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Syngas Production Using a Biomass Gasification Process

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Synthesis Gas Created Using a Catalyst for the Thermal Decomposition of Hydrocarbon

A biomass gasification process efficiently creates syngas with a reaction time 10 to 100 times faster than current biomass to syngas conversion technologies. This thermal decomposition of solid carbon and hydrogen containing biomass creates hydrogen gas and carbon monoxide gas without requiring heat inputs (autothermal) and has conversion rates above 99%. The process, known as catalytic partial oxidation, creates synthesis gas in a total reactor time of tens of milliseconds and does not accumulate solid carbon (char) on the catalyst. The reaction is quick, does not allow char to form on the catalyst, and is autothermal because very large amounts of heat are released when the biomass contacts with the catalyst.

Syngas from Renewable Biomass can be Refined into Liquid Fuel, Chemicals, or Fertilizer Agents

The metal catalyst, the only mechanism required for the conversion process, not only prevents the buildup of char on its surface but is easily scaled and also operable at atmospheric pressure. These properties make this technology especially applicable in small scale applications and in situations where a small portable reactor system containing the catalyst is implemented near renewable biomass sources. Such a portable device would eliminate the costs of transporting biomass to a centralized processing location. The high yields of syngas created using this conversion process can be further processed into liquid fuel, chemicals, or fertilizer agents. Potential sources of renewable biomass fuels containing carbon and hydrogen include wood, agricultural crops, and animal wastes. This wide range of feedstocks may be wet or dry.

BENEFITS OF THE BIOMASS TO SYNGAS GASIFICATION TECHNIQUE:

- High conversion rates (>99%)
- No solid carbon (char) formation
- Fast reaction time (< 50 milliseconds)
- Reduced biomass transportation costs
- Compatible with multiple feedstocks including solid or liquid biomass
- Heating is not required (autothermal)
- Operates at atmospheric pressure

Researchers: Lanny D. Schmidt, PhD Professor, Chemical Engineering and Materials Science, College of Science and Engineering
Paul Dauenhauer, PhD Associate Professor, Chemical Engineering and Materials Science, College of Science and Engineering