



## Study of Platinum loading effect on performance of GDE for Glucose Oxidation

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### Introduction:

Glucose is most abundantly found monosaccharide in nature and complete oxidation of glucose produces very high energy ( $-2.87 \times 10^6$  J/mole). To derive useful energy from glucose, direct conversion of chemical energy to electrical energy is the best option. In electrode preparation for glucose oxidation, different parameters such as catalyst loading [1-3], metal percentage [1], are influencing on electrode performance. In this paper effect of different loading of metal catalyst on glucose oxidation was studied.

### Experimental

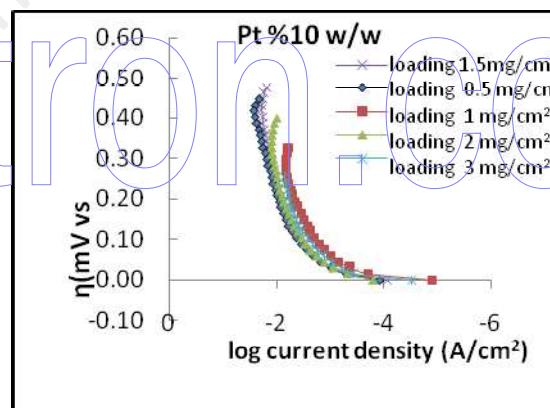
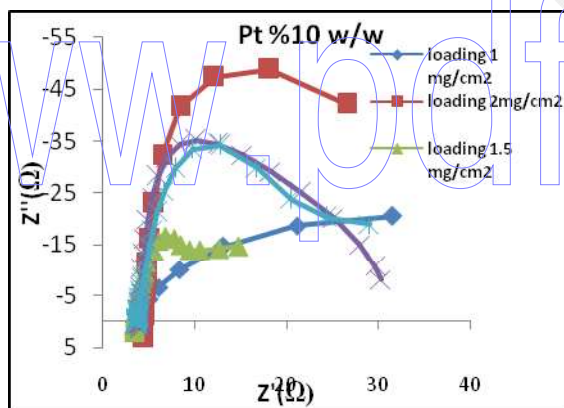
Two electrodes were prepared by immobilizing platinum on Vulcan with Pt/Vulcan ratio 5% and 10%. An aqueous solution of  $K_2PtCl_6$  was prepared and glucose, as protecting agent, and Vulcan were added. A freshly prepared  $NaBH_4$  solution was added drop wise under vigorous stirring condition and a black colloidal dispersion obtained. Then electro catalyst was

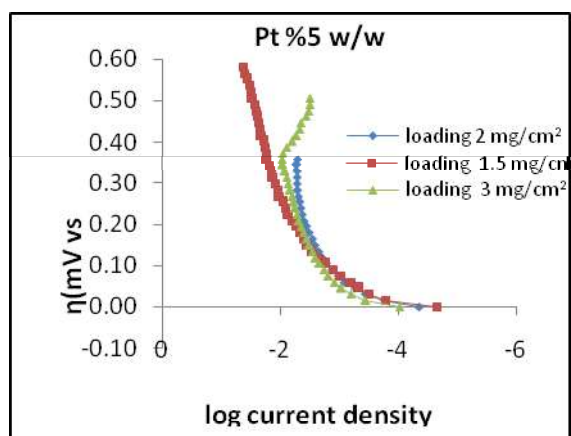
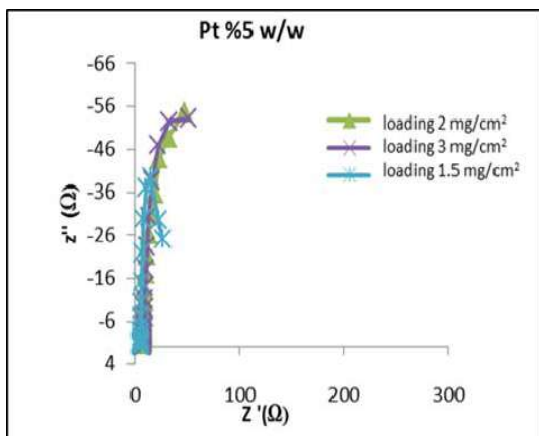
prepared by mixing catalyst, distilled water, Isopropyl alcohol and PTFE. After electrocatalyst preparation, it was coated on Carbon paper. The electrochemical experiments were performed in a three-electrode cell arrangement. A platinum sheet was used as counter electrode, while all potentials were measured with respect to Ag/AgCl electrode.

Electrochemical experiments were carried out using Zahner Electrochemical systems.

### Results:

The electro catalytic performance of the electrode was investigated by Cyclic Voltammetry (C.V) and electrochemical Impedance Spectroscopy (E.I.S), Linear Sweep Voltametry (L.S.V) respectively. The result indicated that pt10%/Vulcan (loading 1.5 mg/cm<sup>2</sup>) a good electro catalytic activity toward the oxidation of glucose. Compared to the pt 5%/Vulcan (loading 0.5, 1 mg/ cm<sup>2</sup>), which displayed a low activity for glucose oxidation





### Conclusion:

The Pt 10%/Vulcan (loading 1.5 mg/cm<sup>2</sup>) is the best electro catalytic activity toward the oxidation of glucose.

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