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MINERALIZATION PATTERNS OF NORTH-WEST PENINSULAR MALAYSIA

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Abstract

North-west Peninsular Malaysia including the Langkawi Islands is characterised by a diversity of rocks which range in age from Cambrian to Tertiary. Five distinct centres of mineralization associated with acid magmatism can be recognised. The mineralization centres on the Langkawi Islands and in the Jerai-Semiling Area, Kedah are associated with stock-like presumably high level granitic intrusions. Skarn type sulphide and scheelite mineralization is prevalent on the south-east Pulau Langkawi and the surrounding islands. Bismuth (Bi) and copper (Cu) in the skarn had been mined in south-east Pulau Langkawi for a short period in the past. Other associated metals in these skarn include lead and zinc. Scheelite some of which is Mo-rich is found in several localities of the skarn rocks located largely at the granite contacts while scattered quartz-tourmaline-wolframite veins are found inside the granite. South-east Pulau Langkawi and the surrounding islands appear to hold good potential for pyrometasomatic scheelite and Cu-Bi deposits.

The Jerai-Semiling area is presently regarded as a Sn-Ta-Nb-Fe mineralization centre associated with the granitic Jerai massif. Economic tin deposits are alluvial in nature; containing in addition significant Ta-Nb minerals. The alluvial cassiterite and Ta-Nb minerals have been related to acid pegmatites veins and dikes commonly found in the south and west of the Jerai area. In situ cassiterite has been found in magnetite-hematite ore, pegmatite, hornblende granite, quartzite and various types of calc-silicate rocks. Mineable iron ore deposits largely consist of residual concentrations of secondary hematite with varying amount of magnetite. The original economic iron ore deposits are interpreted as pyrometasomatic magnetite (minor hematite) deposits which had replaced calc-silicate rocks and are usually located at contacts of granite and pegmatites with other rock types. Bands, lenses and disseminations of sulphides consisting of chalcopyrite, monoclinic pyrrhotite, pyrite and arsenopyrite are found quite commonly in the schist and calc-silicate rocks of the Jerai area. The Jerai area is believed to hold potential for primary Sn-Fe skarn type (magnetite-cassiterite) and cassiterite-sulphide replacement type deposits.

The mineralization centres at Gumong China-Kaki Bukit Area, Perlis and Sintok Area, Kedah are associated with the distal parts of two elongated granitic batholiths which had extended southward from Thailand into Peninsular Malaysia. The source of the cassiterites in the famous cave mines and other gravel pump mines in the general area of Kaki Bukit is from the Gumong China granite. Evidence indicates that these original primary sources at Gumong China were in the form of quartz-tourmaline-cassiterite veins. Abundant pseudomorphs of hematite after pyrite in the semi-hard cave alluvium indicates the presence of abundant sulphides, mainly pyrite in the original source area. Lead and zinc sulphides have been reported to occur in the limestone hills of Kaki Bukit Area.

The Sintok Area, Kedah had been famous for its Sn-W mineralization especially at Bukit Kachi where substantial cassiterite and wolframite were mined from numerous greisen bordered veins of significant depth. The Bukit Kachi mineralization is quite intense and are largely exocontact and consists of several parallel veins cutting tourmaline schist.

Greisenized economical endocontact cassiterite mineralization, but of lesser intensity, has been found at several localities. Diffuse exocontact cassiterite mineralization in the schist at numerous localities within 2 km of the granite contacts has given rise to eluvial tin deposits which had been worked by ground sluicing (lampang) in the past and these together with the endocontact mineralization had contributed to the thin but rich gravelly to bouldery placer deposits in the Sungai Sintok and Sungai Badak drainage systems.

The fifth mineralization centre is located in the general area of Klian Intan, Perak and Baling, Kedah. This centre is associated with the northern extension of the Bintang Range Batholith where multiple phase granitic intrusions have been mapped. Alluvial tin is being mined in around Baling and Kroh, Kedah while near Kroh and in Klian Intan (Perak) parallel sheeted and stockwork veins cutting the meta-sediments are being mined by open-cut methods. Alluvial tin and float barite ores had been located in the Sungai Pong area which is approximately 15 km south of Kroh.