

EFFICIENCY IMPROVEMENT OF S.I ENGINE USING OXY-HYDROGEN

First Author – Singh Rajnish
Second Author – Bawaskar Nikhil
Third Author – Pandit Ankit
Fourth Author – Shanbhag Sumer
Guide – Prof. Manoj Jadhav

Pillai HOC College Of Engineering & Technology

Khalapur , HOC Colony Rd, Taluka, Rasayani, Maharashtra 410207

Abstract: In this experiment we have studied the basic properties of gas generated through electrolysis of water and then used this gas in the bike as a fuel with gasoline by mixing it with air. This results the increased mileage of bike up to 30 to 60% and reduce the polluting contents from the exhaust gases. Hydrogen gas combined with the standard air/fuel mixture increases the mileage. This form of alternative fuel is provided by a hydrogen generator mounted in the vehicle. Once set up is ready, the hydrogen gas (fuel) will be produced from water, an electrolyte compound, and electricity supplied from a battery provided. It is actually an electrolysis unit having high grade stainless steel/graphite/semiconductors as electrodes in a closed container and mixture of distilled water & suitable ionic solution (KOH or NaOH) as electrolyte. Power for electrolysis is taken from an additional battery provided (12V). This battery can be recharged from a dynamo/alternator/motor provided on the vehicle. Keyword- KOH, NaOH, SI engine, electrolysis of water, hydrogen cell.

Key words: Electrolysis, Hydrogen, Gasoline, Mileage, Exhaust.

INTRODUCTION

Compare to other kinds of fuel around the world, water is one of the free recourses and by applying the technique, it can be converted into hydrogen with oxygen, its chemical term is HHO (Oxyhydrogen) and in general “Free Energy”. It is cheaper, safer, tremendous explosive and never pollutes the atmosphere. While crossing a gas or diesel operated power we can feel the smell of the respective fuels, it shows that the fuel is not completely burnt. It is explicit that we waste fuel and pollute the atmosphere. This mixed Oxyhydrogen ignites releasing the extra electrons into the igniting fuel and thus the added extra energy from the Oxyhydrogen leads cent percent of complete burning of the fuel. The Oxyhydrogen has Polymorphism that is it acts differently - before burning, while burning, and after burning. Before burning of Hydrogen, which is a lightest gas with one proton and one

electron and more efficient fuel three times of the explosive power when camper to fuel gas and five times than petrol.

Figures and Tables

Sr.No.	Fuel	Flame Velocity (cm/sec)
1	Hydrogen	225
2	Ethylene	42
3	Methane	39
4	Ethane	38
5	Propane	43
6	Butane	70

Actually, the Oxyhydrogen requires little bit of energy of ignition to produce wide level of tremendous flammable temperature within the high speed of lighting and there is no chance to compare with respect to other fuel. As a result of fact it increases the engine performance, torque, minimums fuel consumption.

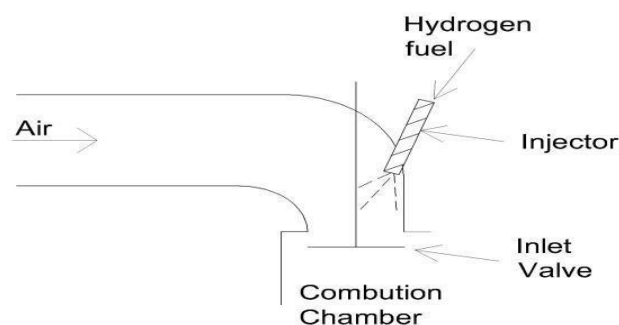


Figure: Schematic diagram of cylinder injection

According to ideal faradic efficiency amount of hydrogen generated is twice the number of moles of oxygen and both are proportional to the total electrical charge conducted by the electrodes solution.

Water has a electro molecular weight of 18 amu.

So 1 mole of water has mass of 18 grams.

So 1000 grams of water contains $\frac{1000}{18}$ moles = 55.5 moles of water

Therefore, 1 litre of water → 111 moles of H_2 and 55.5 moles of O_2 .

$55.5 H_2O \rightarrow 55.5 H_2 + 27.75 O_2$.

1 kg of water ≡ 111.19 gm of hydrogen + 888.81 gm of oxygen.

Considering 1 litre of water has mass of 1000 gms.

Avogadro’s law states that one mole of any ideal gas occupies 22.4 litres of volume.

Therefore, 55.5 moles of H_2 ≡ 1243.2 litres of hydrogen gas.

And, 27.27 moles of O_2 ≡ 621.6 litres of oxygen.

The energy density of the hydrogen gas 141.86MJ/kg

Energy released by hydrogen combustion:

$0.002 * 55.55 * 141.86 = 15.76 MJ$ (considering 1 litre of water)

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Abbreviations and Acronyms

Abbreviation	Full name
KOH	Potassium Hydroxide
H2	2 Elements of Hydrogen
O2	2 Elements of Oxygen
Kg	Kilogram
Gm	Gram
Amu	Atomic mass Unit



CONCLUSION

Without any major modifications in the existing system hydrogen can be used in both SI and CI engines. Internal combustion engine powered vehicles can possibly operate with both petroleum products and dual-fuels with hydrogen.

Direct injection system solves the problem of pre- ignition in the intake manifold, not necessary to prevent the pre-ignition inside the combustion chamber. Due to its properties, hydrogen has proved to be an excellent fuel for IC engines and signifies a reliable option to the fossil fuels replacement.

The power loss of hydrogen operated engine is compensated by using super charging and it is more effective than gasoline, Iso-octane and methane fueled engines for the same operating conditions.

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