

Cassiterite Deposits around the Liwong Pluton

Amphoe Chana, Nathawi, and Thepa, Changwat Songkhla

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ABSTRACT

Purpose of investigation is to study cassiterite deposits in this area, extent and boundary of the Liwong Pluton, relation between cassiterite and galena mineralization, distribution of cassiterite deposits around the pluton, and potential areas of cassiterite, galena and rare earths minerals.

The highest tin producing area in Changwat Songkhla is from the Liwong Pluton region. Production of tin concentrates was 6,406 metric tons (1975-1991) and the estimated value was more than one billion baht.

The investigated area is in Amphoe Chana, Amphoe Nathawi and Amphoe Thepa, between latitudes $6^{\circ}42' - 6^{\circ}57'N$. and longitudes $100^{\circ}42' - 100^{\circ}58'E$. Total area is approximately 600 sq.km.

Late Triassic to Early Jurassic granite intruded Middle to Late Triassic sedimentary rocks consisting of sandstone, siltstone, shale, mudstone, chert, and conglomerate. Their metamorphic equivalents occur along contacts between the intrusion and the country rocks. The sedimentary rocks named the Nathawi Formation which is mapped into the Chert member (older) and the Clastic member. Relation between the two members is fault contact. The conspicuous feature of chert beds in the Chert member is folded varying from isoclinal to recumbent folding whereas the Clastic member occurs as asymmetrical anticlines and synclines.

Quaternary sediments near shore-line is covered by silica sands. Some old channel alluvium lying in the west, southwest and southeast of the Liwong Pluton are tin placer deposits and some of them are 36 in depth.

Intrusive rocks are granite, aplite, and quartz veins, approximate exposure of 60 sq.km. Medium-grained granite consists of porphyritic and equigranular textures with biotite as characteristic accessory mineral. Hydrothermal Quartz veins are either tin bearing or tin barren, northeastward and northwestward trending, 2 mm. to tens of meter in thickness. Large quartz dike is 3.25 km. in length, 500-750 m. in width, and approximate average height 150 m., and N. 305° trending. Chemical analyses of granite and aplite from 15 localities are shown in variation diagrams for their major oxides and some trace elements.

Three prominent directions of fault are NNE., N., and WNW. They are strike-slip faults, reverse faults, thrust faults, and inferred fault.

Cassiterite deposits occurs as alluvial placers and hydrothermal quartz veins. Most of them located in the west and southwest of the pluton where 9 mines were operated. The other two mines due northeast and southeast of the pluton. Open-cast mining together with gravel-pump mining were operated in eight alluvial placers, at 6-36 m. in depth, with the grade of tin varying from 0.3 to 1.19 kg/cu.m. The vein-type deposits are operated under gophering and small tunnelling method of mining, and the grade of ore veins varies from 2.4 to 20 kg/cu.m.

Hydrothermal alteration occurs near tin bearing quartz veins and sulfide veins. There are three kinds: argillization, silicification and sericitization. XRD determination results of clay samples from alteration zones show peaks of quartz, kaolinite and mica.

Result from the study shows mineral potential areas on cassiterite, galena, and rare earths. The high silver content, 600 grams per metric ton, in galena-ore vein are reported.

Besides tin and lead ores there are granite as dimension stone, quartz for industrial uses, and silica sands.