Advanced Research Projects Agency • ENERGY

IMPACCT PROJECT

LAWRENCE BERKELEY NATIONAL LAB

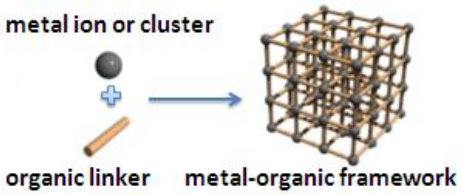
METAL ORGANIC FRAMEWORK RESEARCH

PROJECT TITLE:	High Throughput Discovery of Robust Metal Organic Framework for CO_2 Capture		
ORGANIZATION:	Lawrence Berkeley National Laboratory (LBNL)	LOCATION:	Berkeley, CA
PROGRAM:	IMPACCT	ARPA-E AWARD:	$3,867,851
TECH TOPIC:	Carbon Capture	PROJECT TERM:	8/15/10 – 8/15/13
WEBSITE:	www.lbl.gov		

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



LBNL is developing a method for identifying the best metal organic frameworks for use in capturing CO_2 from the flue gas of coal-fired power plants. Metal organic frameworks are porous, crystalline compounds that, based on their chemical structure, vary considerably in terms of their capacity to grab hold of passing CO_2 molecules and their ability to withstand the harsh conditions found in the gas exhaust of coal-fired power plants. Owing primarily to their high tunability, metal organic frameworks can have an incredibly wide range of different chemical and physical properties, so identifying the best to use for CO_2 capture and storage can be a difficult task. LBNL uses high-throughput instrumentation to analyze nearly 100 materials at a time, screening them for the characteristics that optimize their ability to selectively adsorb CO_2 from coal exhaust. Their work will identify the most promising frameworks and accelerate their large-scale commercial development to benefit further research into reducing the cost of CO_2 capture and storage.

IMPACT

If successful, LBNL's new methods for identifying the most suitable metal organic frameworks for use in carbon capture technology will be an indispensible tool for future researchers and dramatically reduce the cost of this technology.

- 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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Partner Organizations:
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Electric Power Research Institute