Gills: The Use of Electrolysis for Extended Underwater Exploration

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At present we know more about our moon than our ocean. This is largely due to the inability of humans to stay underwater for long periods of time. Submarines use electrolysis to help maintain oxygen levels. In this project, we investigate if this method could be used for individual human use as well. Electrolysis is the process of using electricity to split water into oxygen and hydrogen gas. This process is usually facilitated by the polymer electrolyte membrane. To test our hypothesis, we created a polymer electrolyte membrane based electrolysis system which would produce 1/10th of the necessary amount of oxygen for human survival. The model was then evaluated using a constant flame which consumes 1/10th of the oxygen a human uses. The polymer electrolyte membranes was able to hold the percentage of oxygen in the system between 16 and 26 percent, allowing for the survival of the flame. Based on this, we can conclude that an oxygen producing system created for a human using polymer electrolyte membrane electrolysis would be able to sustain human life underwater.

Awards Won:
Consortium for Ocean Leadership: First Award of $3,000