

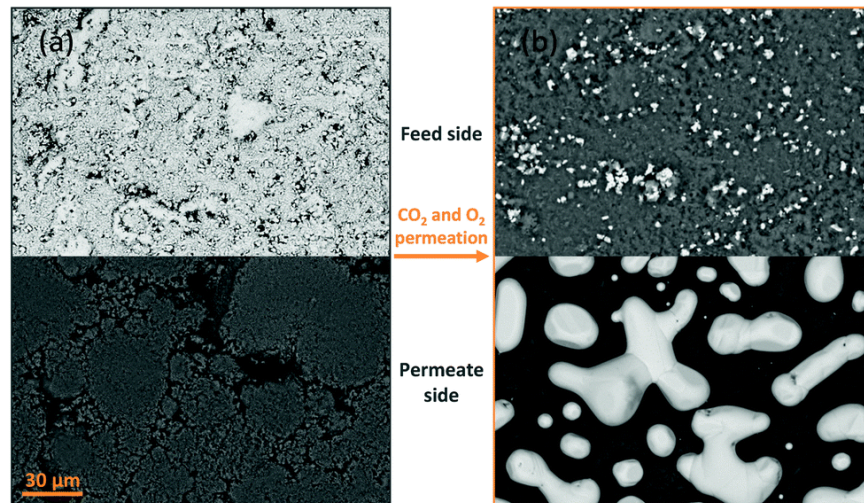
# CO2 capture filter: A groundbreaking idea for the post-carbon industry

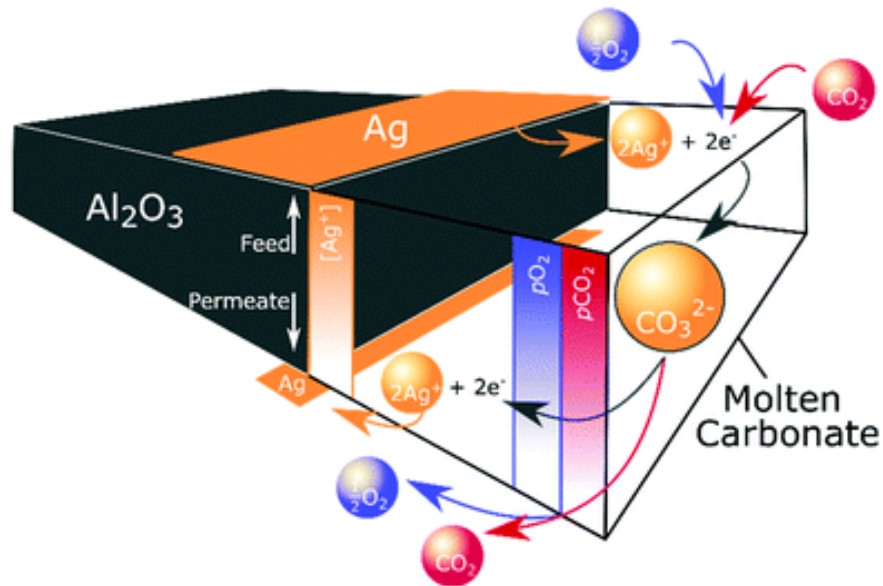
In Australia, the country's three largest coal-fired power plants have designed a process of capturing CO2 as input to algae biomass farming systems. This type of algae is then used to produce plastics and animal feed. Some other development directions of the CCS industry are CO2 capture, burial.

We all know that burning fossil fuels to serve the energy needs of human society is affecting the environment. It increases greenhouse gas emissions, namely CO2, and is causing the Earth to heat up day by day.

But now, a team of British scientists claims they have created silver crystals that can filter CO2 out of the air. The groundbreaking idea was that they would use this filter as a net, capturing every CO2 molecule in the exhaust to give them a chance to release it into the environment.

The recovered CO2 can be utilized to produce plastic, concrete or biofuels. Or simply, scientists can bury them in the ground to carbonate available metal oxides, creating limestone mines that can store CO2 in a more environmentally friendly way.





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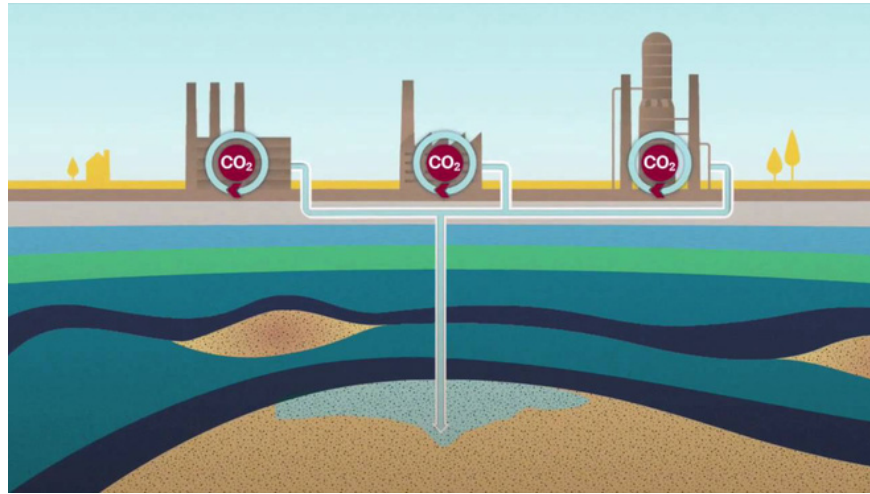
The new study, published in Energy & Environmental Science, uses a technique that the authors say no one has ever tried before. They planted a small amount of silver molecules on the air separator membrane and used the same CO2 stream to grow the silver crystals growing on it.

These silver crystals increase the filtration efficiency and capture CO2, which saves a large amount of precious metal. As a result, the cost of creating filters will decrease, making the idea of ??applying it on an industrial scale more feasible.

" We do not create a filter entirely made of silver," explained Greg Mutch, engineer, research author from the University of Newcastle, UK. "Instead, we only seed a small amount of silver and feed the crystals inside the membrane, which increases the efficiency we want."

Carbon filter and filter for the idea that we can capture and store carbon (Carbon capture and storage (CCS) help reduce or completely eliminate the amount of greenhouse gas emissions that we emit into the environment from public activities. Karma.

A number of industrial CCS projects have been implemented around the world. Typically, the United States currently has about 5,800 km of CO2 pipelines and Norway with 160 km of similar pipelines. The CO2 recovered in these countries is used to pump down exhausted oil fields, reducing the viscosity of the remaining oil and recovering it.



CO<sub>2</sub> recovered from thermal power plants is pumped below an exhausted oil field, reducing the viscosity of the remaining oil and recovering it.

In Australia, the country's three largest coal-fired power plants have designed a process of capturing CO<sub>2</sub> as input to algae biomass farming systems. This algae is then used to produce plastic and animal feed.

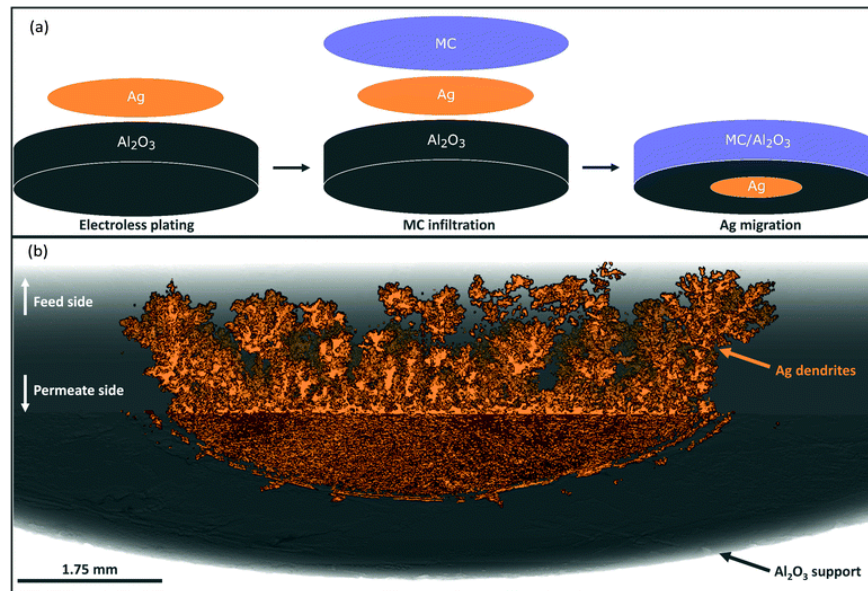
Some other development directions of CCS industry are recovering CO<sub>2</sub>, burying them underground, containing metal oxide mines such as CaO, MgO to form limestone carbonate. In this state, carbon will be stored more sustainably underground, instead of entering the atmosphere and creating a greenhouse effect.

The science and industry of carbon sequestration and storage has been continuously developed over the past 10 years. However, it still faces a major obstacle that is cost. While scientists have countless ideas about CO<sub>2</sub> filters that can capture these emissions, they often fail to deploy them on an industrial scale because the cost and cost are so great.

So in this new study, British scientists have tried to solve the problem. They observed that silver when produced into two-phase films can isolate and separate CO<sub>2</sub> from other gases. This membrane acts as a permeable barrier, allowing other gases to diffuse through, except for the trapped CO<sub>2</sub>.

The thing is, silver is a rare metal so it's not cheap. To overcome this weakness, scientists have tested a breakthrough idea. They created original aluminum oxide filters and only added a small amount of silver molecule.

These silver molecules then automatically grow into thicker lattices, increasing the area exposed to CO<sub>2</sub> and increasing the efficiency of the filter. This crystalline process takes place in the flow of air through the membrane.



Silver crystals are grown on the surface of aluminum oxygen film.

"Through unbalanced growth driven by Ag [silver] branch fibers, from a small amount of Ag, low-cost, low-flux film materials have been converted into high-flux membrane materials, but keep costs low," the authors wrote in the study.

In other words, at a cheaper cost, silver crystal films developed on aluminum oxide have comparable performance to the CO<sub>2</sub> capture processes currently in use. "In fact, this system is likely to reduce both the size of the equipment needed and potentially reduce operating costs," Mitch said.

CO<sub>2</sub> capture films are in a big problem called "Carbon neutrality", or carbon neutralization. The concept, introduced in 2006, aims to develop industry with zero CO<sub>2</sub> emissions.

To do that, we have to find ways to reduce greenhouse gas emissions or offset emissions by natural methods, such as reforestation, or man-made films like capturing and reusing. CO<sub>2</sub>.

The goal is to go from a current high carbon emissions industry, to a low carbon industry and then to the post-carbon industry. This is said to be a sustainable solution for both the environment and human society in the future.

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