



## Inventors

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## A Filter for Passive Collection of Carbon Dioxide from an Air Stream

**AzTE Case #M16-055P**

### Background

Direct capture of CO<sub>2</sub> from ambient air is an important technology for several reasons. First, it can provide access to an important commercial and industrial resource (CO<sub>2</sub>) in a wide range of locations. Second, the ability of removing CO<sub>2</sub> from the atmosphere provides a tool for managing CO<sub>2</sub> emissions. Because CO<sub>2</sub> concentration in the air is extremely low, it is advantageous to use a passive system that can operate with a very low pressure drop across a wind-driven collector. A simple monolith is one of the best designs for such a system. Unfortunately, many sorbent materials cannot be easily formed into a stable monolith. The material may not lend itself to extrusion technology, or the sorbent material is not dimensionally stable and thus could change dimension when exposed to the sorbate or other chemicals. Such changes in dimension can lead to distortions of the channels, which would interfere with the fluid flow through the monolith, reducing efficiency and product lifetime.

### Invention Description

Researchers at Arizona State University have designed passive filter systems that provide contact between the air and sorbent surfaces, without the need for air blowers or fans. Flat sheets of sorbent material are exposed to the airflow and spacers are used to keep them a fixed distance from each other. This design gives a uniform exposure to the airflow, and it makes it possible to create stable filter structures that can be moved between fixtures suitable for exposure to air or other fluids and regeneration chambers in which the sorbent material is regenerated.

## Intellectual Property

### **Status:**

*Pending*

### Potential Applications

- CO<sub>2</sub> sequestration
- Air filtration
- GHG emission reduction

### Benefits and Advantages

- **Versatility** –
  - able to take a variety of different sorbents and include them in the structure, while tolerating dimensional instability that otherwise would degrade performance
  - flat sheets of composite material are relatively easy to manufacture
  - basic design concept can be transferred to other sorbent systems
- **Environmental Sustainability** – passive CO<sub>2</sub> sequestration technique which is able to operate with a very low pressure drop across a wind-driven collector
- **Longevity** – design utilizes precise construction for long-term monolith stability

## Contact

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