ABSTRAK

KONTROL STRUKTUR GEOLOGI TERHADAP KARAKTERISTIK ENDAPAN TIMAH (Sn) PRIMER PADA PIT PAKU PT TIMAH TBK DI DAERAH PAKU, BANGKA SELATAN, KEPULAUAN BANGKA BELITUNG

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Daerah Pit Paku, Kecamatan Payung, Kabupaten Bangka Selatan, merupakan salah satu lokasi endapan timah primer yang memperlihatkan keterdapatan alterasi hidrotermal, urat mineral, dan breksi hidrotermal. Penelitian ini bertujuan untuk mengetahui kondisi geologi daerah penelitian, karakteristik endapan timah primer, serta menganalisis kontrol struktur geologi terhadap alterasi, mineralisasi, geometri tubuh bijih, dan distribusi kadar Sn–Pb–Zn. Metode penelitian meliputi pemetaan geologi rinci pada 99 titik pengamatan, analisis petrografi, mineragrafi, *X-ray Fluorescence* (XRF), dan *Analytical Spectral Devices* (ASD). Data yang diperoleh kemudian diintegrasikan untuk mengkaji hubungan antara litologi, struktur geologi, alterasi, mineralisasi, dan distribusi kadar logam. Hasil penelitian menunjukkan bahwa daerah penelitian tersusun atas Satuan Filit Kompleks Malihan Pemali dan Satuan Meta-batupasir Kompleks Malihan Pemali. Struktur geologi yang berkembang berupa sesar mendatar kiri, sesar mendatar kanan, sesar normal, kekar, dan urat. Alterasi hidrotermal yang teridentifikasi terdiri atas zona silisifikasi, zona filik, dan zona argilik dengan himpunan mineral kuarsa, muskovit, phengit, illit-smektit, kaolinit, halloisit, dan dikit. Mineralisasi dicirikan oleh kehadiran kasiterit yang berasosiasi dengan pirit, kalkopirit, galena, dan kuarsa. Hasil analisis XRF menunjukkan kadar Sn mencapai 137.305 ppm, Pb mencapai 15.964 ppm, dan Zn mencapai 1.311 ppm. Hasil integrasi data menunjukkan bahwa sesar mendatar kiri berarah hampir Barat–Timur berperan sebagai jalur utama migrasi fluida hidrotermal dan mengontrol perkembangan alterasi, pembentukan breksi hidrotermal, pengendapan kasiterit, serta distribusi kadar Sn. Sementara itu, unsur Pb dan Zn cenderung berasosiasi dengan mineral sulfida. Dengan demikian, struktur geologi merupakan faktor utama yang mengontrol pembentukan endapan timah primer di Pit Paku.

Kata kunci: ASD, Kasiterit, Struktur Geologi, Timah Primer, XRF

ABSTRACT

GEOLOGICAL STRUCTURE CONTROL ON THE CHARACTERISTICS OF PRIMARY TIN (SN) DEPOSITS AT THE PAKU PIT OF PT TIMAH TBK, PAKU AREA, SOUTH BANGKA, BANGKA BELITUNG ISLANDS

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The Pit Paku area, Payung District, South Bangka Regency, is one of the primary tin deposit locations that exhibits the presence of hydrothermal alteration, mineral veins, and hydrothermal breccias. This study aims to determine the geological conditions of the study area, the characteristics of the primary tin deposit, and to analyze the control of geological structures on alteration, mineralization, ore body geometry, and the distribution of Sn–Pb–Zn grades. The research methods include detailed geological mapping at 99 observation points, petrographic analysis, mineragraphic analysis, X-ray Fluorescence (XRF), and Analytical Spectral Devices (ASD). The obtained data were then integrated to examine the relationship between lithology, geological structures, alteration, mineralization, and metal grade distribution.The results indicate that the study area is composed of the Phyllite Kompleks Malihan Pemali Unit and Metasandstone Kompleks Malihan Pemali Unit. The geological structures developed in the area include sinistral strike-slip faults, dextral strike-slip faults, normal faults, joints, and veins. The identified hydrothermal alteration consists of silicification, phyllic, and argillic zones with mineral assemblages of quartz, muscovite, phengite, illite-smektite, kaolinite, halloysite, and dickite. Mineralization is characterized by the presence of cassiterite associated with pyrite, chalcopyrite, galena, and quartz. XRF analysis results show Sn concentrations reaching 137,305 ppm, Pb concentrations reaching 15,964 ppm, and Zn concentrations reaching 1,311 ppm. The integrated data indicate that a nearly east–west trending sinistral strike-slip fault acted as the main pathway for hydrothermal fluid migration and controlled the development of alteration, the formation of hydrothermal breccias, the deposition of cassiterite, and the distribution of Sn grades. Meanwhile, Pb and Zn are commonly associated with sulfide minerals. Therefore, geological structures are the main factor controlling the formation of the primary tin deposit in the Pit Paku area.

Keywords: *ASD, Cassiterite, Geological Structure, Primary Tin Deposit, XRF.*