Biomimetic Chemical Compounds for Capturing Carbon Dioxide from Power Plant Stacks and the Atmosphere

Tech ID: 32804 / UC Case 2021-691-0

ABSTRACT

Researchers at the University of California, Davis have developed synthetic biochemical compounds that capture carbon dioxide from the atmosphere or sources such as power plants. These new derivatives mimic how some plants capture carbon dioxide from the air and use it for photosynthesis.

FULL DESCRIPTION

In the biological field, C4 plants are a specific type of plant where the acquired carbon dioxide is first fixed into a four-carbon atom compound. Subsequently, the carbon dioxide enters and is involved in various photosynthetic processes.

These C4 plants use phosphoenolpyruvate, a chemical compound derivative of phosphoenolpyruvic acid, to capture carbon dioxide at night from the atmosphere and then release it during the day for photosynthesis. Researchers at the University of California, Davis have developed new phosphoenol derivatives that can capture carbon dioxide from industrial sources such as power plants before it enters the atmosphere or from the atmosphere itself.

APPLICATIONS

- Useful in industries with major carbon dioxide emissions
- Natural gas processing
- Fossil fuel-based hydrogen production plants
- Use in synthetic fuel plants

FEATURES/BENEFITS

- Contains no nitrogen; non-toxic
- Less energy intensive than current solvents for carbon capture
- Compounds will not be lost to atmosphere or react to form toxic compounds

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20240342685	10/17/2024	2021-691
Patent Cooperation Treaty	Published Application	WO 2023/018974	02/16/2023	2021-691

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OTHER INFORMATION

KEYWORDS

photosynthesis, carbon dioxide, carbon capture, phosphoenol pyruvate, C4 plant, direct air capture fossil fuel carbon capture and sequestration, bioenergy carbon capture and sequestration

CATEGORIZED AS

- **Biotechnology**
  - Industrial/ Energy
- **Energy**
  - Bioenergy
  - Hydrocarbon
  - Transmission

RELATED CASES

2021-691-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Mathematical Model and Apparatus to Optimize Functional Electrical Stimulation for Non-Isometric Limb Movement
- Instrument for Measuring Particulate Aerosol Elemental Composition
- Thermodynamic Integration Simulation Method for Filling Molecular Enclosures Using Spliced Soft-Core Interaction Potential

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