

# Catalysis and Reaction Engineering



Pacific Northwest  
National Laboratory

Operated by Battelle for the  
U.S. Department of Energy

Environmental Technology Directorate

Developing and applying innovative catalysis and reaction engineering solutions for efficient utilization of fossil energy; conversion of biomass and renewable feedstocks to fuels and chemicals; reduction of environmental emissions and waste streams; and energy efficient production of chemicals.

## Clients

### U.S. Department of Energy

- Basic Energy Sciences
- Energy Efficiency and Renewable Energy
  - Office of Biomass Program
  - Hydrogen, Fuel Cells & Infrastructure Technologies Program
  - Industrial Technologies Program
- Environmental Management Science Program
- Fossil Energy

### U.S. Department of Defense

- Strategic Environmental Research and Development Program

### Industrial Partners

- Food and Agriculture
- Chemical

### National Institutes of Health

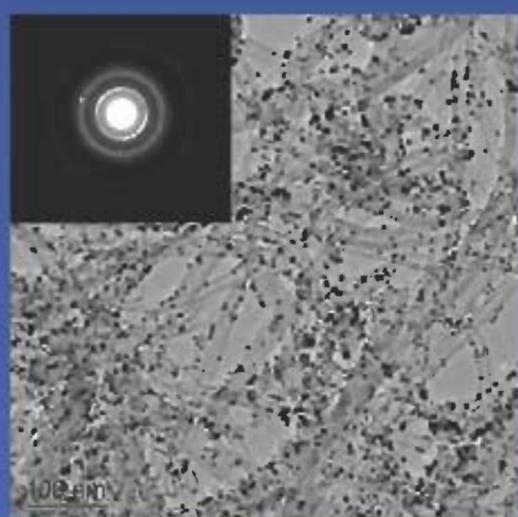
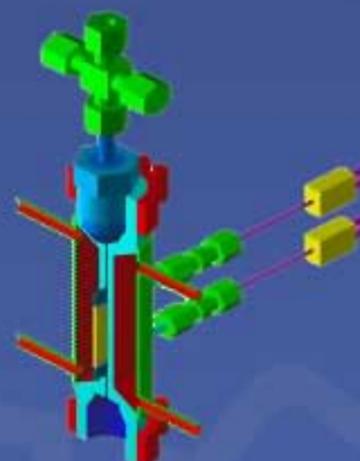
### National Science Foundation

### Universities

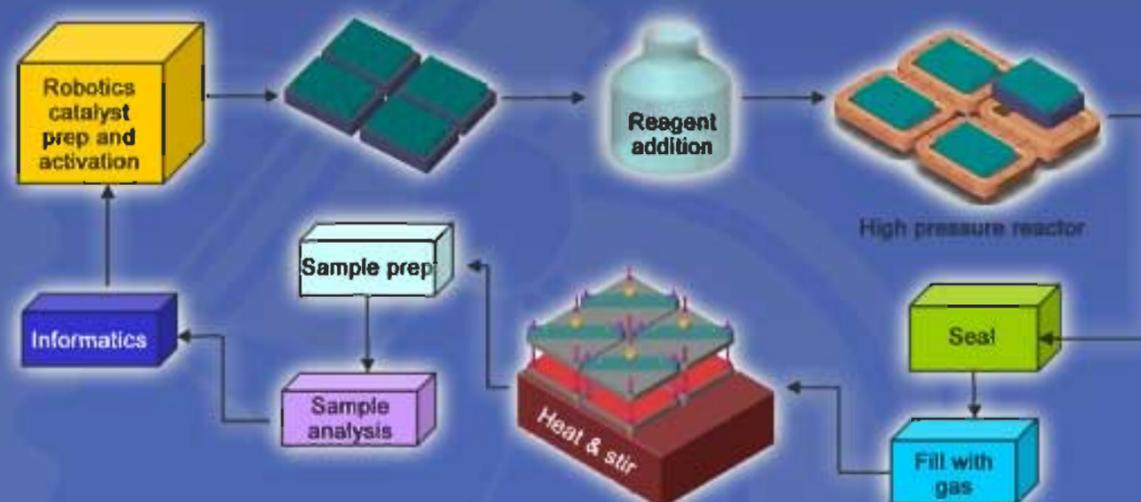


Advanced catalyst characterization and testing facilities are used to gain a further fundamental understanding of the catalytic materials and chemical reaction(s) occurring on catalyst surfaces.

In this microchannel reactor system, for fuel/chemical synthesis, the catalyst is maintained at isothermal conditions for kinetics studies.



Pt Nano Particles/  
Carbon Nanotubes  
Nanocomposites  
for Fuel Cells: These  
nanocomposites,  
demonstrated as  
electrocatalysts for  
the reduction of  
oxygen and methanol,  
can be used for  
fabrication of fuel  
cell electrodes.



Combinatorial Catalysis (CombiCat): High throughput catalyst preparation and screening techniques permit evaluation of up to 384 individual catalyst samples at one time for rapid discovery of improved compositions and new chemistries. An array of automated robotics, computerized instrumentation, and graphical data mining complements this rapid catalyst screening capability.

- Monolith catalysts for microreactors
- Solid acid/base, selective oxidation, selective hydrogenation catalysts
- Mesoporous materials
- Emissions catalysts
- Nanotechnology
- Microreactors

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