

SUMMARY

Eka Firman Widya Nugraha, Department of Mechanical Engineering, Faculty of Engineering, Universitas Brawijaya, April 2016, The Effect Of Electrode Gap Distance And The Thickness Of Plate On The Productivity Of Brown's Gas On Dry Cell Electrolyzer, Academic Supervisor: Dr.Eng. Denny Widhiyanuriyawan, S.T., MT. and Haslinda Kusumaningsih, S.T., M.Eng.

Brown's gas has been an alternative energy which was developed to reduce fuel oil consumption and produced through an electrolysis process of water. The electrolysis of water is the process of the resolving of water molecules (H_2O) that will produce hydrogen and oxygen gas by using electrical energy as a trigger for reaction. An instrument that has been used for Brown's gas production by conducting the electrolysis process of water was called electrolyzer. This research used dry cell electrolyzer to produced Brown's gas. Electrodes and neutral plates were made of stainless steel 304 L and use o-ring as a divider between the plates. Material that used in this research was sodium bicarbonate ($NaHCO_3$) as a catalyst and water as a solvent. The Thickness of stainless steel 304 L plates that used in this research is 0.3, 1 and 1.5 mm and distace of electrode gap of 1.5, 1.8, 2 and 3 mm. The purposes of this study were to determine the effect of variations in the distance of electrode gap and the thickness of plate to be used in the electrolyzer to productivity Brown's gas was produced. DC electrical current that was used by 10 Ampere, the volume of water in the electrolyte solution was 2.5 liters, the percentage of $NaHCO_3$ catalyst mass fraction was 1.77% (45 grams) and the ambient temperature was kept constant. The results of this study are variations within the electrode gap distance and the thickness of plates to be used in dry cell electrolyzer was affected the productivity Brown's gas. The highest Brown's gas productivity was on 1.5 mm electrode gap distance and the plate thickness was on 0.3 mm with a productivity value 0.0148958 l / s, while the lowest productivity was for the configuration of electrodes within a gap of electrode distance of 3 mm and the plate thickness of 1.5 mm with a value of 0.0091875 productivity l / s. The highest efficiency of dry cell electroyzer was on the configuration within a gap electrode distance of 1.5 mm and the plate thickness of 0.3 mm with a value of 22.6498%, while the lowest efficiency was on the electrode gap distance of 3 mm and the plate thickness of 1.5 mm with a plate a value of 13.1882%.

Keywords : Water electrolysis, Productivity of Brown's gas, Electrode gap distance, The thickness of electrode plate and neutral plate.