

Answer on Question#49885 – Chemistry – Other

Why is hydrogen gas not an ideal fuel?

Answer:

Hydrogen gas (H₂) is a very perspective kind of fuel.

- It has high energy density ($2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{l}) + 572 \text{ kJ}$ (286 kJ/mol));
- Some types of fuel cells work with hydrogen are much more efficient then fuel cell work with hydrocarbon fuels;
- Hydrogen fuel is environmentally friendly ($2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$).

But hydrogen fuel has some important limitations.

- Costs.

Hydrogen is produced by fossil sources. About 80% of hydrogen produced from steam reforming and small parts (3-4%) produced by electrolysis and some thermochemical cycles. The production of unit of hydrogen fuel by steam reformation or electrolysis is approximately 3 to 6 times more expensive than the production of an equivalent unit of fuel from natural gas. That's the main defect of hydrogen fuel. It's too expensive. The production of hydrogen requires much more energy than the hydrogen fuel produces.

- Hydrogen storage and transport.

Hydrogen gas is highly flammable and forms an explosive mixture with air (2 : 1). So, hydrogen fuel requires special conditions for storage and transport, special containers and safety systems.

Conclusion:

Hydrogen fuel is the most perspective type of fuel but presently is too expensive and it's precisely not an ideal fuel.