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Hydrogen Explained

Production of Hydrogen

Basics

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How is hydrogen made?

Because hydrogen doesn't exist on earth as a gas, it must be separated from other elements. Hydrogen atoms can be separated from water, biomass, or natural gas molecules.

The two most common methods used to produce hydrogen are *steam reforming* and *electrolysis* (water splitting).

Steam reforming is a widely used method of hydrogen production

Steam reforming is currently the least expensive method of producing hydrogen, and it accounts for most of the commercially produced hydrogen in the United States. This method is used in industries to separate hydrogen atoms from carbon atoms in methane (CH₄). The steam reforming process results in carbon dioxide emissions.¹

Electrolysis uses electricity

Electrolysis is a process that splits hydrogen from water using an electric current. The process can be used on a small scale or a large scale. Electrolysis does not produce any emissions other than hydrogen and oxygen. However, if the electricity used in the process is produced from fossil fuels, then there are pollution and carbon dioxide emissions indirectly associated with electrolysis. However, the electricity used in electrolysis can also come from renewable sources like wind and solar.

Other methods of producing hydrogen

Research is underway to develop other methods used to produce hydrogen. These methods include using microbes that use light to make hydrogen, converting biomass into liquids and separating the hydrogen, and using solar energy technologies to split hydrogen from water molecules.

1. U.S. Environmental Protection Agency, [Climate Change State of Knowledge](#).

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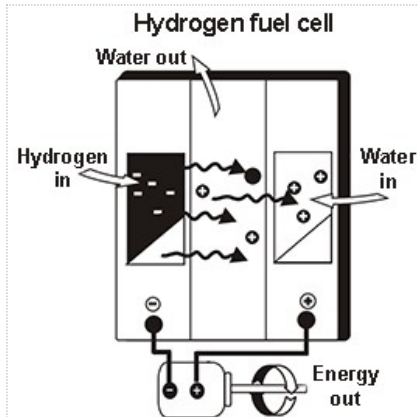
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