Advanced Research Projects Agency • ENERGY

IMPACCT PROJECT

GEORGIA TECH

COMPOSITE MEMBRANES FOR CO_2 CAPTURE

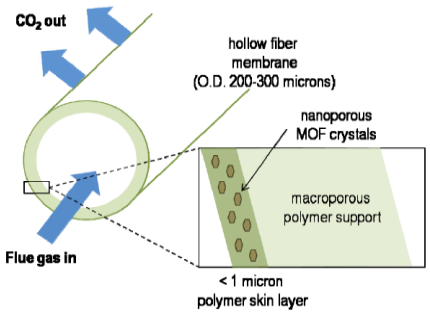
PROJECT TITLE:	High Performance Metal Organic Frameworks/Polymer Composite Membranes for Carbon Dioxide Capture		
ORGANIZATION:	Georgia Tech Research Corporation (Georgia Tech)	LOCATION:	Atlanta, GA
PROGRAM:	IMPACCT	ARPA-E AWARD:	$1,000,000
TECH TOPIC:	Carbon Capture	PROJECT TERM:	7/1/10 – 6/30/12
WEBSITE:	www.gtrc.gatech.edu		

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 the IMPACCT program.

PROJECT INNOVATION + ADVANTAGES

A team of six faculty members at Georgia Tech are developing an enhanced membrane by fitting metal organic frameworks, compounds that show great promise for improved carbon capture, into hollow fiber membranes. This new material would be highly efficient at removing CO_2 from the flue gas produced at coal-fired power plants. The team is analyzing thousands of metal organic frameworks to identify those that are most suitable for carbon capture based both on their ability to allow coal exhaust to pass easily through them and their ability to select CO_2 from that exhaust for capture and storage. The most suitable frameworks would be inserted into the walls of the hollow fiber membranes, making the technology readily scalable due to their high surface area. This composite membrane would be highly stable, withstanding the harsh gas environment found in coal exhaust.



IMPACT

If successful, Georgia Tech's design would create a composite membrane that efficiently pulls CO_2 from exhaust for capture and storage at a cost of $25 per ton, a level significantly below both DOE targets and current-generation 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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