

Amy Choi, amylase, The Meadows School

One biological mechanism I've had a long term interest in was the artificial leaf, which I first encountered while reading the news. The artificial leaf mimics photosynthesis, and splits hydrogen and oxygen from water. During the light reaction part of photosynthesis, as opposed to the Calvin cycle. This splitting, known as electrolysis, occurs in photosystem II. Amazingly, biochemical engineers were able to mimic this process, creating a cost-effective, silicon solar cell. The artificial leaf turns sunlight energy into a wireless flow of electricity, which, with the help of metal catalysts, splits oxygen and hydrogen. With the artificial leaf, hydrogen energy can be produced in a cost effective manner, and without adverse environmental impacts. Nocera, one of the MIT professors leading the team, hoped to make renewable energy sources more available to those of less fortunate communities.

The artificial leaf inspires me; oftentimes, hydrogen energy is disregarded as expensive and inefficient. However, this leaf could create a shift in this perspective, and introduce a feasible means of implementing hydrogen energy into our daily lives. It changes my perspective of nature by allowing me to appreciate a commonly known phenomenon that could typically be overlooked. Additionally, learning about such technology makes me feel like my AP Bio class was worth it!

In the future, panels could collect the solar energy, and then transfer it to the solar leaf when necessary. This would increase energy efficiency, and reduce wasting sources of electricity within households, schools, etc. As the technology develops further, the cost-efficiency only increases, making it even economically favorable to invest in such a product!

Source: <https://news.mit.edu/2011/artificial-leaf-0930>

BIOMIMICRY IN

THE ARTIFICIAL LEAF

The future of hydrogen energy!

THE ISSUE

Hydrogen fuel is expensive right now - it could be difficult to store and transport, and even obtaining the molecule could prove troublesome.

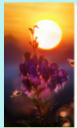
THE SOLUTION - USING BIOMIMICRY

Plants get hydrogen for free! This happens during photosynthesis, more specifically during the light reaction, a process known as electrolysis occurs, splitting a water molecule into hydrogen and oxygen.



Consequently, scientists began the manufacturing of this artificial leaf, which mimics the process of photosynthesis in order to obtain hydrogen.

WHAT ARE THE BENEFITS?



It's cost efficient - more research into this topic could lead to the increase of hydrogen energy as a fuel for cars, houses, etc.



It's energy efficient - future models involving the artificial leaf involve the storage of solar energy, and the activation of the leaf only when necessary!

WHEN WILL WE SEE THIS?

Unfortunately, we are still in the developing area, but with further research, the artificial leaf will be implemented into everyday life!

REFERENCES

<https://news.mit.edu/2011/artificial-leaf-0930>

