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BIO4PRODUCTS: CREATING SUSTAINABLE RESOURCES FOR PROCESSING INDUSTRY

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Biomass is a sustainable feedstock for the production of high added value chemicals and materials, and will play an important role in the transition of the European process industry to a sustainable process industry. However, for the optimal utilization of these bio-resources the fractionation of the biomass on basis of functionalities is required. The innovative approach of Bio4Products is to apply fast pyrolysis to enable the fractionation of the bio-resource, but keeping the key chemical functionalities in separate, depolymerized fractions. In an earlier project, a bench-scale fractionation unit was constructed to process 12 kg/h of pyrolysis oils and produce raw-materials for further upstream processing. Currently this continuous bench scale fractionation facility is being scaled up from a TRL-5 to TRL-6-7. The construction of the pilot-plant with a pyrolysis oil processing capacity of the 3 t/d has started, and should be finished in Q2 of 2018. Subsequently, Bio4Products will demonstrate the use of the resulting intermediate processing streams for the production of wood preservation products, moulding resins, phenolic resins and roofing material as cost-effective renewable alternatives for fossil resources in the conventional products (30-100% substitution). Like for the fractionation, each of the steps in the whole chain has at least been proven on bench-scale (TRL5) and should reach TRL 6-7 by execution of this project. The feedstock flexibility will be shown by demonstrating the complete chain for four different biomass resources (residual) representative for the majority of biomass resources available in Europe. Both the sugar and lignin stream can be produced in non-concentrated form, or can optionally be further treated in subsequent processing. For the wood modification, the dilute sugar stream is used, while for the moulding resins a more concentrated sugar stream is desired. The untreated lignin can be readily used in phenolic resins, while a concentrated (solid) stream is desired for roofing material. Only for the optional resin extraction an additional solvent is applied, which will be recycled. The project, which began in September 2016 will run for four years, and is funded by the sustainable process industry through resource and energy efficiency (SPIRE) programme, under the EU framework programme Horizon 2020. In this contribution an update will be given on the construction of the pilot-plant and the applications of the various fractions.

BIOGRAPHY

Hans Heeres graduated in 2003 and got his PhD in 2010 (both in Chemical Engineering at the University of Groningen). He worked on asymmetric homogenous catalyzed hydrogenation- and hydro-acylation reactions and on the development of a one-pot synthesis of γ-valerolactone from sugars. Since joining BTG as a Researcher in 2010, his main expertise and work field is in the recovery and production of valuable chemicals and products from biomass derived solids and liquids, and the chemical/physical analysis of intermediates, building blocks and final products.

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