Hydrogen and Oxygen Gas Production From Water for a Marine Engine as a Function of Voltage and Electrolyte Concentration

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Petroleum-based engines use carbon-based non-renewable energy sources, and electric options have low range and slow refuel speeds. This experiment focused on designing, engineering, and producing a wet cell system using boat batteries to produce enough oxy-hydrogen (HHO) gas for a marine engine from water and an electrolyte. Advantages of HHO include good energy to weight ratio, but poor energy to volume ratio. Therefore, skipping the energy expense of compression and storage holds promise. In this experiment, an electrolysis wet cell and the cylinder were constructed and tested with different electrolyte mixtures with different power levels. Other research demonstrates it is possible to run a 2.3-liter engine on 50L/min of HHO gas without compression. The amount of HHO gas needed per cc of displacement, is calculated as follows: (50L/min)÷(2.3L)=22cc/minute for each 1cc displacement. If the marine engine used gas at a similar rate to the 2.3L engine, an 85cc engine would need: (22cc/min)×(85cc)= 1,870cc/min of HHO gas. This goal was completed with the prototype at 18 volts. Theoretically, enough gas was produced to run a 145 cc engine, almost twice the goal. Other expanded applications include military ships or airplanes without the pollution from petroleum-based engines or the low range, refuel speeds and weight issues of electric options. A marine engine could likely utilize this HHO system, not just as a catalyst, but as a fuel.

Awards Won:

Lawrence Technological University: Tuition scholarship of $19,650 per year, renewable for up to four years and applicable to any major