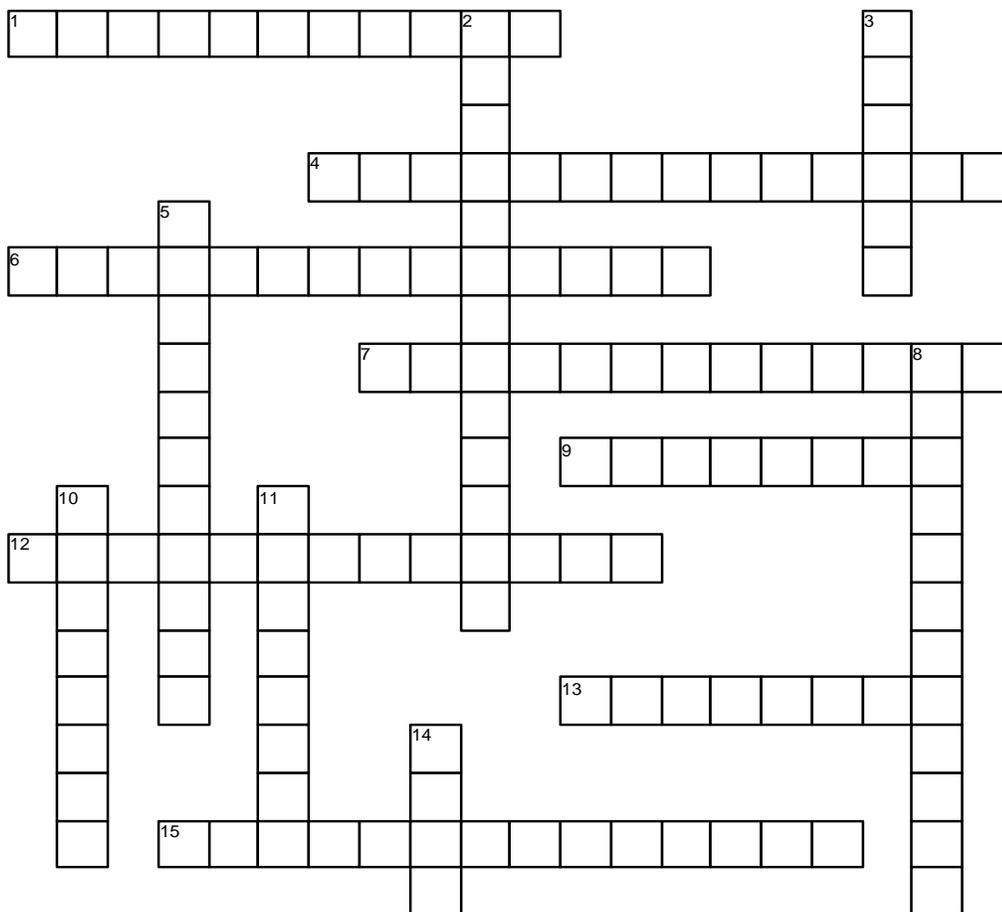


# Fuel Cells And Advanced Technologies

## Chapter 46



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### ACROSS

- 1 Ultracapacitor cells are based on \_\_\_\_\_-\_\_\_\_\_ technology, in which two activated-carbon electrodes are immersed in an organic electrolyte.
- 4 Hybridization tends to increase efficiency in vehicles with conventional drive trains, as energy that was once lost during braking and otherwise normal operation is instead stored for later use in a high-voltage battery or \_\_\_\_\_.
- 6 A \_\_\_\_\_-\_\_\_\_\_ vehicle would also have an electrical storage device that can be used to power the vehicle.
- 7 Hydrogen is only an \_\_\_\_\_, as energy must be expended to generate the hydrogen and store it so it can be used as a fuel.
- 9 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.
- 12 It is more common for hundreds of fuel cells to be built together in a \_\_\_\_\_-\_\_\_\_\_.
- 13 A \_\_\_\_\_-\_\_\_\_\_ vehicle uses the fuel cell as its only source of power.
- 15 Hydrogen is an excellent fuel because it has a very high \_\_\_\_\_ when compared to an equivalent amount of fossil fuel.

### DOWN

- 2 Methanol has a higher \_\_\_\_\_ than gaseous hydrogen because it exists in a liquid state at normal temperatures, and is easier to handle since no compressors or other high-pressure equipment is needed.
- 3 The fuel-cell design that is best suited for automotive applications is the \_\_\_\_\_ exchange membrane.
- 5 There are a number of different types of fuel cells, and these are differentiated by the type of \_\_\_\_\_ that is used in their design.
- 8 The chemical reaction in a fuel cell is the opposite of \_\_\_\_\_.
- 10 A \_\_\_\_\_ is an electrochemical device in which the chemical energy of hydrogen and oxygen is converted into electrical energy.
- 11 The part of the PEM fuel cell that contains the membrane, catalyst coatings, and electrodes is known as the \_\_\_\_\_ electrode assembly.
- 14 The Proton Exchange Membrane fuel cell is also known as a \_\_\_\_\_.