

Characteristics of primary tin mineralization associated with magnetite bedding-plane lodes, Belitung Island, Indonesia: A case study of the Batubesi and Pagar Damar prospects

Yacobus Ekakrismi Nugraha*, Jordan Romora Simarmata, and Lucas Donny Setijadji

Universitas Gadjah Mada (UGM), Yogyakarta, Indonesia, *e-mail,
ekakrismi.nugraha@gmail.com

Belitung island in Indonesia is located at the southern tip of the SE Asian Tin Belt, and is well known for hosting primary major tin deposits such as Tikus and Kelapa Kampit. There are also several iron lodes present that have unclear genetic links to the tin mineralization. We studied two of the iron lodes, i.e., the Batubesi and Pagar Damar occurrences in eastern Belitung island. The aims of this study were to characterize geology, mineralogy, and geochemistry of the mineralization and to determine if either of these mineral occurrences are genetically related to the tin mineralization. Research methods consisted of geological-alteration mapping, petrography, mineralogical analysis, and geochemical analysis using XRF and ICP-MS.

The magnetite bedding-plane lode at Batubesi is striking NNW-SSE and is 3,000 m long and 5 m wide. This lode is associated with a strike-slip fault contact between Triassic granite and Paleozoic sandstone. Recent mining activities of the iron ore reveal that within about a 100 m vertical zone, mineralization grades from massive iron at the top, to skarnoid Fe-base metals style ores with pargasite, fluorite, chlorite, and plagioclase in the middle, and to greisen associated with granitic dike swarms at the base. Sericitic alteration appears in the greisen zone, whereas wide argillic alteration dominates the wider upper zone. Cassiterite is found disseminated within the lode, while cassiterite appears as replacement texture around the magnetite-fluorite bands in the skarn although at less abundance than in the magnetite bedding-plane lode. The Pagar Damar prospect, located 20 km to south of Batubesi, is characterized by a magnetite bedding-plane lode and magnetite-quartz fault veins hosted by Paleozoic claystone interbedded with sandstone. The lode is striking N290E and is 500 m long and 1.5 m wide, while the fault veins trend N-S and are only 0.1 m wide. Silicification is narrowly present surrounding the lode and argillic alteration is more widespread at the outer zone. Tin is present as cassiterite, found as tiny inclusions in quartz in fault veins, while within the bedding plane lode, cassiterite occurs as disseminated grains in magnetite ore. This study concludes that iron lodes are genetically associated with tin mineralization and they form as the outer and shallower zone. Iron lodes can be used as exploration guide towards the high-grade tin zone within the greisenized granite at deeper levels.