Hyperthermal Nozzle cracking:

Structural polymers — cellulose, hemicellulose, and lignin

Objectivities for Thermal Chemical Research

- Next 20 years energy consumption in the U.S is projected to rise by 30% with energy production only to grow 25%.
- Biofuels via Biomass (Cellulosic Ethanol).
- Reduce the Price of ETOH per gallon by 2012
- 30 x 30 – Produce enough ETOH to displace 30% of our current gasoline consumption by the year 2030.

* Biomass in plant material: agricultural crops, trees, and grasses.
* Structural polymers — cellulose, hemicellulose, and lignin.
* Thermochemical processing converts solid biomass to clean liquid fuels and chemicals. All local sources in a way that reduces dependence on carbon stored over geological times.
* All thermal methods use heat to break the chemical bonds of large structural biopolymers to smaller semi-volatile or volatile units & "&quot;volatiles.

Experimental Apparatus

Hyperthermal Nozzle cracking:

Pyrolysis of Furfural

Ethanol Production

Thermochemical Decomposition

Conclusions/Future

"Furfural thermally initially cracks to produce furan Further thermal cracking of furan produces [CH(R)CH + CO] + [CH(R)CH + H2CH]"

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