Advanced Research Projects Agency • ENERGY

FIRST OPEN SOLICITATION

LEHIGH UNIVERSITY

CO_2 CAPTURE USING ELECTRIC FIELDS

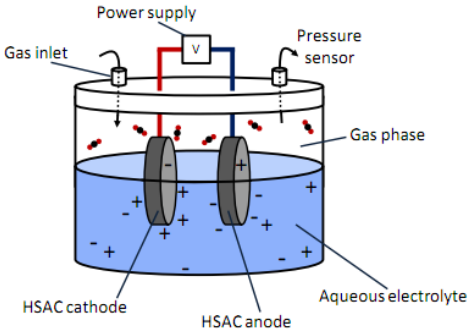
PROJECT TITLE:	Electric Field Swing Adsorption for Carbon Capture Applications		
ORGANIZATION:	Lehigh University	LOCATION:	Bethlehem, PA
PROGRAM:	FOA1	ARPA-E AWARD:	$560,809
TECH TOPIC:	Carbon Capture	PROJECT TERM:	1/1/10 – 6/30/12
WEBSITE:	www.arpa-e.energy.gov/ProgramsProjects/OtherProjects.aspx		

CRITICAL NEED

Coal-fired power plants provide nearly 50% of all electricity in the U.S. While coal is a cheap and abundant natural resource, its continued use contributes to rising carbon dioxide (CO_2) levels in the atmosphere. Capturing and storing this CO_2 would reduce atmospheric greenhouse gas levels while allowing power plants to continue using inexpensive coal. Carbon capture and storage represents a significant cost to power plants that must retrofit their existing facilities to accommodate new technologies. Reducing these costs is the primary objective of ARPA-E's carbon capture program.

PROJECT INNOVATION + ADVANTAGES

Two faculty members at Lehigh University created a new technique called supercapacitive swing adsorption (SSA) that uses electrical charges to encourage materials to capture and release CO_2. Current CO_2 capture methods include expensive processes that involve changes in temperature or pressure. Lehigh University's approach uses electric fields to improve the ability of inexpensive carbon sorbents to trap CO_2. Because this process uses electric fields and not electric current, the overall energy consumption is projected to be much lower than conventional methods. Lehigh University is now optimizing the materials to maximize CO_2 capture and minimize the energy needed for the process.



IMPACT

If successful, Lehigh University's SSA capture technique would represent an efficient and cost-effective technological development that enables significant reductions in greenhouse gas emissions while helping position the U.S. as the leader in advanced energy technologies.

- SECURITY: Enabling continued use of domestic coal for electricity generation will preserve the stability of the electric grid.
- ENVIRONMENT: Carbon capture technology could prevent more than 800 million tons of CO_2 from being emitted into the atmosphere each year.
- ECONOMY: Improving the cost-effectiveness of carbon capture methods will minimize added costs to homeowners and businesses using electricity generated by coal-fired power plants for the foreseeable future.
- JOBS: Retrofitting coal-fired power plants to capture and store carbon dioxide could create jobs in the U.S. manufacturing, construction, and engineering sectors.

CONTACTS

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