



Enzymatic Carbon Sequestration

As the global race to combat climate change intensifies, enzymatic technology emerges as a groundbreaking solution. What if we could turn CO₂ from a costly liability into a valuable resource using nature's own tools?

BACKGROUND

Carbon sequestration plays a pivotal role in climate change mitigation, yet existing methods face critical barriers: they are energy-intensive, costly, and dependent on purified CO₂ streams that exclude common impurities like oxygen and nitrogen. Such limitations render traditional technologies impractical for scalable deployment, creating a pressing need for innovative solutions. In contrast, enzymatic carbon capture leverages carbonic anhydrases (CAs) – nature's highly efficient catalysts – to overcome these challenges.

TECHNOLOGY

Leveraging cutting-edge bioengineering, acib has developed an enzymatic CO₂ capture system utilizing tailored carbonic anhydrases (CAs). Sourced from robust organisms like *Acetobacterium woodii* and *Persephonella marina*, these enzymes exhibit remarkable stability across diverse conditions, from extreme cold to high heat. Our system not only maximizes CO₂ capture efficiency but also facilitates the generation of high-value precursors for biotechnological innovation. This dual benefit – capture and conversion – represents a paradigm shift in carbon management.

KEY ADVANTAGES

- 1. Broad Versatility:** Adapts seamlessly to diverse CO₂ concentrations and operational temperatures, making it suitable for varied industrial settings.
- 2. Exceptional Stability:** Engineered enzymes maintain performance under harsh conditions, including elevated temperatures.
- 3. Value-Added Potential:** Converts captured CO₂ into biotechnological precursors, unlocking new processes and revenue streams.
- 4. Environmental Sustainability:** Drastically reduces energy consumption and eliminates harmful by-products, supporting global decarbonization efforts.

OFFER

We invite you to collaborate with acib in advancing next-generation CO₂ sequestration technology. By combining our expertise in enzymatic innovation with your vision and resources, we can unlock transformative solutions for industries worldwide. Let's collaborate to convert CO₂ from a global challenge into an economic and environmental opportunity. Together, we can shape a sustainable, circular future.

EXPERTS

Dr. Günther Bochmann
Dr. Doris Ribitsch
Prof. Dr. Georg Gübitz

DEVELOPMENT STATUS:

Technology Readiness Level 3
(experimental proof-of-concept)

KEYWORDS

- Carbon Capture and Storage (CCS)
- Carbon Capture and Utilization (CCU)
- Direct Air Capture (DAC)
- Green Chemistry
- Carbonic Anhydrases (CAs)
- Sustainable Bioprocesses
- Biocatalysis
- Climate-Tech
- Industrial Biotechnology
- Climate Change Mitigation

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