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Hydrothermal liquefaction in an integrated bio-refining platform

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As environmental issues and depletion of the fossil fuel reserves becomes more pressing concerns, it is a must to find alternatives. In 2012, the global petrochemical production was just shy of 2000 million tons, most of which needs to be replaced within the coming decades. Some of the petrochemicals can be replaced by sugar- and biogas-based chemicals. Other chemicals, especially aromatic compounds, are more difficult to produce. The Biobase initiative at Aarhus University in collaboration with a large national biorefining program under the Biovalue brand is involving other Danish universities and several international industrial partners. In this context a unique pilot scale centre has been established in which a wide range of bio-refining processes can be developed and demonstrated in kg to ton scale. Existing facilities include a wide range of pilot-scale reactors, fermenters, large-scale extruders, decanters, separators etc. Hydrothermal liquefaction (HTL) of biomass forms the overall key element in this facility and provides the opportunity to fulfil part of the overall bio-refinery objective by being able to convert non-food plant/bio-material into liquid fuels and value added chemicals. In this presentation, the overall bio-refining facility with special focus to a large HTL pilot facility recently established with several novel technical developments will be covered. The plant is a 135 m plug flow system with a constant inner diameter. It can operate at up to 350 bars and 450°C. The flow rate can be up to 100 L/h and 30% dry matter content, depending on biomass type. A novel setup for pumping and oscillating the reactor contents as well as novel heat-recovery methods is included. In addition, new results from wood and other lignocellulose based waste streams including lignin will be presented and its potential as a source of bio-based aromatic compounds will be discussed.

Biography

Ib Johannsen is currently working as a Professor at Department of Engineering, Aarhus University, Denmark.

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