Frequently asked questions Fuel Cell Technology
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Module 5: Fuel cell characterization

Test -5

Module 5: Frequently asked questions:

Question no. 1. Why do we want to characterize a fuel cell?

Question no. 2. What is the difference between in-situ and ex-situ characterization techniques?

Question no. 3. Explain current interruption technique in detail?

Question no. 4. How the current interruption technique is different from electro chemical impedance spectroscopy?

Question no. 5. Area of a fuel cell is increased by 20-times and its resistance is decreased to $1/10^{th}$. Find out the percentage change in the ohmic loss of the fuel cell.

Question no. 6. Cyclic voltammetry (CV) is performed for an electrochemical reaction. How will we get the information about the reversibility of the reaction as well as number of electrons transferred in the electrochemical reaction.

Question no. 7. What is an electrical circuit representation for diffusion layer at electrode?

Question no. 8. How to perform ionic conductivity of a polymer electrolyte membrane?

Question no. 9. Discuss about the electrical conductivity measurement of the bipolar plate.

Question no. 10. Describe how to calculate the active platinum catalyst area from the cyclic voltammogram?.

Module 5: Solution of Frequently asked questions:

Solution 5:

Assuming a current density of J (A.m^{-2}) is used for calculating the ohmic losses.

The Ohmic losses can be calculated using, $\eta_{ohm} = J\,(RA)$

where, R and A are the resistance and the area of the electrode, respectively.

Now,

Consider the initial area of the cell is A m^2 and the corresponding resistance is R and later the area is increased to 20 A and the resistance is reduced to R/10 as per the problem statement.

In first case,

$$\eta_{ohm} = JRA$$

In second case,

$$\eta_{ohm} = J\,(\ R/10\ ) \times 20A\ = 2\,JRA$$

Thus, the ohmic losses increased by 100%.