

Can scientists use carbon dioxide to make things?

By Scientific American, adapted by Newsela staff on 07.29.16

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Smoke bellows from a chimney stack at BlueScope Steel's steelworks at Port Kembla, south of Sydney, Australia, July 8, 2011. AP Photo/Rob Griffith

We humans released almost 40 billion tons of carbon dioxide into the air in 2014. Carbon dioxide is a gas. Mostly, it is released when power plants and factories burn coal and natural gas.

All that carbon dioxide is causing enormous problems. It remains in our atmosphere and traps heat. Over time, all that trapped heat is causing average global temperatures to go up. Scientists call this global warming, or climate change.

A Dangerous Situation

Global warming is having all sorts of dangerous effects. It is drying up lakes in some places, and causing flooding in other areas, as ice caps melt. Food is becoming harder to grow and some places are running out of water.

So far, governments have mostly focused on ways to lower the amount of carbon dioxide that gets released. However, there could be another approach. What if scientists could use carbon dioxide to help make things? Then, says scientist Lynden Archer, “carbon dioxide would not be a nuisance anymore, but a gift.”

Scientists think the gas could be used to help make certain chemicals. Perhaps it could be used in place of the coal and gas now used to produce many chemicals. Instead of being trapped in the air, the carbon would then be stored or captured in the chemical.

There is one big problem, though. To use carbon dioxide, scientists first have to heat it up. Usually, that requires electricity. Much of that electricity comes from power plants that burn coal or natural gas. The power plants end up releasing more carbon dioxide into the atmosphere than was captured.

Better Uses For Carbon Dioxide

The XPrize Foundation thinks there is a way to make carbon use work. It is now offering a \$20-million prize to the team of scientists that comes up with the best way to use carbon dioxide. More than 40 teams are competing. The winning team will be announced in 2020.

New ways to use carbon dioxide could help in the fight against global warming. Companies producing chemicals might start to switch away from coal and natural gas. If they used carbon dioxide enough, it could make a real difference.

Archer thinks fuel cells are the answer. Fuel cells are devices like batteries. They use chemical reactions to produce electricity. Archer says he can turn carbon dioxide into a useful chemical, and produce electricity at the same time.

Archer ran an experiment in which he mixed carbon dioxide with aluminum and oxygen. The mix produced oxalates. Oxalates are used to make dyes, chemicals that eat rust, and many other different kinds of chemicals.

Normally, making chemicals uses up a lot of electricity. Archer says that is not the case with his system.

It does take electricity to make the oxalates, but his system produces more electricity than it uses, Archer says. The new electricity is produced by the fuel cells as the oxalates are formed.

Companies Work On Finding Solutions

Currently, a number of companies are working on other ideas. For example, Skyonic captures carbon dioxide given off by a cement plant and uses it to make limestone and acid. Solidia Technologies puts carbon dioxide into concrete.

Still, scientist Howard Herzog says we should not get too hopeful. He thinks many of these ideas are too good to be true. He thinks they will all end up using more power than they save.

As a result, more carbon dioxide will be released into the atmosphere, Herzog says. The result will be more pollution, not less.

In addition, the global warming problem is simply too big, Herzog says. Carbon use by chemical factories is not enough to solve it.

Scientist Kendra Kuhl agrees carbon use is not enough to stop global warming. Still, Kuhl says her company will try to win the Carbon XPrize. Coal and natural gas cause too many problems, she says. It is worth at least trying to use carbon dioxide instead, Kuhl says.

Quiz

1 What are the main ideas of this article?

1. Oxalates are made by mixing carbon dioxide with aluminum and oxygen.
2. Carbon dioxide is contributing to climate change.
3. Power plants release carbon dioxide into the atmosphere.
4. Scientists are looking for ways to change carbon dioxide into something useful.

- (A) 1 and 3
(B) 2 and 3
(C) 3 and 4
(D) 2 and 4

2 How does the information in the following paragraphs from the section "Better Uses For Carbon Dioxide" support a main idea of the article?

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- (A) It provides an example of how carbon dioxide can be used to make new electricity.
(B) It shows the steps Archer took in his experiment to create oxalates.
(C) It explains how fuel cells work like batteries to produce electricity.
(D) It shows how experiments with carbon dioxide use many different chemicals.

- 3 Read the sentences from the section "A Dangerous Situation."

So far, governments have mostly focused on ways to lower the amount of carbon dioxide that gets released. However, there could be another approach.

What does the author MOST LIKELY mean by "approach"?

- (A) way to solve a problem
 - (B) to move closer
 - (C) to reach a goal
 - (D) viewpoint
- 4 Read the sentence from the introduction [paragraphs 1-2].

Scientists call this global warming, or climate change.

Which word or phrase from the article BEST helps you understand the meaning of "climate change"?

- (A) dangerous effects
- (B) chemical reactions
- (C) trapped heat
- (D) new electricity