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Hydrogen Recovery and Fic Increase in The Chemical Industry

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Abstract:

The article examines the production of hydrogen in cheap and convenient ways and the improvement of useful processes through these methods.

Keywords: electrolysis, fik, fuel, renewable energy.

Introduction

Recently, a lot of attention has been paid to the development of the economy in our country, to improving the lifestyle of the population, to the production of cheap but high-quality products that meet the needs of the people. Of course, nowadays we cannot imagine all sectors of the national economy and production enterprises without a heating system. At a time when the society and the economy are developing, first of all, obtaining heat and fuels is growing rapidly. Hydrogen energy involves the use of hydrogen or hydrogen-containing compounds to produce energy for all practical purposes required by high energy efficiency, environmental and social benefits, as well as economic competitiveness. The world is currently testing the emergence of hydrogen energy in all areas, including energy production, storage and distribution; electricity, heating and cooling for buildings and households; industry; transportation; and production of raw materials.

Problems. Energy efficiency and sustainability are two important factors in the transition from the current fossil fuel-based economy to a circular economy, a renewable circular sustainable fuel cycle that characterizes the high-efficiency engineering and energy technology choices of the 21st century. Discusses methods and prospects for hydrogen production and its application in key energy sectors to fully realize the use of hydrogen energy technologies. An unexpected opportunity to find and harvest natural hydrogen on Earth, once thought to be non-existent, has opened up. Analyzed to understand possible geological interpretations to guide future performance of sustainable and perennial fuels.Hydrogen is produced from hydrocarbons (such as natural gas) at higher temperatures than water in catalytic reformers. Different raw materials can be used for hydrogen production. For example, through natural gas, LPG, naphtha, as well as hydrogen-rich gases. Steam processing of natural gas, LPG or naphtha (raw material) and

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subsequent purification is the most economical process for hydrogen production. This method provides 95% of the world's hydrogen needs. Naphtha is desulfurized, mixed with steam, and synthesis gas is obtained under the influence of high heat with the help of a nickel catalyst.

Solution: If natural gas, oil, coal, and electrolysis processes used for hydrogen production produce 100% hydrogen, the most hydrogen we can get from natural gas is 48%. 30% from oil, 18% from coal and 4% from electrolysis. The principle of hydrogen production by electrolysis of water is very simple. In this process, water is split into hydrogen and oxygen gases with electricity. We can also use the hydrogen obtained as a result of electrolysis as a reducing agent in the chemical industry in the process of hydrogenation or reduction in drug reactions. In addition, we use hydrogen in the fuel cell, this is a method of energy storage. The efficiency of hydrogen fuel cells is very high, 70-90%. It can be seen that 1 molecule of CH4 methane, i.e. natural gas, produces 4 molecules of H atoms. We can easily use the produced hydrogen gas as a fuel for motor vehicles.

Let's look at 3 more ways to get hydrogen:

In this way, hydrogen vapor is obtained through hot coke, as a result, we can produce 75% pure hydrogen. We pass the steam through a hot iron to get hydrogen, as a result we can get 97% pure hydrogen. In this method, in the electrolysis method, we obtain 99% pure hydrogen by electrolyzing water under the influence of temperature and pressure.

Table 1: Plan data for hydrogen production:

N%	Raw material:	Natural gas	LPG	Naphtha
1	Hydrogen power	200 dan 10000 up to Nm/h	200 dan 10000 up to Nm/h	200 dan 10000 up to Nm/h
2	Product pressure	10-30 bar(abs)	10-30 bar(abs)	10-30 bar(abs)
3	Hydrogen purity	99,99 vol,% up to	99,99 vol, % up to	99,99 vol, % up to

THE RESULT

The above-mentioned methods show that we can apply the produced hydrogen gas and fuel to production enterprises from the energy obtained from it:

1. Metallurgy and steel industry
2. In the petrochemical and oil refining industry
3. Production of glass and foat glass
4. Chemical and pharmaceutical industry
5. Production of H2O2
6. Food industry
7. Electronics industry
8. Technical gases.

Table 2 presents a comparison of the energy consumption of transportation applications powered by compressed gas and cryogenic liquid hydrogen versus propane and gasoline. As can be seen here, gas-phase hydrogen has a significant energy requirement to compress the hydrogen to the required operating pressure. The vehicle selected for comparison here is powered by a compression-ignition diesel engine.

Table 2: Vehicle energy consumption comparing hydrogen versus propane and gasoline.

N%	Parameter	H2(gaz) 0.1	H 2 (liquid)	Propan	Benzin
1	Work pressure (MPa	20	0.1	0,5	0.1
2	Weight per customer (kg	40 000	30 000	40 000	40 000
3	Buyer's weight (kg)	39 600	27 000	20 000	14 000
4	Delivered weight (kg)	400	2100	20 000	26 000
5	Low heating value of the supplied fuel (LHV) (MJ / kg)	120	120	46.3	44.8

Summary

The production technology of H2 shows that today every plant and factory enterprises have a high consumption of electricity, increasing the efficiency of fuel products can be solved through this technology. It is planned to reduce the economy and energy used for production compared to FIK. Therefore, we can save energy through H production technologies and slowly reduce the toxic CO2 emissions compared to gasoline propane.

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