

Thermochemical conversion of biomass for the co-production of bio-energy and green chemicals

Publieke samenvatting / Public summary

Aanleiding

Biomass gasification takes place at much lower temperatures than coal gasification: typically 800-900°C. Interestingly, gas produced at these moderate temperatures contains large amounts of methane, ethylene and benzene. The Dutch government aims to introduce over 20% of energy production via the gasification of biomass in 2050 to produce green gas and biofuels. This can be achieved if the availability of biomass is abundant and the economics of biomass gasification is compelling. Two means of achieving this is by use of cheap waste as biomass source and the co-production of green chemicals while generating green energy from this biomass.

Doelstelling

The aim of the project is to develop separation processes that (1) increase economic viability of bio-energy plants and (2) produce ethylene and benzene as high-value green chemicals with (3) high efficiency. The innovation will contribute to the bio-based economy that enables green growth in the Netherlands.

Korte omschrijving

In this 2-year innovation project led by ECN, the co-production gasification process will be optimized for various biomass feedstock and adsorption-based separation modules will be developed. Research will focus on ways to increase the yields of high-value chemicals during gasification. This includes using promising feedstock such as lignin and humin, side

Projectinformatie / Project information

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Algemene informatie / General information

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products from sugar production and sugar conversion processes. ECN will develop benzene separation and Avantium focuses on ethylene separation. Integrated tests will be done to proof the concepts in a complete process from biomass to BioSNG (Synthetic Natural Gas, essentially methane). ECN brings its gasification and gas cleaning experience and facilities, whereas Avantium will use their quick screening capabilities and catalysts know-how as well as act as supplier of relevant feedstock to increase ethylene and/or benzene yields. A market study will be performed by Kodok, in which information will be generated on competition, prices, qualities, volumes, etc. A high-level road map will be made, describing the path from the current state of affairs till the situation where foreseen quantities of purified bio-ethylene and bio-benzen

Resultaat

Separating ethylene and benzene from the process is “killing two birds with one stone”: it improves the economy of large-scale bio-energy and green high-value chemicals are produced that replace fossil oil-based molecules. The project will finally result in a decision and plan to upscale and demonstrate the innovation.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.

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