

Daerah penelitian terletak di Desa Cihaur, Kecamatan Simpenan, Kabupaten Sukabumi, Provinsi Jawa Barat pada Izin Usaha Pertambangan PT Generasi Muda Bersatu yang berada di busur magmatik Sunda bagian selatan yang berumur Miosen. Berdasarkan studi awal, daerah penelitian memiliki potensi mineralisasi Pb-Zn dengan mineral utama berupa galena dan sfalerit. Namun demikian belum diketahui kontrol geologi, mineralisasi, dan geokimia dari potensi endapan tersebut. Berdasarkan hal tersebut, penelitian ini memiliki tujuan untuk mengetahui kondisi geologi daerah penelitian, mengetahui karakteristik geokimia intrusi dan mineralisasi, serta merekonstruksi model genetik mineralisasi. Untuk mencapai hal tersebut dilakukan pendekatan dengan analisis petrografi, mikroskopi bijih, *X-Ray Diffraction (XRD)*, *Inductively Coupled Plasma Mass Spectrometry (ICP-MS)*, *Mikro X-Ray Fluoresence (XRF)*, dan *Atomic Absorption Spectrometer (AAS)*. Daerah penelitian tersusun atas satuan perselingan lapilli tufa-breksi tufa, intrusi dasit dan satuan tufa, sedangkan data *logging* menunjukkan lima satuan litologi yakni satuan perselingan lapilli tufa-tufa, satuan batugamping, satuan perselingan lapilli tufa-breksi tufa, intrusi dasit, satuan tufa. Alterasi yang berkembang terbagi menjadi dua sistem, yaitu berkaitan dengan skarn dan berkaitan dengan urat kuarsa. Alterasi berkaitan dengan skarn meliputi alterasi metamorfisme isokimia, metasomatisme prograde (wolastonit-klinopiroksen+garnet), retrograde (klorit-epidot-kalsit+aktinolit), propilitik (klorit-epidot-kalsit), serta argilik (mineral lempung). Alterasi yang berkaitan dengan sistem urat meliputi alterasi silisifikasi, silika-lempung, lempung-silika, argilik, dan propilitik. Mineralisasi yang dijumpai berupa sfalerit, galena, pirit 1 (anhedral), pirit 2 (euhedral), pirhotit, kalkopirit, dan kerusit. Intrusi dasit berdasarkan diagram normalisasi rasio $\text{CaO}/(\text{K}_2\text{O} + \text{Na}_2\text{O} + \text{CaO})$ versus saturasi aluminium menunjukkan bahwa intrusi dasit termasuk ke dalam intrusi metaluminus. Secara geokimia, skarn prograde dan retrograde menunjukkan rentang unsur mayor yang luas, namun skarn yang termineralisasi dan sulfida masif menunjukkan kemiripan pola unsur jejak pada batugamping fanerozoik pada diagram laba-laba ternormalisasi. Diagram plot biner Nb vs unsur imobil lain serta Al vs unsur imobil lain dapat membedakan dengan jelas antara skarn-masif sulfida dan *metalimestone* dengan intrusi dasit. *Metalimestone*, skarn, dan masif sulfida memiliki nilai anomali Nb negatif dibandingkan dengan intrusi dasit, sehingga skarn Cihaur dapat diklasifikasikan sebagai eksoskarn. Pembentukan mineralisasi daerah penelitian terbagi menjadi lima tahap yaitu (1) pengendapan batuan piroklastik (tufa, lapilli tufa, breksi tufa) dan pembentukan batugamping secara berselingan, (2) tahap skarn metamorfisme isokimia, (3) skarn progradasi metasomatisme, (4) skarn retrogradasi dan argilik-propilitik, dan (5) supergen.

Kata kunci : Skarn, Cihaur, Pb-Zn, geokimia, batugamping

ABSTRACT

The research area is located in Cihaur Village, Simpenan District, Sukabumi Regency, West Java Province, on the Mining Business License of PT Generasi Muda Bersatu, situated in the magmatic arc of the southern part of the Sunda, which is Miocene-aged. Based on preliminary studies, the research area has the potential for Pb-Zn mineralization with the main minerals being galena and sphalerite. However, the geological controls, mineralization, and geochemical characteristics of this potential deposit are not yet known. Therefore, this study aims to determine the geological conditions of the research area, understand the geochemical characteristics of intrusions and mineralization, and reconstruct the genetic model of mineralization. To achieve these objectives, a methodological approach involving petrographic analysis, ore microscopy, X-Ray Diffraction (XRD), Inductively Coupled Plasma Mass Spectrometry (ICP-MS), Micro X-Ray Fluorescence (XRF), and Atomic Absorption Spectrometer (AAS) is employed. The research area consists of units of intercalated lapilli tuff-breccia tuff, dacite intrusion, and tuff units. Data logging indicates five lithological units: intercalated lapilli tuff-tuff units, limestone units, intercalated lapilli tuff-breccia tuff units, dacite intrusion, and tuff unit. The developed alteration is divided into two systems: skarn-related alteration and quartz vein-related alteration. Skarn-related alteration includes isochemical metamorphism alteration, prograde metasomatism (wollastonite-clinopyroxene+garnet), retrograde (chlorite-epidote-calcite+actinolite), propylitic (chlorite-epidote-calcite), and argillic (clay minerals). Vein-related alteration includes silicification, silica-clay, clay-silica, argillic, and propylitic alterations. The encountered mineralization includes sphalerite, galena, pyrite 1 (anhedral), pyrite 2 (euhedral), pyrrhotite, chalcopyrite, and cerussite. Based on the normalization diagram of the $\text{CaO}/(\text{K}_2\text{O} + \text{Na}_2\text{O} + \text{CaO})$ ratio versus aluminum saturation, the dacite intrusion belongs to the metaluminous intrusion. Geochemically, prograde and retrograde skarns exhibit a wide range of major elements, while mineralized skarns and massive sulfides show similarity in trace element patterns to Phanerozoic limestone on normalized spider diagrams. Bivariate plots of Nb versus other immobile elements and Al versus other immobile elements can clearly distinguish between skarn-massive sulfide and metalimestone with dacite intrusion. Metalimestone, skarn, and massive sulfide have relatively negative Nb values compared to dacite intrusion, thus classifying Cihaur skarn as exoskarn. The formation of mineralization in the research area is divided into five stages: (1) deposition of pyroclastic rocks (tuff, lapilli tuff, tuff breccia) and concurrent limestone formation, (2) isochemical metamorphism skarn stage, (3) prograde skarn metasomatism, (4) retrograde skarn and argillic-propylitic, and (5) supergene processes.

Keywords: Skarn, Cihaur, Pb-Zn, geochemistry, limestone.