

## AN ONBOARD HYDROGEN GENERATION METHOD BASED ON HYDRIDES AND WATER RECOVERY FOR MICRO-FUEL CELLS

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The purpose of this paper is to conduct experiments to generate hydrogen in a fuel cell by employing hydrides and water recovery methods. Micro-proton exchange membrane fuel cells are the next generation power source for micro-scale applications. The methods presented in the paper make use of the recycled water produced from the cathode reaction to develop high energy density micro fuel cells. The method for this experiment is accomplished by utilizing oxidation-reduction reactions that take place in the cell. These reactants must be constantly replenished through an external source. This paper will introduce the methods and procedures that permit a solution to the small-scale generation of fuel and water byproduct; this is accomplished by implementing a water recovery mechanism. The experiment commenced with designing and manufacturing a Nafion membrane and a fuel cell package. From then the calcium hydride and lithium aluminum hydride was loaded. These hydrides were given controlled amounts of water vapor and the amount of gas production was measured. After the amount of gas is measured, we are able to calculate the most efficient way to receive the greatest amount of hydrogen from the cell. The objective of our experiment is to achieve a higher energy density for micro-fuel cells. Our aim is that the results of our research will replace lithium ion batteries with a high energy density fuel cell that can increase longevity as a source, and is able to be used in multiple environments including pace makers and space exploration.

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