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Physiochemical Role of Nanoparticles in Solid Fuel Cells, Production and Applications in Physics and Chemical Sciences

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Abstract

Demand of fuel cells have been increased due to the high potential and incredibly efficient power sources. They have been wide range of applications such as portable fuel cells in laptops, up to huge stationary installations to power data centers. Ordinary cells are not providing good reliability and quality of power while on the other hand, fuel cells with efficient metal body allows the good reliability and quality of power provided does not degrade over time. Fuels cell that comprised of carbon nanotubes have been efficiently used for the fabrication process due to fine catalysis of adoption major barrier to many applications for power generation for commercial, industrial and residential buildings and in remote or inaccessible areas. The carbon-nanotubes are made up of smaller particles of carbon with allow the network of fine fibers while on the other hand, ordinary cells can be designed in storing hydrogen, as per the requirements. Porous Platinum nanotubes nanoporous have been designed to adopt the porosity and flow of the carbon particles for generation of energy. Different oxidants can be employed for fuel adjustments and other site reactions but oxygen is preferable due to their availability. It is easy to maintain the fuel cells adjustment through the use of nanotechnology to the industrials processes for manufacturing of variety of new materials.

Keywords: Power generation, Ordinary cells, fuel cells, power data centers, nanotechnology.

INTRODUCTION

Advances in fuel cells have been in order to achieve the maximum save of energy with eco-friendly. Fuel cells that can be hydrogen ions to pass for generation of electrical energy. The other aspects of fuels cells are nanochip for designing of efficient membranes that allows the storage as well as shelf life as compared to the other ordinary cells. Fuel cells and ordinary cell are comparatively designed in both industrial and commercial area but the loss due to ordinary cells not affordable [1, 2]. While on the other hand, fuel cells can be designed through disciple of engineering and physics that allows the novel synthesis of lighter, no loss or wastage of energy in any ways. They also act as development of renewable energy resources by reducing the demand for common oils from industries. Many of other cells have been manufactured in industrials for fuel reduction, electrical and other appliances. Some of them are not reliable due to high cost and create noise pollution and have been replaced with the alternatives and advanced technology such as nano based manufacturing [3-5].

Ordinary cells are not reliable due to discharge of oils and can cause the environmental hazardous while on the other hands, fuel cells do not have to be discharged when the chemicals are consumed. Therefore, much valuable fuel cells through the nanotechnology can be manufactured in order to meet the demand of industrial and commercials [6, 7]. Due to expensive materials utilization to manufacture for

ordinary cells due the high cost of catalyst, ordinary cells have been replaced by nano based fuels cells that are much better than other chemical based batteries. Ordinary cells are not providing good reliability and quality of power while on the other hand, fuel cells with efficient metal body allows the good reliability and quality of power provided does not degrade over time [1, 8].

Role of nanoparticles in solid fuel cells

Demand of fuel cells have been increased due to the high potential and incredibly efficient power sources. They have been wide range of applications such as portable fuel cells in laptops, up to huge stationary installations to power data centers. While on the other hand, ordinary cells allows the loss of energy and not economically valuable and potentially too dangerous; this contributes to the low production numbers. Ordinary cells are major cause of noise and environmental pollution due to large discharge of poisonous materials in the form of arsenic and lead while on the other hand, fuel cells with piece of nanomaterial's are much smooth and efficient alternative to conventional energy production [9, 10].

Fuels cell that comprised of carbon nanotubes have been efficiently used for the fabrication process due to fine catalysis of adoption major barrier to many applications for power generation for commercial, industrial and residential buildings and in remote or inaccessible areas. They are zero-emissive in nature and no pollution created as compared to the other sources of fossil fuels [6, 8]. Some products of the fossil fuels can cause the excessive combustion that causes the causes pollution to the environment. While on other hand, nanofuel cells are free from discharging of toxic metals to environment. The main principle of using of nanotechnology's for smaller sized materials allows for adjustment of molecules and substances at the nanoscale level, that increase the mechanical and physical properties of newly synthesized fuel cells with potential use in almost industrial designing [10, 11].

Table-1: Shows the type of cells with physical significance

Type of cell	Physical significance	Industrials /Fields applications
Fuel cells	Advances in fuel cells have been in order to achieve the maximum save of energy with eco-friendly.	Aspects of fuels cells are nanochip for designing of efficient membranes that allows the storage as well as shelf life as compared to the other ordinary cells.
Fuel cells and ordinary cells	Fuel cells and ordinary cell are comparatively designed in both industrial and commercial area	industrials for fuel reduction, electrical and other appliances
Ordinary cells	Ordinary cells are not reliable due to discharge of oils and can cause the environmental hazardous	ordinary cells allows the loss of energy and not economically valuable
Fuel cells	fuel cells with efficient metal body allows the good reliability and quality of power provided does not degrade over time	Demand of fuel cells have been increased due to the high potential and incredibly efficient power sources

The carbon-nanotubes are made up of smaller particles of carbon with allow the network of fine fibers while on the other hand, ordinary cells can be designed in storing hydrogen, as per the requirements. Hydrogen base designed of cells are not suitable and don't meet the industrial demand as carbon based nanotubes fuel cells much safer than other cells in any aspects especially in appliances [22, 27]. Mesoporous carbon fibers that have been used as catalysts support for platinum in decreasing the costs of combustion during the oxidative and reduction reactions. Automotive catalysis with platinum has decreases the efficiency of certain metals such as arsenic and lead while use in combinations. These have been replaced by nanoparticles that are economically valuable. Their catalytic activity can be enhanced through the metallic body with network of mesoporous carbon fibers that assembled all metals in the form of chain alternatives to the traditionally used heavy batteries [12, 13].

Porous Platinum nanotubes nanoporous have been designed to adopt the porosity and flow of the carbon particles for generation of energy. Different parts of fuel cells with different combinations of metals have ben studied but the main purpose is to establish the correct relation with nanospheres with hollow structures like PtNi, Pt, CuPt and PtCu and AgPt [1, 9, 11]. Different fuel cells with nanotechnology have been operated such as, PtNi alloy based nanomaterials can be with combinations of platinum and nickel packed into the hollow sphere for the movement of electrons. CuPt alloy based nanomaterial's can be with combinations of platinum and copper packed into the hollow sphere for the movement of electrons. AgPt alloy based nanomaterials can be with combinations of platinum and silver packed into the hollow sphere for the movement of electrons [14, 15].

Fuel cells have different operations in industrial processes while specific metal or type of gas used for particular sectors such as hydrogen, and some are able to use methanol or natural gas. Some hydrocarbons are compressed to carbon and hydrogen with metallic parts in the form of nanoparticles that

makes the industrial processes smooth and efficient. Nano based fuel cells can be operated at low temperature and can be optimized through different catalysts in order to control the reactions happening inside the fuel cell also reduced the rate of counter attack to the appliances [16, 17].

The excessive use of platinum and other metals have been rewired lots of materials in their presentations and not valuable for large commercial areas. In this regard, there is need of emerging technology that snowballed the replacement of toxic metals with catalysts through the use of nanotechnology in fuel cells is immensely focused on electrolytic deposition of electrodes with high activity of targeted piece of nanosheet for all automotive internal combustion deplete the entire supply of platinum several [26, 29]. It also reduced the cost of been rewired lots of materials in their preparations and hence can be served as electrolytic platform for large commercial areas. Various efforts in the fields of Physical and engineering sciences have been made for developing ion-exchange membrane electrolytes that improved efficiency and durability at reduced cost; improving membrane electrode assemblies [17-19].

The working of fuel cells with nanosheet following the anode fuel oxidation in which flow of electrons increased while on the other hand, flow of protons increased towards the electrolyte layer. It created the oxidation and reduction reactions and this flow can be controlled through the nanomaterials but depends on the particular metal melted in appropriate manner. Different oxidants can be employed for fuel adjustments and other site reactions but oxygen is preferable due to their availability. Methanol, methane or carbon monoxide in the form hydrocarbons employed for designing of nanobased fuel cells [28, 29]. In the grid connection of fuel cells systems, where major site for occurring the reactions, different fuel cell together with the power rating and the benefit for each types of the fuel cell. Impurities in metals can leads to catalytic performance and hence decreases the fuel yields at optimum level. Different conditions following optimum pH, concentrations and temperature also affect the overall reactions to be addressed for controlling the rate of combustion. Fuel cells and electric motors are less durable than petrol engines and diesel engines, so they are not so long-lasting [20-23].

Fuels work that work at high temperature can created in electrolyte layer thinner leading a cause of loss of electrolyte films. However, a variety of polymers such as yttria-stabilized zirconia has been commixed during designing and manufacturing of nanobased fuel cells. Layer of nanofluid deposited to make them ideal over traditional cells high surface energy that ultimately increase the surface area of the nanofuel cells [22, 28]. It also affected the heat carrier and thermo physical properties and resist the alteration in pH and temperature also environmental changes. Transparent conductive oxides in conjugation with nanoparticles possess the excellent properties in conducting and flowing of electrons through the cells. It leads to the n- or p-type conductivity under a reducing or oxidizing sides for oriented fuel cells [24-28].

Crystallic layer can packed the organic solvent and aqueous solution with nanosheet comprised of carbon particles so that polycrystalline nanostructures designed that posses the features of 3D feature of this structure in efficient way through layering method. Different types of fuel cells that have been used in electronic appliances are solid acid fuel cells following the lysome solid acids that undergo a phase transition for the formation of superprotonic structures. The ultimate final fuel cells are being characterized through increases different types of specific with elegance conductivity by several orders of magnitude. There is need to determine the agglomeration state of the particles and their effective size for large scale manufacturing especially for generation of high energy and heavy stations [29, 30].

The nanotechnology based optical fibers consisting of a fine structured solar cell can be utilized complementarily for different applications to power generations due to efficient power source. Some of the traditionally designed capacitors are not reliable due to high cost of manufacturing and troubleshooting issues. While on the other hand, nanotechnology also applied to super capacitors dielectric capacitors that carry much expectation for next-generation energy storage devices due to their high power densities. Smaller piece of nanoparticles have been incorporated into the super capacitors for efficient designed capacitors are more reliable in manufacturing and handling. These advances in the fields of nanofuel cells leads to utilized of high-capacity electrode materials and offer the possibility of improved rate capability [7, 10]. The catalytic performance influenced by the electrode materials, it is significant to endeavor to enhance the electrode performance through the lighter materials that can pass to the ion and movements of chemical materials. Ordinary generators are not efficient for production of energy due to environmental pollution and heavy instrument machinery. While on the other hand, nanochips based generators are much efficient for production of heavy energy as they can assist in the industrials and mechanical processes. One of example is the nanobots that could use employed for power production using the surrounding as a chemical catalyst through series of chemical reactions occurring in appropriate manner [1, 31-33].

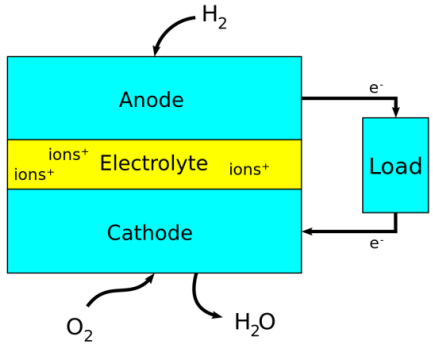

Fig-1: Shows the working of fuel cells under the influence of ions and eletrcons

Proton exchange membrane fuel cells have been used for different purposes especially for improving the energy efficiency through low emissions. Proton exchange membrane fuel cells are designed on the basis of semipermeable membrane to conduct protons while acting as an electronic insulator and reactant barrier to oxygen and hydrogen gas. It allows the flow of materials to surface where smaller molecules can pass and foreign particles can trapped while on the other hand, other fuel cells without the chip comprising of nanoparticles can cause serious hazardous issues related to the environmental pollution [34, 35]. Proton exchange membrane fuel cells to be used for stationary power generation for running in high efficiency into competition with other types of fuel cells that require high purity hydrogen for operation. Some of the most prominent alloys and nanomaterials used as electrode materials are copper, graphite, titanium, brass, silver, and platinum [11, 19, 20, 26].

CONCLUSION

Although, many fuels have been efficiently used for production of energy of energy also potential applications in different fields Due to their immense, it is easy to find the troubleshooting problems in instruments and electronics devices. It is easy to maintain the fuel cells adjustment through the use of nanotechnology to the industrials processes for manufacturing of chemicals and electrodes based chips. This can enabled for production of a high integration capacity of photonic devices in the future.

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