ABSTRAK

Dalam lingkungan air laut, suatu material logam akan mengalami proses korosi karena adanya salinitas air laut yang diakibatkan adanya klorida pada air laut. Reaksi antara klorida dan logam ini yang menyebabkan proses korosi pada material. Terdapat berbagai metode untuk mengontrol laju korosi. Salah satunya adalah proteksi katodik menggunakan anoda korban. Salah satu material yang sering di aplikasikan menjadi anoda korban adalah aluminium karena memiliki potensial elektrokimia yang lebih rendah daripada besi dan logam lainnya yang umum digunakan dalam struktur bangunan di lingkungan laut.

Dalam penelitian ini, menggunakan 3 variasi salinitas berbeda yaitu 33%, 35%, dan 37%. Pengujian kekerasan menggunakan ASTM E384, dan pengujian laju korosi menggunakan ASTM G31-72. Berdasarkan hasil pengujian yang dilakukan, nilai kekerasan mengalami pengerjaan dingin kekerasannya menurun ketika dilakukan *solution treatment* yaitu 54,9±11,09VHN menjadi 50,7±1,01VHN. Hasil karakterisasi struktur mikro *non treatment* berupa butiran *elongated* setelah dilakukan *solution treatment* berubah menjadi butiran yang *equiaxed*. Dalam hasil pengujian laju korosi, dilakukan perhitungan potensial dimana spesimen hasil *solution treatment* dapat merubah potensial -0,4±0V menjadi -0,7133±0,0660V menggunakan *reference electrode* Ag|$AgCl_2$. Variasi salinitas air laut juga mempengaruhi potensial dari aluminium, seiring naiknya salinitas, potensial aluminium naik seiring dengan kenaikan salinitas dari 33% ke 37% yaitu sebesar -0,5667±0,1247V; -0,7133±0,0660V; dan -0,7667±0,0471V.

Kata kunci: *Solution treatment*, salinitas, korosi, kekerasan, struktur mikro

ABSTRACT

In a marine environment, a metal material will undergo corrosion due to the salinity of seawater, which is caused by the presence of chloride in seawater. The reaction between chloride and the metal is what causes the corrosion process on the material. There are various methods to control the corrosion rate, and one of them is cathodic protection using sacrificial anodes. One of the materials commonly used as sacrificial anodes is aluminum because it has a lower electrochemical potential compared to iron and other metals commonly used in marine structural constructions.

In this study, three different salinity variations were used (33%, 35%, and 37%). Hardness testing was conducted using ASTM E384, and corrosion rate testing was performed using ASTM G31-72. Based on the test results, the hardness value decreased after cold working, from 54.9±11.09 VHN to 50.7±1.01 VHN when solution treatment was applied. Microstructure characterization revealed that the non-treated specimens had elongated grains, which transformed into equiaxed grains after solution treatment. In the corrosion rate testing, potential calculations were carried out, and the specimens resulting from solution treatment were found to change their potential from -0.4±0V to -0.7133±0.0660V using the Ag|AgCl2 reference electrode. The variations in seawater salinity also affected the potential of aluminum, with the potential of aluminum increasing with the rise in salinity, ranging from -0.5667±0.1247V for 33% salinity to -0.7133±0.0660V for 35% salinity, and -0.7667±0.0471V for 37% salinity.

Keywords: Solution treatment, salinity, corrosion, hardness, microstructure