

How Do Fuel Cells Work

Fuel Cells are important emerging technologies today and have the potential to successfully replace the currently employed fossil fuels, towards a cleaner, greener, more efficient and more capable source of energy. They have the potential to generate power to run automobiles and hence replace the ubiquitous Internal Combustion engine and also provide for the running of stand-alone and portable power generation units which need mechanical input.

As a principle, Fuel Cells operate just like a battery complete with an anode, a cathode sandwiched between electrolytes along with a catalyst. However, unlike a battery, it does not lose its power and need recharging. As a matter of fact, it produces energy and keeps working until hydrogen is fed to it. It can also be stacked up and the total resulting current can be used to provide for the desired output.

In Operation, Hydrogen is made to pass over one electrode while oxygen is made to pass over the other produced electricity, water and heat in the process.

The Hydrogen gas, after having gone through a successful reform through the fuel-reformer, is fed to the "anode" of the fuel cell, while the oxygen enters through the cathode of the same apparatus. Due to the chemical reaction of the catalyst in the electrolyte, the hydrogen splits into an electron and a proton, both of which travel in different paths to the cathode. While the proton passes through the electrolyte, the electron and a bunch of more of its like pass together, forming an electric current in the process are tapped into for commercial use.

The 'Fuel-Reformer' as mentioned above can be used to extract the Hydrogen gas out of any of its existing forms, say from biogas, methane, and ethanol. Even though this is amongst the most plethoric elements on earth, it never exists as hydrogen itself and is found only as a compound, however once separated, it is the ultimate source of clean energy. There is really no problem finding the fuel for successful operation of the Fuel Cell.

However, problems still exist and apart from the fact there are still concerns about usage of hydrogen as a fuel, the fuel cells are very expensive and we haven't been successful in getting them through the economies of scale and hence lower the costs. Nevertheless, it should not worry us too long, since once upon a time, Ford's Model T was expensive too, while the automobiles today are ubiquitous and taken for granted.

About the Author

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