Aston University
Business Partnership Unit

Commercial Opportunity

Combined Pyrolysis Reformer

Scientists in Aston's Bioenergy Research Group have devised a novel technique for maximising the production of synthetic gas during biomass pyrolysis and eradicating the use of abrasive heat carriers. Aston's Business Partnership Unit is now actively seeking commercial partners to exploit this innovative technology.

Highlights

- Maximised production of synthetic gas during biomass pyrolysis
- Reuse of pyrolysis char provides heat to pyrolysis process
- No requirement for an additional, abrasive heat carrier
- Improved green energy balance of biomass pyrolysis

Background

Biomass pyrolysis—the thermal decomposition of plant material in the absence of oxygen—produces char, liquid (bio-oil), and synthetic gas (syngas) phases. A gasification-type pyrolysis process is utilized to maximise the production of syngas for use in combined heat and power (CHP) applications. In such processes, the solid biomass is initially heated to 300-600°C and subsequently to 700-800°C to decrease the liquid vapour concentration and to gasify a portion of the char. To achieve rapid and efficient heating of the biomass feedstock (and the by-products of the initial heating), sand or other thermally-conductive particles, such as spheres of metal, ceramics, or Silicon carbide, are used as a heat transfer medium. These media can however cause severe abrasion in reactors. Following its initial use, the heat transfer medium is returned to the entrance of the pyrolysis reactor for reuse, via a duct within the reactor.

The Technology

Aston scientists have devised a technique for maximising the production of syngas during biomass pyrolysis and eradicating the need for an abrasive heat carrier. The technique utilises an asymmetric double screw, comprising an inner screw and an outer screw. The outer screw pushes biomass forward through the reactor. The inner screw, operating in reverse, continuously conveys a portion of the char residue to the entrance of the pyrolysis reactor for reuse. The reuse of char effectively reduces the liquid vapour phase of the pyrolysis process, thus increasing the syngas phase. The char crucially also acts as the heat transfer medium, removing the abrasive action of other media.

Intellectual Property Protection

This technology is the subject of a PCT patent application:

Title	*Patents Pending*	*Priority Claimed*	*Our Ref*
Thermal Treatment of Biomass	PCT/GB2009/001225	May 14, 2008	PAT-2008-004

Further Information

Further information can be made available and commercial discussions commenced on entering into a non-disclosure agreement.

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