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| Fuel cells | Both | Rechargeable batteries |
| An energy conversion device. | Converts chemical energy directly into electrical energy using “spontaneous” redox reactions. | Energy storage device. |
| Only provide electrical energy when reactants (fuel) are constantly provided to the cell (open system). | Have a negative electrode where an oxidation half-reaction occurs and a positive electrode where a reduction half-reaction occurs. | Has chemical energy stored in its parts, in a closed system, and so can provide electricity until its stored chemical energy is used up. |
| Can be used continuously and for a long period as long as fuel is available. | Generate electrical energy using chemical energy (compounds in the cells undergo chemical reactions which send electrons into an external circuit). | Must be charged, which takes them out of operation for a period of time. |
| Electrodes are made of porous material, which allows for the free movement of hydrogen, oxygen, and water. | Generate a current through an external circuit, which is caused by the separation of the half-reactions part of a full redox reaction. | Electrodes are made of solid metal compounds and lattices. |
| Contain expensive components such as platinum catalysts. | Made up of an electrolyte, an anode, and a cathode. | Don’t contain expensive components. |
| Larger. |  | Smaller. |
| Produce a large amount of electrical energy. |  | Produce a smaller amount of electrical energy. |