

Oxygen From Plants

The oxygen that people breathe on Earth also comes from the splitting of water, but it's not a mechanical process. Plants, algae, ***cyanobacteria*** and phytoplankton all split water molecules as part of **photosynthesis** -- the process that converts sunlight, carbon dioxide and water into sugars for food. The hydrogen is used for making sugars, and the oxygen is released into the atmosphere.

"Eventually, it would be great if we could use plants to (produce oxygen) for us," said Monsi Roman, chief microbiologist for the ECLSS (***Environmental Control and Life Support Systems***) project at *Marshall Space Flight Center*. "The byproduct of plants doing this for us is food."

However, "the chemical-mechanical systems [**like electrolysis**] are much more **compact**, less labor intensive, and more reliable than a plant-based system," Perry noted. "A plant-based life support system design is presently at the basic research and demonstration stage ... and there are a **myriad** of challenges that must be overcome to make it **viable**."

Hydrogen that's leftover from splitting water will be vented into space, at least at first. NASA engineers have left room in the ECLSS hardware racks for a machine that combines the hydrogen with excess carbon dioxide from the air in a chemical reaction that produces water and **methane**. The water would help replace the water used to make oxygen, and the methane would be vented to space. "We're looking to close the loop completely, where everything will be (re)used," Roman said. Various uses for the **methane** are being considered, including expelling it to help provide the thrust necessary to maintain the Space Station's orbit.

Right: The oxygen that humans and animals breathe on Earth is produced by plants and other photosynthetic organisms such as algae.

cyanobacteria: mistakenly called blue green algae, they are really photosynthetic bacteria. Sometimes they are referred to as pond scum.

compact: able to fit in a small space

myriad: extremely great number

viable: capable of working successfully

methane: CH₄, main ingredient of natural gas

