THE ELECTROLYSIS OF WATER TO GENERATE HYDROGEN (HHO) AND A STUDY OF THE EFFECT OF ADDITION OF HHO TO GASOLINE AS AN ENGINE PERFORMANCE IMPROVER

ABSTRACT

The purpose of this work is to fabricate a simple innovative HHO generation system through the process of water electrolysis and evaluate the effect of hydroxyl gas HHO addition to petrol, used as fuel in 4-stroke engine. HHO cell is optimized for maximum HHO gas productivity per input power. The type of catalyst is varied with potassium hydroxide as the optimized system. The results showed that the maximum productivity of the cell was 68 L/h HHO gas when 6 g/L of KOH is used. The results also showed 55% in the gasoline engine thermal efficiency.

Introduction

H2 (hydrogen gas) is being considered as an alternative fuel to enhance engine efficiency and produce less pollution. This is not feasible in a commercial point of view as it increases the manufacturing cost and impacts the vehicle market price. Mohamed El-Kassaby [1] have designed, integrated and tested a compact HHO generating device on a gasoline engine. Their results showed that fuel consumption was reduced approximately by 34%. The effect of HHO addition on SI engines was studied by Kuware [2] et al. their results reported a reduction in Specific Fuel consumption (SFC) of 20-30%.

Hydrogen has a higher flame speed and its gasoline blend can be combusted faster. Still, as H2 addition widen the mixture flammability limit to leaner fuel equivalence, the reaction rate will be reduced and combustion would be prolonged in lean conditions. It was found that HHO-gasoline blends can provide a comparable performance to H2 blends. HHO was claimed to grant a greater enhancement in thermal efficiency. HHO was reported to reduce the CA of heat release duration. The unsolved problems exist in both the automobile product and manufacturing process. The IC engine technology, as such is one of the oldest. In the IC engine, petrol or diesel fuel gets converted to mechanical power by means of controlled combustion. So, we decided to reduce the emission of the vehicles by using HHO gas as the supplementary fuel. By using this fuel thermal and mechanical efficiencies are also increased. HHO gas is available in abundant form and can be extracted from many kinds of sources, in this case by water electrolysis.

CONCLUSIONS

The use of H2 or HHO produced by water electrolysis is investigated in gasoline engines. They provide advantages such as increased efficiency and peak pressure, and alleviate reduced mass of the cylinder charge. A hydrogen generator is designed and fabricated capable of delivering the required flow for optimum performance, and to be at an acceptable size and weight for installation on a passenger vehicle (such as a motorcycle engine). A thermal efficiency of 54.6% and mechanical efficiency of 69% was obtained.

HFS Hydrogen Generator System

The Patented Hydrogen Generator System produced by HFS pty ltd is significantly better than this reported system. The HFS system does not use Neutral plate arrangement but instead had three

double cells connected in series and therefore does not waste overvoltage as heat and converts all of the electrical energy into chemical energy (hydrogen gas)

The HFS hydrogen generator system can easily produce 3 litre of Hydrogen per minute. The Production rate has been shown to produce 36% to 42% improvements in fuel economy on vehicles driven in heavy traffic . It has also been shown to produce savings of 31% and 32% on a 7.2 litre 2022 diesel truck in city and highway conditions , with a full load.

The HFS system uses a number of patented design characteristics to increase the gas production far above what is expected by a simple electrolysis setup, as used in the report above. For more information and assistance in obtaining a HFS hydrogen Fuel system call Gavan on 0403177183 or email glknox11@live.com

https://hydrogenfuelsystems.com.au

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