

Microstructure and Discharge Performance of Aluminum Al 6061 Alloy as Anode for Electrolyte Activated Battery

(Mikrostruktur dan Prestasi Nyahcas Aloi Aluminium Al 6061 sebagai Anod untuk Bateri Teraktif Elektrolit)

ABSTRACT

Electrolyte activated battery finds its important use during natural disaster emergencies, such as floods and typhoons. Nevertheless, high corrosion rate will deteriorate the discharge performance of the battery and it is influenced by the type of electrolyte and discharge current. In this study, the corrosion and discharge performance of a commercial Al 6061 aluminum alloy as an anode are investigated at different discharge currents (0.001, 0.01, and 1 mA) and in different electrolytes, namely salt water, urea, and distilled water. Scanning electron microscopy results show that electrode in salt water has the most serious corrosion, followed by that of in urea and in distilled water. These electrode-electrolyte combinations are further investigated with potentiodynamic polarization, galvanostatic discharge, and electrochemical impedance spectroscopy (EIS) to understand their discharge potential, discharge behavior, and corrosion mechanism. Among all combinations, aluminum in water is found to have the highest discharge performance with discharge potentials ranging from 716 to 744 mV, regardless of discharge current.