MIT researchers harness the sun's power

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For decades, scientists have been trying to replicate the process of photosynthesis -- the process by which plants convert sunlight into energy. The Economist reports that Angela Belcher and her colleagues at the Massachusetts Institute of Technology have made headway, replicating the first phase of the photosynthesis process.

According to the article, photosynthesis is a two-step reaction process. In the first step, sunlight splits water into hydrogen and oxygen.

"Plants do this with a complex molecular 'photosystem' that uses the energy of sunlight to break apart water molecules, liberating electrons, hydrogen ions and oxygen," according to the Economist. The second half of the equation involves electrons and hydrogen combining with CO2 to make growing power in the form of carbohydrates.

That first half is the trickier of the two processes. The Economist reports that we have already harnessed sunlight to split water, using as an example solar panels that generate electricity in this manner. The article also mentions that this is not an efficient process and researchers have recently been using plant compounds like chlorophyll to help trap light and "facilitate the process of converting carbon dioxide, water, and sunlight."

That's where Belcher comes in. She and her team used a virus called M13, which is harmless to humans, and coated it with catalysts and plant pigments "which act as an antenna to capture the light." According to the article, the virus acts like a framework for the components to grab hold

at the proper spacing and "trigger the water-splitting reaction." The results are a much more efficient reaction, though the viruses sometimes clump together.

Belcher's team first focused on producing oxygen from the reaction and next they will focus on how to harvest hydrogen gas. This would make their project more similar to the process of plants, which store energy as hydrogen gas. The researchers could release the gas, burning it or using it to generate electricity.

Current obstacles to the research include the high price of the catalyst materials, but Belcher says we are not too far removed from a machine that efficiently uses sunlight to split water atoms.