

Office for **Technology Commercialization**

UNIVERSITY OF MINNESOTA



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Fast, Efficient, Small-Scale Conversion of Biomass to Syngas

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Renewable Energy

- Energy independence
- Reduce greenhouse gases
- Economic value from waste



Need for efficient, cost-effective ways to produce energy and chemicals from renewable materials



Biomass Gasification

- Convert organic materials into syngas (carbon monoxide + hydrogen)
 - Energy input required
 - High cost of capital
 - Transportation of biomass
 - Waste
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- Demand for greater conversion efficiency
 - More cost-effective process





Biomass to Syngas Reactor



- Lower energy input
- Higher throughput
- Distributed energy production
- Less capital cost
- Reduced biomass transportation costs



Flash Volatilization



- Process for rapidly converting biomass into syngas
- Catalyst and reactor system
 - Rh-Ce Catalyst
- Catalytic partial oxidation



Features

- Compatible with multiple feedstocks
 - Solid or liquid biomass
 - Moisture containing materials
- Fast reaction time (<50 ms)
- High (99%) conversion
- No external heat required (autothermal)
- Low char/tar produced



Applications

- Electricity generation in remote locations with available biomass
 - Developing countries
 - Small industrial facilities
 - Agricultural areas
- Conversion to value added chemicals
 - Methanol, ammonia



IP Licensing

- IP Status - PCT & US applications filed
- Development next steps
 - Alternative feedstocks
 - Process optimization
 - Scale-up
 - Process economics



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