

STAINLESS STEEL/Fe-Co-Ni ELECTRODE ACTIVITY IN FERMENTED MEDIA

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ABSTRACT

The plenitude water in the earth therefor using water as alternative raw material to produce renewable energy is a defiance. Water molecule can electrochemical decompose into hydrogen dan oxygen gas. The hydrogen gas is a fuel which friendly because no pollutant, so reasonable to substitute a fossil fuel which is diminish in the earth. In addition to friendly gas, the octane number of hydrogen gas is high, that the effort to supply renewable energy, especially to produce hydrogen gas in an easy, cheap and safety manner must be developed.

The research had studied electrocatalyst and media to raise the effectivity of water electrolysis. The electrocatalyst had been prepared by coating ternary metal of Fe, Co, and Ni on to stainless steel in voltammetric cell. The electrode had been characterized by voltammeter eDAQ EChem, XRD (x-ray diffraction), SEM-EDX (scanning electron microscopic-energy dispersive X-ray spectroscopy) and GSA (gas sorption analyzer). The media, a fermented flour had been characterized by infrared spectrometer. Application of the electrocatalyst electrode, stainless steel/Fe-Co-Ni was used to decompose water molecules into hydrogen and oxygen gas in base solutions (5 gram of NaHCO_3 / liter water) and using the media 0 – 10 gram/ liter water, and had been studied by cyclic voltammetry with eDAQ EChem voltammeter. Optimum condition of hydrogen production had been determined by product and energy efficiencies.

The result that the activity of the electrode raised in range 1-6 g media/L water, on the contrary went down at adding the media over 7 g/L water. The optimum condition had been attained at 2 g/L water, it was increased hydrogen gas production of 5.7% than no media and 1.82 times better than stainless steel electrode. The energy consumption is similarly on variation of concentration of the media, at -0.996 V.

Kata Kunci: *renewable energy, water decomposition, hydrogen gas, electrocatalyst, ternary metal coating*