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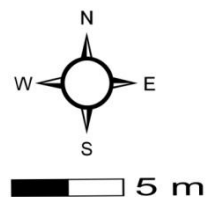
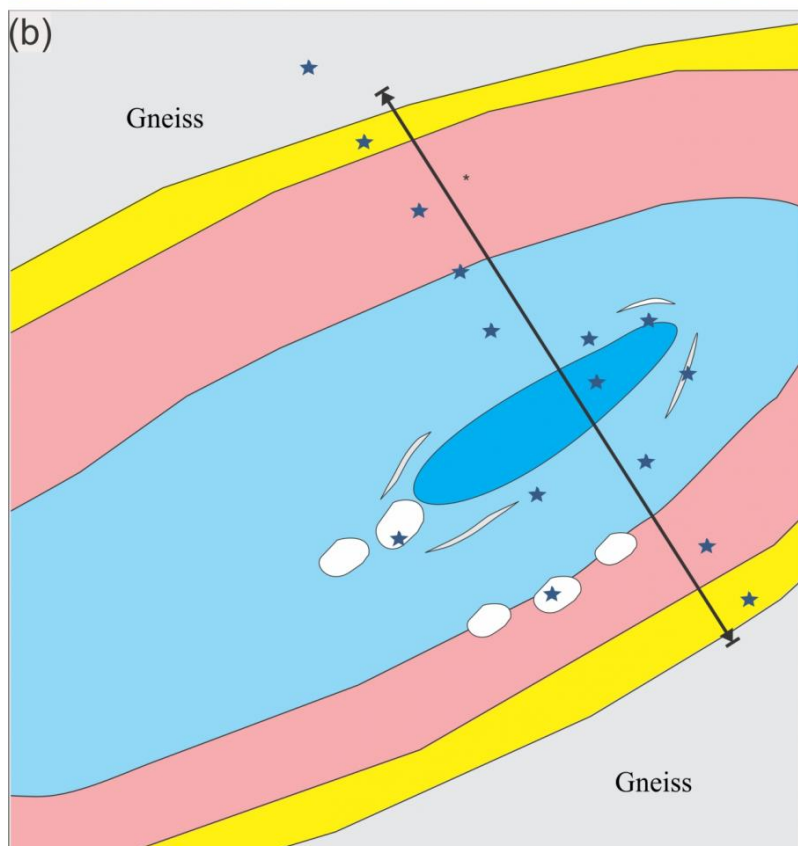
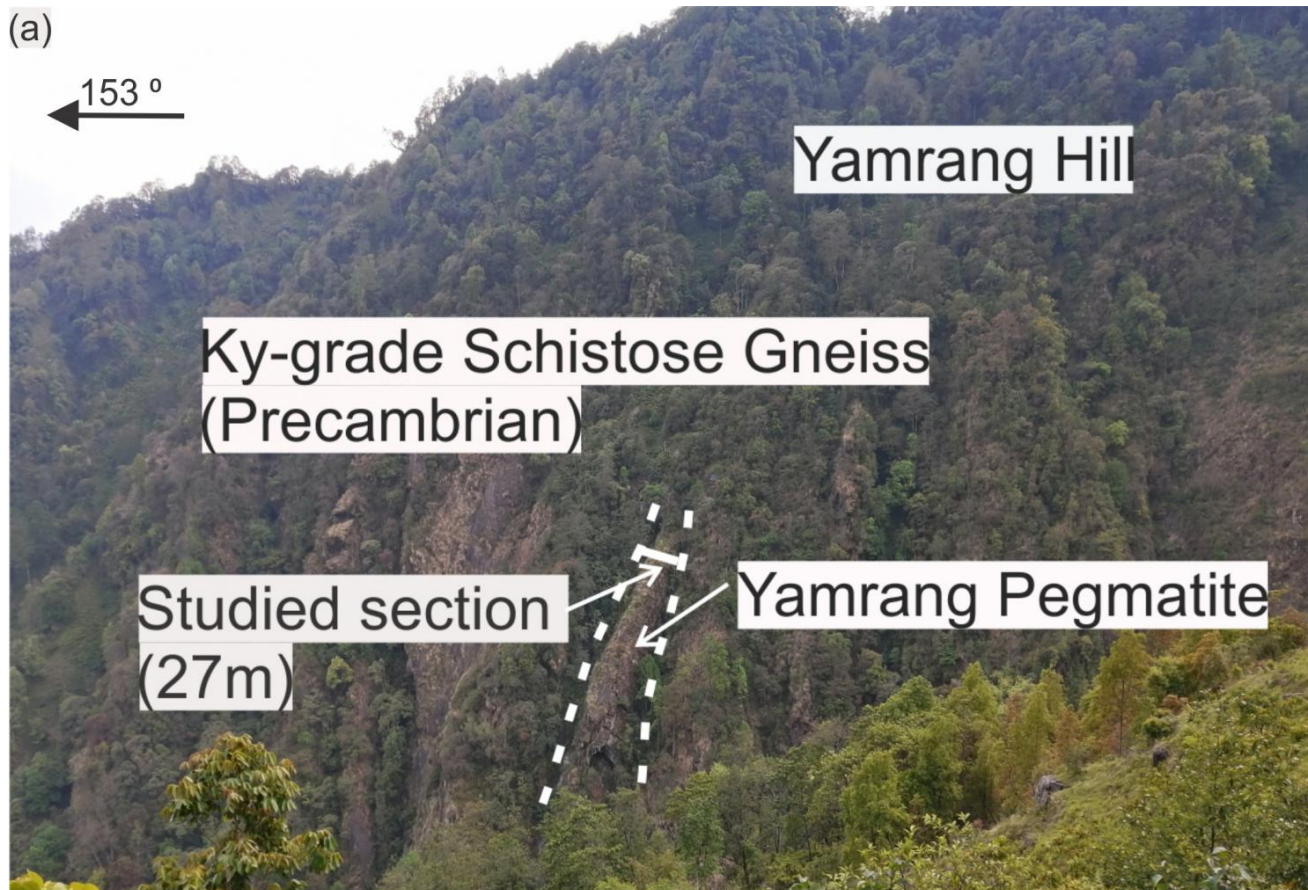
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Occurrence, Texture, and Mineralogy of Beryl-bearing Yamrang Pegmatite in Ikhabu Pegmatite Field, Eastern Nepal: New Beryl-Columbite Subtype REL Pegmatite from Himalaya

Sushmita Bhandari^{1, 2}, Kezhang Qin^{1, 2}, Qifeng Zhou³

1. Key Laboratory of Mineral Resources, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China, 2. University of Chinese Academy of Sciences, Beijing 100049, China, 3. Institute of Mineral Resources Research, China Metallurgical Geology Bureau, Beijing 101300, China

Rare metals, especially beryl-aquamarine, have been sporadically reported from Nepal Himalaya. However, occurrences of rare-element pegmatites (REL) from Nepal Himalaya, their distribution, mineralization characteristics, host-rock properties, and ages are unknown. Our work aims to present for the first time the detailed occurrences, distribution, types, and mineralization characteristics of the beryl-bearing Ikhabu pegmatite field from the Taplejung district of Eastern Nepal. We accessed the Yamrang, Sangsabu, and Wairung beryl-bearing pegmatite dikes in the Ikhabu area and presented the detailed study from the biggest Yamrang pegmatite. Yamrang pegmatite is an intensely beryl-mineralized, zoned pegmatite dike on Yamrang hill with 25- to 30-m width and 130-m visible extension, lying at 27.50° N, 87.73° E. Based on field geology, microscopic observation, and major and trace element analysis of beryl, garnet, and tourmaline, mineralogy, texture, and zonations of Yamrang pegmatite are characterized, classification of Ikhabu pegmatite field is done, evolution degree is identified, and possible exploration implications for REL mineralization in the Himalaya are discussed. The Ikhabu pegmatite field belongs to the beryl-columbite subtype, rare-element pegmatite, but also consists of aquamarine-bearing miarolitic pockets formed by late-stage hydrothermal activities. Yamrang pegmatite shows a pattern of axial symmetric zonation and can be differentiated into 5 mineralogical-textural zones, as follows: Zone 1) Saccharoidal albite+quartz+muscovite zone (wall zone); Zone 2) Blocky perthitic microcline zone (outer intermediate zone); Zone 3) Perthite+quartz+muscovite+albite+beryl (inner intermediate zone); Zone 4) Quartz+beryl core zone; and Zone 5) Miarolitic beryl pocket zone. Beryl occurs in zones 3, 4, and 5 in association with quartz and k-feldspar. Beryls are homogeneous to weakly zoned, green to blue, prismatic to columnar, and belonging to the sodic beryl type. They consist of low total alkali contents (<1 wt %), Na ~0.5 wt %, Li and Cs <0.5 wt %, and high Na/Li (i.e., >3.5) and high Fe content (0.7 wt %) with low REE, mostly below detection level (bdl) but elevated Be (59898.82 ppm) and Ga (25.06 ppm) content compared with world's evolved pegmatites. The garnets are reddish-brown, euhedral, and belong to the almandine-spessartine series (Xsps ~50) with high HREE (217 ppm) and Y vs. \sum REE (1.9). Tourmalines are black to greenish colored, Mg-Ca rich dravite-schorl type from outer zone to Fe-Mn rich schorl variety from inner zone with overall high Ti (0.4 wt %) and low Pb, Bi, and REE (bdl). Sodic beryl with low REE contents, spessartine garnet with Xsps ~50, high HREE and Y vs. \sum REE, and schorl tourmaline with high Ti and low Pb, Bi, and REE contents indicate that Yamrang pegmatite and thus the Ikhabu pegmatite field is modestly fractionated REL pegmatite. The higher evolution of Yamrang pegmatite than other pegmatites suggests the regional evolution direction from North to South in the Ikhabu Pegmatite field. Along with high alkali contents of beryl and high Xsps contents of garnet, high Li, Ga, Nb, Mn, Fe, and low Mg, Ti contents of schorl tourmaline are found as evolution indicators in the Ikhabu Pegmatite field and possibly are useful indicators in modestly fractionated pegmatites elsewhere.



- ★ Sample location
- ↔ Studied section
- Zone 1 Saccharoidal Ab+Qz+Ms
- Zone 2 Blocky perthitic Mc
- Zone 3 Perthite+Qz +Ms+Ab +Brl
- Zone 4 Qz+Brl
- Zone 5 Mirolitic pocket