kalba-Narym batholith resulted in the formation of pegmatites, some of which are mineralized and can be classified as LCT pegmatites. These pegmatites are discovered in several regions of East Kazakhstan, including the Asubulak deposit cluster. The mineralized pegmatites are classified based on mineralogical and geochemical characteristics and are divided into three categories: a) microcline-albite with pollucite and petalite (Ta, Cs, Be, Sn), b) microcline-albite with spodumene (Ta, Nb, Cs, Li, Be, Sn), and c) spodumene-albite (Li, Ta, Nb, Sn) (Dyachkov et al., 2021). At the deposit scale, the structurally controlled mineralization occurs at the intersection of the EW-oriented major Asubulak fault with NS minor structures. At the greater regional scale, the orientation of pegmatitic bodies is aligned with the NW-SE direction of the Irtysh Shear Zone. This research documents the geological overview of the Kalba-Narym Belt in relation to mineralogical and structural variations within known and prospective regions. The preliminary research on various tourmaline types and their geochemical composition is undertaken for obtaining data on fluids responsible for the formation of mineralized pegmatites.