

STAINLESS STEEL CYCLIC VOLTAMMOGRAMS IN VARIOUS MEDIA

by Dewi Yuanita Lestari, Endang Widjajanti LFX, Isana Supiah Yosephine Louise

ABSTRACT

Stainless steel is a metal alloy that has high conductivity and resistance to corrosion, therefore it is possible to be used as a working electrode at breaking water molecules into hydrogen and oxygen gases. The splitting of water molecules has a typical cyclic voltammogram, albeit under different conditions. Likewise when using different electrodes, only the peak current becomes different. The peak current is proportional to the concentration of the species, so it can predict the efficiency of the product, while the energy efficiency can be calculated from the over potential. Therefore studying the cyclic voltammogram of stainless steel in various media can be used as a reference to determine the optimum conditions of splitting water molecules into hydrogen and oxygen gases.

The effectiveness of water electrolysis into hydrogen and oxygen gases can be increased through various means, including the media used. In this research we would try to study the cyclic voltammogram of stainless steel in various media to determine the effectiveness of water electrolysis in various media. The research method used cyclic voltammetry with the eDAQ EChem voltameter tool, which is able to describe the flow of voltage and current used during electrolysis. Based on stainless steel voltammogram in various media it could be determined the optimal condition of hydrogen production both from product yield and energy side.

Generally, the media caused the occurrence of covering by relatively large molecules around the electrode surface resulting in decreased activity of stainless steel electrodes. If the result of the study are sorted based on the efficiency of the product, which has a relatively large efficiency towards the relatively small efficiency, namely the addition of breadfruit leaves powder, rambutan seed flour, paria extract, aloe vera extract, and mango seed flour. When viewed from energy efficiency, which requires relatively low energy to relatively large energy needs, the sequences becomes namely the addition of aloe vera extract, breadfruit flour, paria extract, rambutan seed powder, and mango seed flour. The most unfavorable medium for breaking water molecules into hydrogen gas was mango seed flour. The optimum condition of water molecule splitting into hydrogen and oxygen gases was achieved by adding 4 grams of breadfruit leaves per liter of water, 2.18% increase in product and 16.67% decrease in energy demand.

Kata Kunci: *voltammogram, stainless steel, media, electrode activity, product efficiency, and energy efficiency*