



# **SNS COLLEGE OF TECHNOLOGY**

**(An Autonomous Institution)**

**COIMBATORE-35.**



Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A+' Grade  
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai.

## **DEPARTMENT OF AUTOMOBILE ENGINEERING**

**COURSE NAME : 19AUT202 - HYBRID ELECTRIC & FUEL CELL VEHICLE**

**II YEAR /III SEMESTER**

**Unit 4- Introduction to Fuel Cells**

**Topic : Microbial Fuel Cell**



# INTRODUCTION



- A microbial fuel cell (MFC) is a bio-electrochemical device that harnesses the power of respiring microbes to convert organic substrates directly into electrical energy.
- At its core, the MFC is a fuel cell, which transforms chemical energy into electricity using oxidation reduction reactions.





# SPECIFICATIONS



- **Fuel** – Exo electrogen Bacteria,
- **Oxidant** - Oxygen
- **Catalyst** - Carbonaceous and metallic-based materials (Carbon Cloth)
- **Electrolyte** – Polymer membrane





# CONSTRUCTION



- It consists of an anode and a cathode separated by a Polymer membrane.
- Microbes at the anode oxidize the organic fuel generating protons which pass through the membrane to the cathode
- The electrons which pass through anode to an external circuit to generate a current.
- Carbonaceous and metallic-based material used very often as catalytic material.

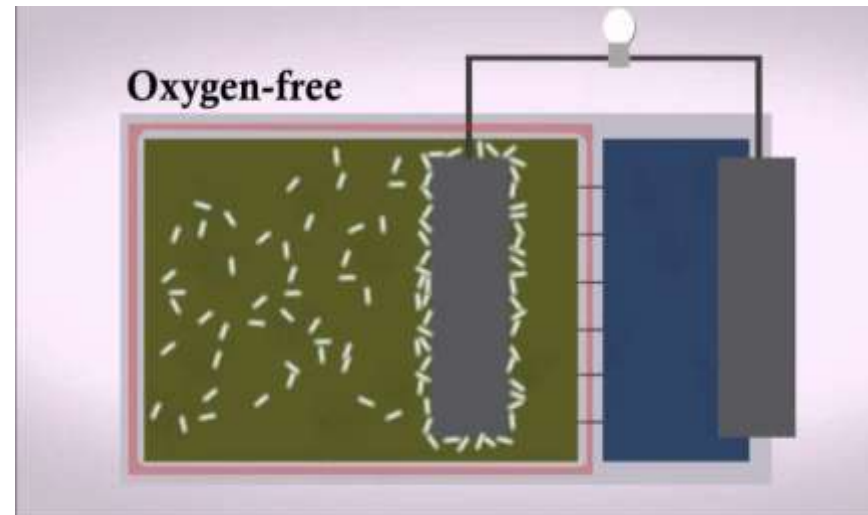




# CONSTRUCTION

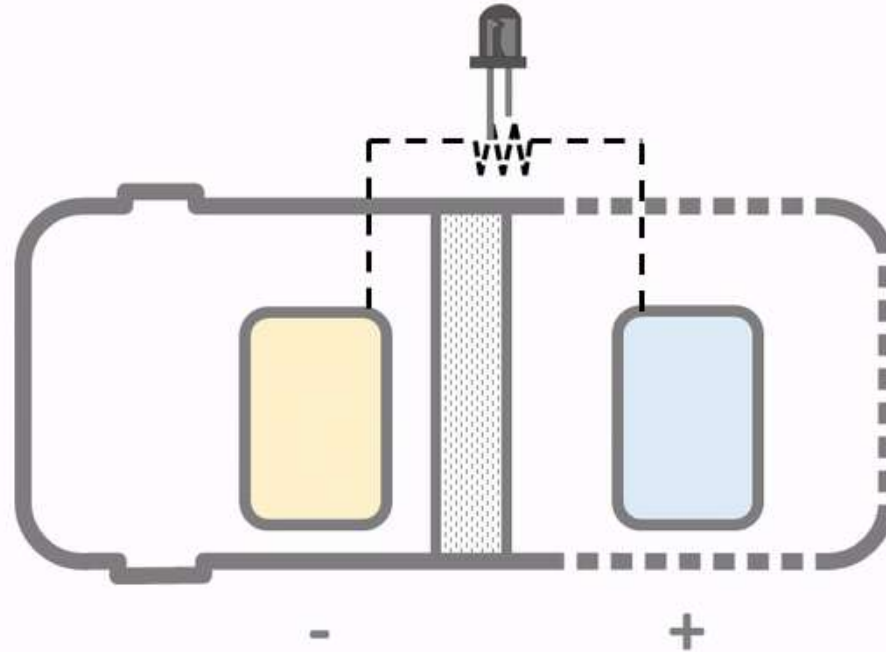


- When bacteria consume an organic substrate like sugar under aerobic conditions, the products of cellular respiration are carbon dioxide and water.
- However, when placed in an environment void of oxygen, cellular respiration will instead produce carbon dioxide, protons and electrons.
- It is therefore necessary to impart an anaerobic environment in the anode chamber of the MFC.





# FUEL CELL WORKING



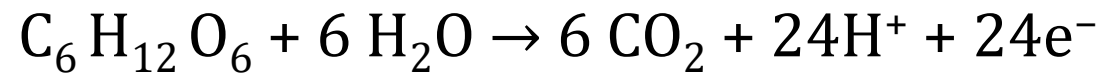




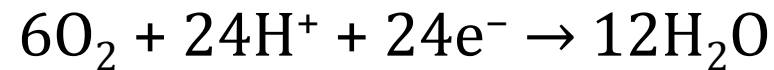
# CHEMICAL REACTION



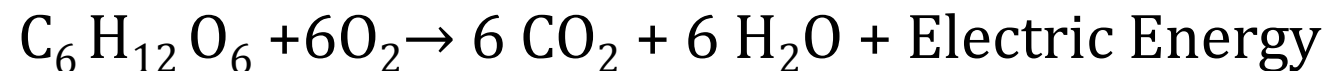
➤ **Anode Reaction:**



➤ **Cathode Reaction:**



➤ **Overall Reaction:**





# APPLICATIONS



- It can be used in waste water treatment plant for Power generation
- It is used as Biosensor.







## REFERENCE



- <https://www.sciencedirect.com/science/article/pii/B9780128163283000210>
- [https://en.wikipedia.org/wiki/Microbial\\_fuel\\_cell](https://en.wikipedia.org/wiki/Microbial_fuel_cell)



**THANK YOU !!!**