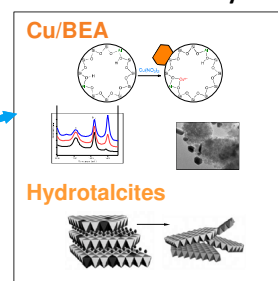


## Capability Nodes

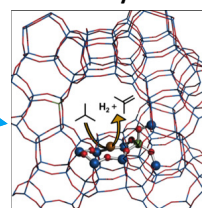
Comprising more than 50 unique, world-class capabilities/expertise in:

### Foundational Science

#### Advanced Synthesis and Characterization

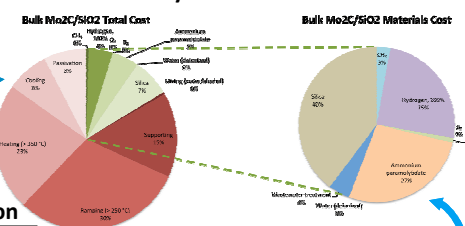


#### Theory

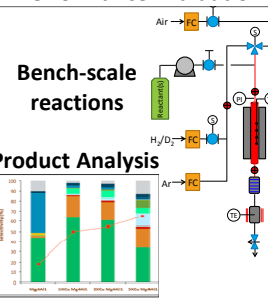


### Applied Engineering

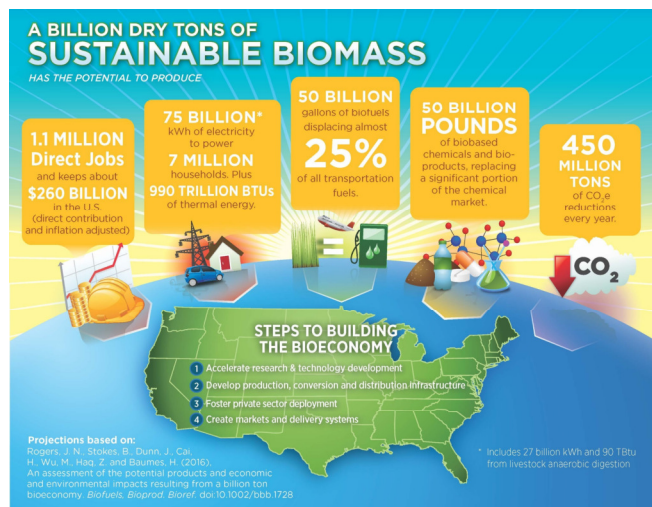
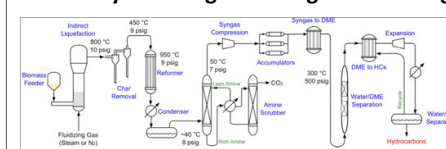
#### Catalyst Cost Estimation



#### Performance Evaluation



#### Catalyst Scaling and Integrated Testing



## Catalysis Challenges due to Biomass

- High oxygen content → new reactions
- Diverse chemical functionalities → competing reactions
- High water content → degradation of catalytic supports
- Impurities (S, N, alkali metals, Cl, etc.) → poisoning
- Multiple states and compositions (solid, liquid, or gas)
- Complex, heterogeneous mixture → difficult to model

## ChemCatBio FY19 Structure

### Catalytic Upgrading of Biochemical Intermediates

(NREL, PNNL, ORNL, LANL)

### Catalytic Upgrading of Indirect Liquefaction Intermediates

(NREL, PNNL, ORNL)

### Catalytic Fast Pyrolysis

(NREL, PNNL)

### Electrocatalytic and Thermocatalytic CO<sub>2</sub> Utilization

(NREL, ORNL)

Zeolites and Metal Oxide Catalysts

Supported Metal Catalysts

### Advanced Catalyst Synthesis and Characterization

(NREL, ANL, ORNL, SNL)

### Catalyst Cost Model Development

(NREL, PNNL)

### Consortium for Computational Physics and Chemistry

(ORNL, NREL, PNNL, ANL, NETL)

### Catalyst Deactivation Mitigation for Biomass Conversion

(PNNL)

## ChemCatBio FY18 Partnership Funding

\$1.8M awarded to partner leveraging ChemCatBio capabilities



## ChemCatBio FY17 Partnership Funding

9 proposals selected, with \$4.3M awarded to 5 labs and 30% cost share provided from industry partners. Unique capabilities in catalyst characterization, catalyst synthesis, catalyst evaluation, theory, and technoconomics being utilized across 5 core labs.



Visit the website: [www.chemcatbio.org](http://www.chemcatbio.org) for quarterly webinar info and more