

Blood Enzyme Could Help Realize Clean Coal

December 3 2009, by Lisa Zyga



A ribbon diagram of carbonic anhydrase, which isolates carbon dioxide in the lungs for exhalation. Image credit: Wikimedia Commons.

(PhysOrg.com) -- An enzyme in our blood that enables our lungs to exhale carbon dioxide could be the key to isolating carbon dioxide emissions from coal plants in order to store them safely underground. A company called Carbozyme, based in New Jersey, is developing a synthetic version of the blood enzyme that could capture carbon dioxide using one-third less energy than other methods.

The blood enzyme, called carbonic anhydrase, is constantly converting and reconverting [carbon dioxide](#) as part of our respiration process. At first, cells pump carbon dioxide into the blood, where carbonic

anhydrase converts the [gas](#) into bicarbonate to make it easier to transport to the lungs. Then, in the lungs, the same enzyme converts the bicarbonate back into carbon dioxide to be exhaled. Carbonic anhydrase works very efficiently, capturing about two pounds of carbon dioxide per day.

By mimicking the way this blood enzyme separates carbon dioxide from other gases in the body, researchers at Carbozyme have demonstrated how to capture and separate carbon dioxide from a wide variety of gas emissions, such as those from coal stacks. Isolating carbon dioxide is essential for sequestering the [greenhouse gas](#) underground, where it can be stored in layers of basalt rock. In addition to using less energy, the synthetic enzyme method also avoids using hazardous chemicals that some other gas separation methods use.

Carbozyme plans to test the technology on coal burners at the University of North Dakota next year, and eventually license the method to coal plants. The company says that the design can also be tailored for different applications, such as in the food and beverage industry and [renewable energy](#).

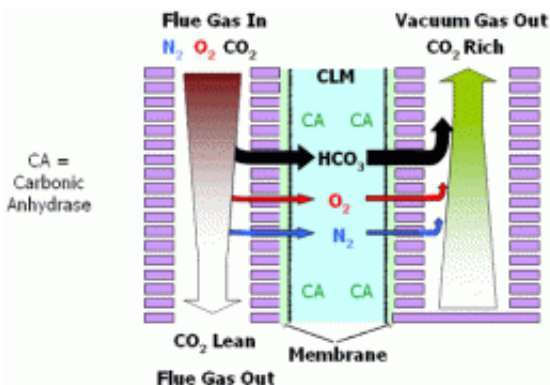


Image credit: Carbozyme, Inc.

More information: www.carbozyme.us

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