

**GEOLOGI DAN ANALISIS FRAKSINASI UNTUK
MENGETAHUI KARAKTERISTIK NIKEL LATERITE
PADA ZONA SAPROLIT LAPANGAN ‘KAPALEO’ PULAU
GEBE, MALUKU UTARA, HALMAHERA TENGAH**

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Pulau Gebe Kabupaten Halmahera Tengah, Provinsi Maluku Utara termasuk dalam *volcanic belts* dan terdapat kompleks basement batuan ultramafik-mafik. Secara Geografis daerah telitian berada pada koordinat $X_{min} = 544000$, $X_{max} = 545500$, $Y_{min} = 9992500$, dan $Y_{max} = 9993750$ (UTM WGS84 Zona 52S) yang tercangkup dalam Peta Geologi Lembar Waigeo, Irian Jaya dengan skala 1:250.000.

Secara geomorfik, daerah telitian dibagi menjadi tiga bentuk asal dan empat bentuk lahan yaitu, Satuan Bentuk Asal Struktural terdiri dari lereng struktural (S1), Satuan Bentuk Asal Denudasional terdiri dari satuan Perbukitan bergelombang lemah (D1) dan Lereng denudasional (D2), dan Satuan Bentuk Asal Antropogenik terdiri dari PIT (A2).

Stratigrafi daerah telitian tersusun atas dua satuan, yaitu satuan litodem Peridotit Gebe yang terdiri dari Harzburgit, Lherzolite, dan Piroksenit dan satuan litodem Serpentin Gebe yang merupakan bagian dari Kompleks Ofiolite Waigeo berumur 148 ± 8 Ma (*Jurassic* Atas) berdasarkan *dating radiometric* K/Ar *xenolith harzburgite* pada intrusi *dike* pada Pulau Gag. (Supriatna, 1995).

Struktur geologi yang berkembang pada daerah telitian adalah sesar dan kekar yang dijumpai pada LP 7 berupa *Reverse Right Slip Fault* dengan arah $N296^{\circ}E/85^{\circ}$, *Right Slip Fault* dengan arah $N222^{\circ}E/62^{\circ}$ dan sesar pada Lp 10 berupa *Reverse Right Slip Fault* dengan arah $N142^{\circ}E/85^{\circ}$. Sedangkan struktur kekar yang dijumpai pada daerah penelitian berupa kekar gerus berpasangan pada LP 26 dengan arah kekar gerus 1 $N293^{\circ}E/75^{\circ}$ dan kekar gerus 2 $N240^{\circ}E/42^{\circ}$ dan kekar terisi mineral (*Extension Joint Release Joint*) Lp 40 dengan arah umum kekar 1 $N 206^{\circ}E / 69^{\circ}$, kekar 2 $N 102^{\circ}E / 85^{\circ}$, release joint $N 149^{\circ} E / 67^{\circ}$, extension joint $N 243^{\circ}E / 81^{\circ}$, dengan arah tegasan Timut laut-Barat daya.

Karakteristik nikel laterite dikelathui dengan profil nikel laterite serta analisis fraksinasi pada tiga dinding Lapangan ‘Kapaleo’ untuk mengetahui kelimpahan unsur Ni, Fe, Mg, dan Si pada ukuran fraksi tertentu (5cm, 2,5cm, dan <1cm) didukung dengan hasil analisis XRF (*X-Ray Fluorescence*) Pengambilan tiga titik fraksi didasarkan atas pengamatan lapangan yang dianggap mewakili karakteristik pada Lapangan ‘Kapaleo’, Titik pertama diambil karena *bedrock-nya* berupa batuan serpentin sehingga dapat mengetahui karakteristik laterit yang

dihasilkan dengan perbedaan komposisi batuan dasarnya. Titik kedua diambil karena banyak mengandung silika tidak ada garnierit, namun hadir krisopras. Sedangkan titik ketiga diambil karena terdapat dua zona laterit, yaitu *earthy saprolite* dan *rocky saprolite* sehingga dapat menggambarkan karakteristik tiap zonasi lateritnya. Dimana memiliki sedikit kandungan silika dan kaya akan mineral garnierite.

Lapangan 'Kapaleo' menunjukkan karakteristik yang khas berupa kehadiran silika dengan tekstur *boxwork*, Kehadiran boulder jarang tidak ada fraksi yang lebih dari 20 cm, Zona Limonite dominasi dijumpai pada bagian Barat Daya hal ini dipengaruhi oleh intensitas rekahan, mobilitas unsur, morfologi, dan tingkat serpentinisasi batuan dasar, Berdasarkan data *X-Ray Fluorescence*, kelimpahan unsur Ni, Fe, dan Mg didominasi oleh ukuran fraksi kecil. Kadarnya meningkat seiring dengan penurunan ukuran butir. Sebaliknya, kandungan Si didominasi oleh fraksi berbutir besar, kadarnya relatif menurun seiring dengan penurunan ukuran butir.

Kata Kunci : Gebe, Kadar, Karakteristik, Nikel Laterit, Fraksinasi

**GEOLOGY AND FRACTIONATION ANALYSIS TO
CHARACTERIZE NICKEL LATERITE IN SAPROLITE ZONE
OF "KAPALEO" FIELD, GEBE ISLAND, NORTH MALUKU,
CENTRAL HALMAHERA**

ABSTRACT

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Gebe Island, Central Halmahera Regency, North Maluku Province is included in the volcanic belts and there is a basement complex of ultramafic-mafic rocks. Geographically, the study area is located at coordinates $X_{min} = 544000$, $X_{max} = 545500$, $Y_{min} = 9992500$, and $Y_{max} = 9993750$ (UTM WGS84 Zone 52S) which is included in the Geological Map of Waigeo Sheet, Irian Jaya with a scale of 1:250,000.

Geomorphically, the study area is divided into three forms of origin and four landforms, namely, Structural Form Unit consisting of structural slopes (S1), Denudational Form Unit consisting of weak undulating hills (D1) and denudational slopes (D2), and Anthropogenic Form Unit consisting of PIT (A2).

The stratigraphy of the study area is composed of two units, namely the Gebe Peridotite lithodemite unit consisting of Harzburgite, Lherzolite, and Pyroxenite and the Gebe Serpentinite lithodemite unit which is part of the Waigeo Ophiolite Complex aged 148 + 8 Ma (Upper Jurassic) based on radiometric dating of K/Ar xenolith harzburgite in dike intrusions on Gag Island. (Supriatna, 1995).

Geological structures that develop in the study area are faults and joints found at LP 7 in the form of Reverse Right Slip Fault with direction $N296^{\circ}E/85^{\circ}$, Right Slip Fault with direction $N222^{\circ}E/62^{\circ}$ and fault at LP 10 in the form of Reverse Right Slip Fault with direction $N142^{\circ}E/85^{\circ}$. While the joints structure found in the study area in the form of paired at LP 25 with the direction 1 $N293^{\circ}E/75^{\circ}$ and 2 $N240^{\circ}E/42^{\circ}$ and (Extension Joint Release Joint) Lp 40 with the direction 1 $N206^{\circ}E/69^{\circ}$ and 2 $N149^{\circ}E/67^{\circ}$ with the direction of Northeast-Southwest.

Nickel laterite characteristics were studied with nickel laterite profiles and fractionation analysis on three walls of the 'Kapaleo' Field to determine the abundance of Ni, Fe, Mg, and Si elements at certain fraction sizes (5cm, 2.5cm, and <1cm) supported by the results of XRF (X-Ray Fluorescence) analysis. The three fraction points were taken based on field observations that were considered to represent the characteristics of the 'Kapaleo' Field, the first point was taken because the bedrock was serpentinite rock so that it could determine the characteristics of the laterite produced with differences in bedrock composition. The second point is taken because

it contains a lot of silica, there is no garnierite, but chrysopras is present. While the third point was taken because there are two laterite zones, namely earthy saprolite and rocky saprolite so that it can describe the characteristics of each laterite zone, which has little silica content and is rich in garnierite minerals.

The 'Kapaleo' field shows distinctive characteristics in the form of the presence of silica with a boxwork texture, the presence of boulders is rare there are no fractions greater than 20 cm, Limonite Zone dominance is found in the Southwest this is influenced by fracture intensity, element mobility, morphology, and the level of serpentinization of bedrock, Based on X-Ray Fluorescence data, the abundance of Ni, Fe, and Mg elements is dominated by small fraction sizes. Their levels increase with decreasing grain size. In contrast, Si content is dominated by the large-grained fraction, its relative content decreases with decreasing grain size.

Keywords: *Gebe, Grades, Characteristics, Laterite Nickel, Fractionation*