Autothermal Pyrolysis

The latest breakthrough in thermal deconstruction of biomass to biofuels and biochemicals at the ISU Bioeconomy Institute is an intensified process called autothermal pyrolysis.

**Autothermal pyrolysis** provides the energy for pyrolysis through partial oxidation of pyrolysis products within the reactor, thereby eliminating the heat transfer bottleneck of conventional pyrolysis.

**Simpler Process, Higher Yields**

Autothermal pyrolysis has four advantages:

- Simplified reactor design, removing the need for external gas.
- Process intensification, increasing outputs of desired products with fewer inputs.
- Higher yields of bio-oil, organics, and sugar.
- Reduced capital costs of more than 25%.

The bio-oil is recovered in fractions, a patented BEI technology, to produce:
- Sugars, which can be fermented to alcohol.
- Phenolic oils, to produce Lignocol (a coal substitute) and drop-in biofuels.
- Aqueous phase, converted to renewable natural gas.

Pyrolysis also produces biochar, a soil amendment and carbon sequestration agent.

**Proving it on a Commercial Scale**

BEI is working to prove the technology works on a commercial scale with our Modular Energy Processing System, or M.E.P.S. It’s being accelerated by the DOE-funded RAPID Institute, the country’s tenth Manufacturing USA initiative. BEI has teamed with Easy Energy Systems, a leading developer of modular systems, and Stine Seed, the nation’s largest independent seed company, on the project. The Iowa State University Power Plant will co-fire coal and Lignocol to generate electricity and reduce coal usage.