

Electrodeposition of Platinum on Carbon Electrode

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Structured Abstract

Background: The title of this study is “Electrodeposition of Platinum on Carbon Electrode”. Platinum has the characteristics of corrosion resistance and inert that make it suitable to be coated on carbon electrodes. Other than that, carbon needs to be electro-deposited because carbon does not resist to high voltage. By replacing carbon with electrodeposited platinum, platinum will last longer because it can resist a high voltage condition. The objectives of this study include to optimize the deposition process of Platinum deposited onto the carbon surface and to compare the hydrogen production efficiency for Platinum-carbon electrodes with pure carbon and pure platinum.

Methods: To make the objectives achieved, the carbon electrodes were electrodeposited by using chronoamperometric method. Cyclic voltammetry is also used to obtain information about the performance and characterization of carbon electrodes. The final step after doing the electrodeposition of carbon is characterization using cyclic voltammetry, Field emission scanning electron microscope (Fesem) and X-Ray Diffraction (XRD). Fesem is used to determine the diameter, particle size and the composition of the samples while for XRD used to determine the crystal structure of the material which are carbon electrodes.

Results: The results obtained include the successfulness to coat Platinum on carbon electrodes without thinning too fast, to make the usage of Platinum coated on carbon electrode functional as Platinum electrode and the cost of using Platinum coated by carbon is less than using the pure Platinum electrode. The best results for carbon electrodes that have been electrodeposited with platinum are at a higher potential which is -0.35 V and higher time of electrodeposition which is at 1000s.

Conclusion: Despite buying a whole electrode that is made of pure platinum, using a carbon electrode coated by platinum is much cheaper in cost since the platinum used is not as much as the whole platinum electrode. Also, the idea of electrodeposited carbon electrodes with platinum is to reduce the usage of pure platinum, so that we can prevent platinum from excessive usage and will have enough supply for future usage.

Keywords: Electrodeposition, carbon electrode, platinum.

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