

SARI

Indonesia timur memiliki sumber daya mineral yang cukup menarik salah satunya merupakan endapan nikel laterit. Proses laterisasi batuan ultramafik menjadi nikel laterit, dicirikan dengan kehadiran profil laterisasi. Masing-masing zona dalam profil endapan nikel laterit memiliki karakteristik yang berbeda baik aspek fisik maupun kandungan unsur kimia. Pengetahuan tiap zona tersebut menjadi point penting dalam keberlangsungan kegiatan pertambangan nikel. Lokasi daerah penelitian berada pada PT. GEO PARTNER MINERAL BLOK X di Desa Siuna, Kecamatan Pagimana, Kabupaten Banggai, Provinsi Sulawesi Tengah. Maksud dari penelitian ini untuk melakukan analisis dan kajian karakteristik endapan nikel laterit pada PT. GEO PARTNER MINERAL BLOK X. Tujuan penelitian ini untuk mengetahui karakteristik tiap zona laterit, mengetahui kadar dan pola dari unsur kimia dari tiap zona laterit, serta menerapkan *machine learning* untuk klasifikasi tiap zona endapan nikel laterit dan diketahuinya tingkat akurasi model. Metode penelitian ini adalah kualitatif dan kuantitatif yang diintegrasikan dengan data geologi permukaan. Penerapan dari *machine learning* menggunakan *Convolution Neural Network* (CNN). Pengamatan aspek fisik karakteristik nikel dilakukan berdasarkan tekstur dan warna, sedangkan aspek kimia dilakukan melalui 10 unsur kimia meliputi Ni, Co, Fe, MgO, SiO, CaO, Al₂O₃, dan Cr₂O₃. Penilaian aspek fisik di terapkan lebih lanjut dalam membangun *machine learning*. Berdasarkan hal itu dapat ditarik kesimpulan Karakteristik nikel pada daerah penelitian dibagi menjadi 3 zona meliputi *overburden* (top soil dan limonit), *ore* nikel (kaya garnierite dan serpentin), dan *Bedrock*. Pola distribusi unsur Fe dan Al₂O₃ terkayakan pada zona *overburden*. Sedangkan Ni, MgO dan SiO terkayakan pada zona saprolit. Arsitektur CNN dibangun menggunakan 3 layer konvolusi dan 1 *fully connected layer*. Skenario perbandingan data *train* : *validation* yaitu 80:20. Hasil akurasi mencapai 80 %.

Kata Kunci : *CNN, Karakteristik, Nikel, dan Ore.*

ABSTRACT

Eastern Indonesia has quite interesting mineral resources, one of which is laterite nickel deposits. The process of laterization of ultramafic rocks into laterite nickel, is characterized by the presence of a laterization profile. Each zone in the laterite nickel deposit profile has different characteristics, both in terms of physical and chemical elements. Knowledge of each zone is an important point in the sustainability of nickel mining activities. The location of the research area is at PT. GEO PARTNER MINERAL BLOK X in Siuna Village, Pagimana District, Banggai Regency, Central Sulawesi Province. The purpose of this research is to analyze and study the characteristics of nickel laterite deposits at PT. GEO PARTNER MINERAL BLOK X. The purpose of this study was to determine the characteristics of each laterite zone, to determine the levels and patterns of chemical elements from each laterite zone, and to apply machine learning for the classification of each laterite nickel deposit zone and to determine the level of model accuracy. This research method is qualitative and quantitative which is integrated with surface geological data. Implementation of machine learning using Convolution Neural Network (CNN). The physical aspects of nickel characteristics were observed based on texture and color, while the chemical aspects were carried out through 10 chemical elements including Ni, Co, Fe, MgO, SiO, CaO, Al₂O₃, and Cr₂O₃. Physical aspect assessment is further applied in building machine learning. Based on this, it can be concluded that the nickel characteristics in the study area are divided into 3 zones including overburden (top soil and limonite), nickel ore (rich in garnierite and serpentine), and Bedrock. The distribution pattern of Fe and Al₂O₃ elements is enriched in the overburden zone. Meanwhile, Ni, MgO and SiO are enriched in the saprolite zone. CNN architecture is built using 3 convolution layers and 1 fully connected layer. The comparison scenario for data train: validation is 80:20. Accuracy results reach 80%.

Keywords: CNN, Characteristics, Nickel, and Ore.