

SARI

Daerah Kotabunan merupakan salah satu daerah yang berada pada Provinsi Sulawesi Utara dengan prospek mineralisasi emas di lokasi Izin Usaha Penambangan (IUP) milik PT. Arafura Surya Alam. Daerah ini memiliki beberapa tipe endapan mineralisasi, salah satu diantaranya merupakan endapan skarn Prospek "B" yang menjadi prospek penelitian dilakukan. Tujuan dari penelitian ini yaitu memahami kondisi geologi, karakteristik alterasi, mineralisasi bijih yang mempengaruhi proses pembentukan mineralisasi. Metode penelitian dibagi menjadi pemetaan geologi, deskripsi batuan inti bawah permukaan dan berbagai analisis laboratorium. Analisis laboratorium terdiri dari analisis petrografi, mikroskopi bijih, XRF (*X-Ray Fluorescence*), dan FA-AAS (*Fire Assay-Atomic Absorption Spectrometry*). Dari hasil analisis, ditemukan unit litologi berupa batugamping, batupasir karbonatan, batuserpih, intrusi andesit, lava dasit, tuf lapili, dan kemudian endapan koluvium. Zona alterasi yang berkembang di daerah penelitian diantaranya adalah *skarn prograde* dan *skarn retrograde*. Berdasarkan *mineral assemblages*, zona alterasi *skarn prograde* terbagi menjadi alterasi kuarsa-garnet-piroksen-kalsit dan kuarsa-diopsid-epidot-kalsit, dan zona alterasi *retrograde skarn* dibagi menjadi alterasi kuarsa-serisit, alterasi serisit-kuarsa-lempung, dan kuarsa-klorit-kalsit. Karakteristik mineralisasi yang berkembang di daerah penelitian dibedakan berdasarkan bentuk bijih, yaitu *massive replacement*, urat, dan diseminasi, dan mineral bijih yang dijumpai pada batuan diantaranya adalah sfalerit, galena, pirit, dan kalkopirit. Mineral bijih berasosiasi dengan tipe endapan skarn dan terkayakan unsur Au dan Zn dalam bentuk bijih masif. Kadar Au yang ditemukan pada endapan ini paling rendah sebesar 4,71 ppm dan paling tinggi 448,35 ppm. Pembentukan mineralisasi di daerah penelitian diawali oleh intrusi andesit pada batugamping yang menyebabkan terjadinya proses metasomatism, struktur geologi berarah NW – SE turut memengaruhi pengendapan fluida kaya logam dan mengendapkan bijih pada batuan. Proses alterasi dan mineralisasi kemudian dipengaruhi oleh infiltrasi air meteorik pada batuan sehingga berkembangnya alterasi mineral *hydrous* yang mengakhiri pembentukan endapan skarn.

Kata kunci: alterasi, mineralisasi, skarn, emas, Kotabunan.

ABSTRACT

The Kotabunan area is one of the areas located in North Sulawesi Province with gold mineralization prospects at the mining license area owned by PT. Arafura Surya Alam. This area has several types of mineralization deposits, one of which is the “B” Prospect skarn deposit, as the research subject. The purpose of this study is to understand the geological conditions, alteration features, and ore characteristics that influence the mineralization formation process. The research methods were divided into geological mapping, subsurface core rock description, and various laboratory analyses. Laboratory analyses consisted of petrographic analysis, ore microscopy, XRF (X-Ray Fluorescence), and FA-AAS (Fire Assay-Atomic Absorption Spectrometry). From the analysis results, lithological units were divided into limestone, carbonate sandstone, shale, andesite intrusion, dacite lava, lapilli tuff, and then colluvial deposits. The alteration zones developed in the study area consist of prograde skarn and retrograde skarn. Based on mineral assemblages, the prograde skarn alteration is subdivided into quartz–garnet–pyroxene–calcite and quartz–diopside–epidote–calcite assemblages, while the retrograde skarn alteration comprises quartz–sericite, sericite–quartz–clay, and quartz–chlorite–calcite assemblages. The mineralization characteristics in the study area are distinguished by ore textures, including massive replacement, vein, and disseminated types. Ore minerals identified in the host rocks include sphalerite, galena, pyrite, and chalcopyrite. The ore minerals are associated with a skarn-type deposit and show enrichment in Au and Zn, particularly in massive ore bodies. Gold grades in the deposit range from a minimum of 4.71 ppm to a maximum of 448.35 ppm. The formation of mineralization in the study area was initiated by andesitic intrusion into limestone, triggering metasomatic processes. NW–SE trending geological structures played a significant role in controlling the migration of metal-rich fluids and the deposition of ore minerals. Subsequently, alteration and mineralization were influenced by the infiltration of meteoric water, leading to the development of hydrous mineral alteration that marked the final stage of skarn deposit formation..

Keywords: *alteration, mineralization, skarn, gold, Kotabunan.*