Rebuilding the Zeppelin: The Power and Purity of Hydrogen

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With gas prices rising and the need for environmentally friendly transportation growing ever prevalent, efficient airships are an untapped resource to transport people and goods. However, since the key part of keeping the airship afloat is the gas that lifts it up, we must determine what purity and type of gas are most ideal to be used. Which gas is able to carry the most weight while still factoring in safety? The hypothesis was that the hydrogen generated with the highest purity would be able to carry the most weight. We produced hydrogen gas using two different methods: the aluminum, water, and sodium hydroxide method; and the zinc and hydrochloric acid method. We contained each type of hydrogen gas in balloons as well as a balloon filled with helium and individually tested their capability to carry weight. The hydrogen gas made from aluminum could carry the most weight, the hydrogen gas made from zinc could carry the second-most weight, and the helium could carry the least amount of weight. The hypothesis was confirmed. The aluminum-made hydrogen gas could carry the most weight and was the purest hydrogen gas that was generated. Changing the lifting gas from helium to high purity hydrogen gas improves the efficiency of the airships and can help preserve the limited amount of helium on the planet. For further research, the exact purity of hydrogen gas needs to be determined and implemented into the model airship.

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