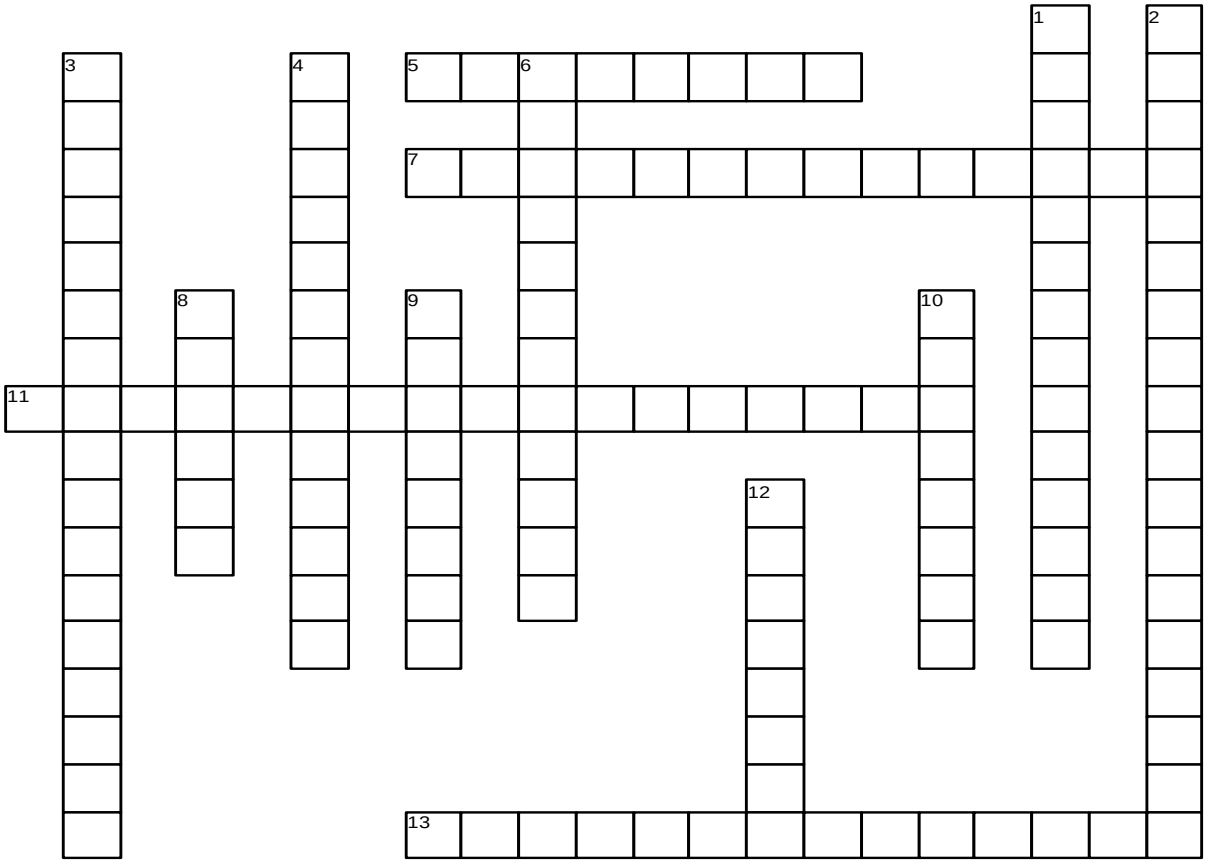
Fuel Cells and Advanced Technologies

Chapter 19



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ACROSS

5 A ____ ____ is an electrochemical device in which the chemical energy of hydrogen and oxygen is converted into electrical energy.

7 Hydrogen is an excellent fuel because it has a very high _____ _____ when compared to an equivalent amount of fossil fuel.

11 The part of the PEM fuel cell that contains the membrane, catalyst coatings, and electrodes is known as the _____ _____ Assembly (MEA).

13 The fuel-cell design that is best suited for automotive applications is the _____ _____ Membrane (PEM).

DOWN

1 _____ cells are based on double-layer technology, in which two activated carbon electrodes are immersed in an organic electrolyte.

2 The Proton Exchange Membrane fuel cell is also known as a _____ _____ Fuel Cell (PEFC).

3 _____ _____ Compression Ignition (HCCI) is a combustion process.

4 While hydrogen can be used as a fuel, it is not an energy source. Instead, hydrogen is only an _____ _____, as energy must be expended to generate the hydrogen and store it so it can be used as a fuel.

6 The chemical reaction in a fuel cell is the opposite of _____.

8 A fuel-cell vehicle (FCV) uses the fuel cell as its only source of power, whereas a fuel-cell _____ vehicle (FCHV) also has an electrical storage device that can be used to power the vehicle.

9 A single fuel cell by itself is not particularly useful, as it generates less than 1 volt of electrical potential. It is more common for hundreds of fuel cells to be built together in a ____-____ stack.

10 A ____-____ vehicle (FCV) uses the fuel cell as its only source of power, whereas a fuel-cell hybrid vehicle (FCHV) also has an electrical storage device that can be used to power the vehicle.

12 One of the major challenges for engineers in this regard is the fact that the heat generated by the fuel cell is classified as ___-_____ heat.