

NEW GENERATION FUEL CELLS

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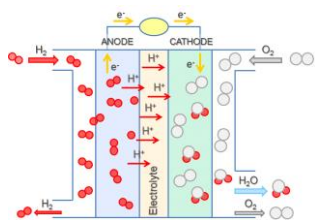
Annotation. As you can see from the title this article is about new generation fuel cells. At the beginning the author underlines the history of fuel cells. After that it is pointed out a schematic diagram of a fuel cell and its operating principles. Next the author describes steam conversion as the cheapest way of getting hydrogen. Then much attention is given to electrolysis of water. Further on it the author shows advantages and disadvantages of gray, blue, and green hydrogen concepts. Next it is spoken about development trends in this sphere. At the end of the text the author draws the conclusion that hydrogen energy systems dispose to the preservation of environmental stability in the world. This text is valuable for students of engineering majors.

Keywords. Fuel cells, oxygen, hydrogen, electrodes, available energy, steam conversion, electrolysis of water, electricity, progressive trends

The ideal fuel is the fuel that produces a lot of energy and no harmful compounds when burned. It is not hard to find and can be stored waiting to be used for centuries. Some people might think that this can only be found in fantasy books, but it exists in reality.

The central component of a new generation fuel cell is a membrane which separates the fuel and oxidizer space. It is impermeable to gas and impermeable to electric current in the form of electrons, but allows electric current in the form of oxygen ions. On this membrane we arrange the electrodes on which these two reactions will take place. At the cathode we will get oxygen ions from gaseous oxygen, and at the melted electrode, we will, with the help of these oxygen ions, oxidize fuel at the output we got water, but we got an additional member in the form of electrons. And these electrons that we got by splitting one reaction into two we can use to get useful work. To do this, we must connect the electrodes with wires and connect a useful load, any device that will use this electric current. [1].

At high temperatures, methane interacts with water to produce hydrogen. Everything would be fine, but the second product that is obtained as a result of all processes is carbon dioxide. And here we can't talk about hydrogen power as something that is not harmful to the environment.



There is a rapid development of hydrogen fuel cells in the modern world. One of the most progressive trends are reversible fuel cells, which take hydrogen or methane as fuel and produce electricity in the forward direction, and produce fuel in the reverse direction, consuming electricity.

However, there are problems in the operation of such TEs, as they need high temperatures to work. The solution was proposed by researchers from the Colorado School of Mines: Ba/Ce/Zr/Yb and Ba/Co/Zr/Y should be used as material for electrodes because they require relatively low temperature (500 degrees Celsius), the system efficiency is 75% and in this case the material almost does not degrade. The advantage of this method over the previous ones is that it makes it possible to observe and study materials with dimensions in the nanoscale (0.1 nm).

References

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