Pressurized Entrained Flow Biomass Gasifier

The 1 MW and 10 bar PEBG gasifier at Energy Technology Center is used for efficient production of high quality syngas.

Background
Gasification of low grade forest based biomass has been identified as a sustainable process for large scale production of renewable transportation fuels. A general problem associated with biomass gasification is tars. In the high temperature oxygen blown entrained flow concept tar production is minimized and a high quality syngas can efficiently be generated.

Description of the pilot plant
The gasifier is fed with pulverized material via a lock hopper system and the syngas is cooled in a water quench. A ceramically lined reactor enables high temperatures (1600 °C). The gasifier can be operated in weekly campaigns. Research have included process optimization and characterization, gas and particle sampling from the interior of the hot and pressurized reactor, slag formation and slag removal and waste water treatment.

Publications

- Energy & Fuels 30 (2016) 6405-6412.
- Fuel 153 (2015) 510-519.
- Biomass and Bioenergy 79 (2015) 166-176.
- Energy & Fuels 28 (2014) 6941-6952.
- Aerosol Science and Technology 48 (2014) 1145-1155.
- ACS Sustainable Chemistry & Engineering 2 (2014) 2063-2069.
- Fuel Processing Technology 125 (2014) 51-58.
- Combustion and Flame 161 (2014) 1923-1934.
- Fuel Processing Technology 115 (2013) 130-138.
- Energy & Fuels 27 (2013) 932-941.

Raw materials evaluated
Wood, forest residue, bark, lignin, pyrolysis oil, peat.

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