

Type deposits of primary gold mineralization in the Central Belt of Peninsular Malaysia

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Abstract: A study of gold mineralization of the Central Belt of Peninsular Malaysia was made, based on fluid inclusion, mineralogy and field observations. The gold mineralizations in the Central Belt can be divided into three types, viz., gold mineralization in quartz veins, gold mineralization in massive sulphides and gold mineralization in skarn. Of the three types, gold mineralization in the quartz veins is the most dominant and being actively mined while the others are limited and of less economic importance. Gold mineralization in quartz veins is distributed from Batu Melintang, Panggung Lalat in Kelantan, through Tersang, Selinsing, Kecau Tui, Penjom and Raub in Pahang to Gunung Ledang in Johor. This mineralization has two styles, viz., gold together with sulphides and gold together with base-metal and carbonate. Fluid inclusion studies indicate that gold-bearing quartz veins in Central Pahang are formed at 50–1,500 m depth, at a temperature range of 100–350°C and salinity of 0.5–4.8 wt% Gold-bearing quartz veins are steeply dipping fault and shear zones trending roughly north-south. Common associated sulphide minerals are pyrite and arsenopyrite while galena, chalcopyrite, sphalerite, tetrahedrite, stibnite and cinnabar are occasionally observed at certain localities. Gold mineralization in massive sulphide is found in Manson's Lode, Sokor, Kelantan and Tasik Chini in Pahang and its common associated minerals are galena, pyrite, sphalerite, chalcopyrite, pyrrhotite and hematite. This type of gold mineralization was once mined and is regarded as a Kuroko-type massive sulphide, formed in an underwater marine environment. Gold mineralization in skarn is not economically important and has been traced in Sungai Sok, Kelantan. The types of primary gold mineralization in the Central Belt are exemplified.

Abstrak: Suatu kajian terhadap permineralan emas di Jalur Tengah Semenanjung Malaysia telah dilakukan, merangkumi kajian bendalir terkeping, mineralogy bijih dan cerapan lapangan. Permineralan emas di Jalur Tengah ini boleh dibahagikan kepada tiga jenis iaitu permineralan emas dalam telerang kuarza, permineralan emas dalam sulfida massif dan permineralan emas dalam skarn. Antara tiga jenis ini, permineralan emasa dalam telerang kuarza paling banyak dan dilombong manakala yang lain terhad dan kurang penting. Permineralan emas dalam telerang kuarza tersebar dari utara iaitu Batu Melintang, ke Panggung Lalat di Kelantan, ke Tersang, Selinsing, Kecau Tui, Penjom dan Raub di Pahang hingga ke Gunung Ledang di Johor. Permineralan ini mempunyai dua gaya, iaitu gaya kuarza emas bersama sulfida dan gaya emas bersama logam bes serta karabonat. Kajian bendalir terkeping menunjukkan pembentukan telerang beremas bagi sample di Pahang terbentuk pada kedalaman antara 50–1,500 m, pada suhu 100–350°C dengan kamasinan air garam 0.5–4.8 wt%. Telerang emas berkemiringan tinggi, terdiri daripada zon sesar dan ricih berarah hampir utara-selatan. Mineral-mineral sulfida lazim bersekutuan dengannya ialah pirit dan arsenopirit manakala galena, kalkopirit, tetrahedrit, stibnit dan sinabar kadangkala dilihat pada lokaliti tertentu. Permineralan emas dalam sulfida massif terdapat di Manson's Lode di Sokor, Kelantan dan di Tasik Chini Pahang dengan mineral-mineral bersekutu terdiri daripada galena, pirit, sfalerit, kalkopirit, piroottit dan hematite. Jenis ini pernah diusahakan dan dianggap sebagai sulfida massif jenis Kuroko terbentuk di dasar laut. Permineralan emas jenis skarn tidaklah penting di Jalur Tengah dan dikesan di Sungai Sok, Kelantan.

INTRODUCTION

Most gold deposits are characterized by mineral association, e.g. pyrite, chalcopyrite, arsenopyrite, sphalerite and galena. Gold mineralizations in the Central Belt of Peninsular Malaysia contain sulphide minerals, related to sheared quartz veins and breccia. Gold is present in quartz veins and not observed to be disseminated in wall rocks. Auriferous vein systems are structurally controlled. Among structural controls are: (1) spatial distribution along reverse fault; (2) syn- to late timing relative to the ductile-brittle deformation; (3) lateral fault and sheared zone. In the present study samples from Sokor, Kecau Tui, Tersang, Selingsing, Raub and Penjom were analysed.

GOLD MINERALIZATION IN CENTRAL BELT

The Central belt is the richest gold-bearing belt of Peninsular Malaysia (Fig. 1). In this belt, the distribution of gold mineralizations stretches from Batu Melintang near the Malaysia-Thai border in the north through Sokor, Panggung Lalat and Gua Musang in Kelantan through Selinsing, Kecau Tui, Penjom and Raub in Pahang and ends in Gunung Ledang, Johor. The gold mineralization episode appears to be related to the intermediate intrusives rather than acid Triassic granites. In most cases the host rocks for the mineralizations are volcano-clastics, limestone and metasedimentary rocks.