CATALYTIC CONVERSION OF CO_2 INTO VALUE-ADDED PRODUCTS

Evaluating new and existing processes for converting waste CO_2 into higher-value, industrially relevant chemicals and materials

CONVERTING CO_2 INTO CHEMICALS FOR INDUSTRY

This project identifies, develops, and evaluates new technologies for converting CO_2 into chemicals that can be sold to **offset CO_2 capture costs, reduce demand for petrochemical-based feedstocks,** and **develop new markets and job opportunities.**

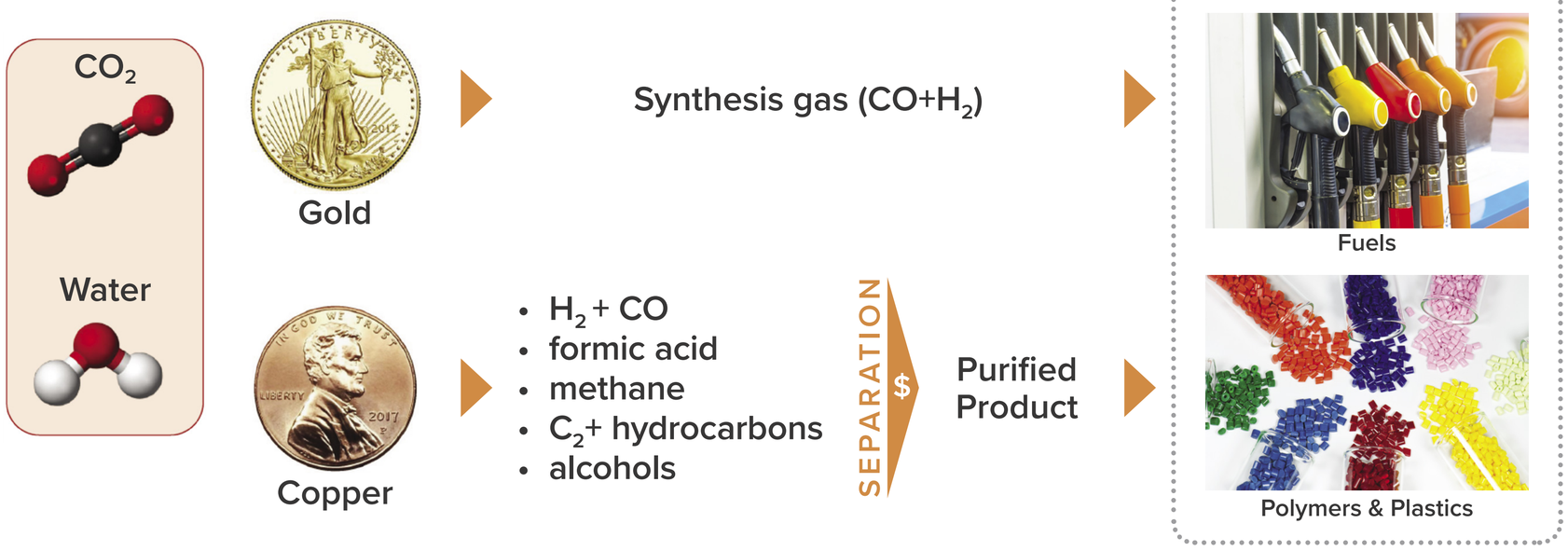
CARBON USE & REUSE BENEFITS:

- Increases energy security due to reduced oil imports
- Facilitates clean and safe development of energy resources
- Provides U.S. industry with low-cost options for reducing GHG emissions

CREATING VALUABLE PRODUCTS FROM CO_2

Early-stage research creates new catalyst materials and reactor designs to selectively convert CO_2 into useful chemicals such as:

FUELS | ALCOHOLS | HYDROCARBONS | CARBON MONOXIDE | POLYMERS | PLASTICS



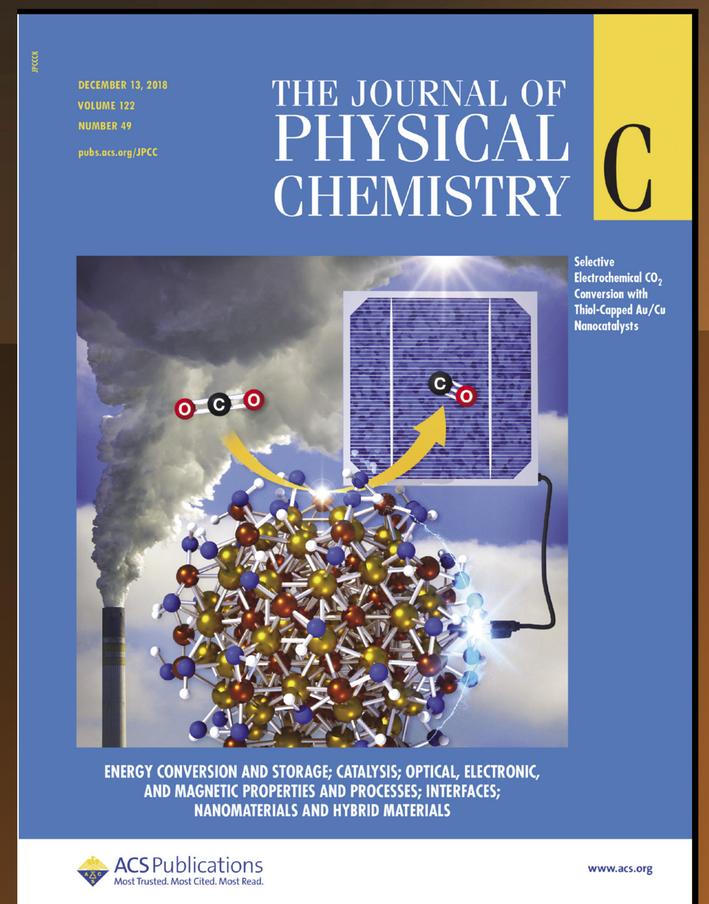
NOVEL APPROACHES FOR CATALYST DESIGN

MICROWAVE-ASSISTED THERMAL CO_2 CONVERSION

New metal oxide catalysts use microwaves to thermally convert CO_2 and methane. Mixed metal oxides absorb microwaves and instantaneously generate heat. This greatly reduces associated heat management issues and makes high-temperature reactions like methane dry reforming with CO_2 practical.

ELECTROCATALYTIC CO_2 REDUCTION

A new nano-porous copper-oxide catalyst for electrochemical CO_2 reduction demonstrates 10–60 times better selectivity compared to commercially available copper materials. This is a significant breakthrough that uses inexpensive material to drastically improve selectivity and performance.



Gold-Copper nanocatalysts retain performance with ~50% reduction in gold and demonstrate success with ligand-capped nanocatalysts. They were chosen for *The Journal of Physical Chemistry C's* December 2018 cover, which includes a manuscript about the results.

QUICK FACTS

AWARD NUMBER
FWP-1022426

PROJECT BUDGET

TOTAL AWARD VALUE
$1,246,000

CONTACTS

HQ PROGRAM MANAGER
JOHN LITYNSKI

TECHNOLOGY MANAGER
LYNN BRICKETT

PRINCIPAL INVESTIGATOR
DOUGLAS KAUFFMAN

2018 Science & Technology ACCOMPLISHMENTS SESSION

Reducing the cost of captured carbon and putting it to work for America

U.S. DEPARTMENT OF ENERGY | NATIONAL ENERGY TECHNOLOGY LABORATORY