Pyrolysis of biomass to fuels and products: research and service work
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Biomass pyrolysis

Lab auger pyrolyzer

Pilot scale auger pyrolyzer

Analytical pyrolyzer (Py-GCMS)
400-900°C Rapid screening

Thermogravimetric analyzer
30-950°C
Kinetics of pyrolysis
Bio-oil production/characterization

Bio-oil characterization

1) GC-MS

2) ESI-MS

3) Water content by KF

4) Viscosity
5) Calorific value
6) FTIR spectroscopy

Volatile & semi-volatiles

Non-volatiles

$M_w$ 877 g/mol

Gaseous products (fuel)

Bio-oil

Bio-char

College of Natural Resources
Bio-oil products/upgrading

Catalytic upgrading of bio-oil to fuels

Polymers from bio-oil

Asphalt additive
Biochar production/characterization

Biochar characterization of properties
- Surface area determination
- Butane activity (organic adsorption)
- Calorific value
- TGA analysis
- Raman/FTIR spectroscopic analysis (chemistry)
- C & N content

Biochar based products
- Soil/potting mix amendment
- Use as reinforcement for composites
Syngas upgrading

Syngas characterization
• Gas composition (H₂ + CO)
• Direct combustion as fuel

Syngas upgrading by Fischer-Tropsch synthesis (FTS)
• Developing iron and cobalt catalysts
• Evaluate catalysts performance to produce hydrocarbons
Thank you!
Questions?