Optimisation of the one-step production of high-quality bio-oil - Optimisation of the one-step production of high-quality bio-oil - Biannual report VISTA in July 2011

by James Gasson — last modified 2011-07-26 09:37
History

Action	Performed by	Date and Time	Comment
Approve Report	Trine Gerlyng	2011-07-26 09:37	No comments.
Submit Report	James Gasson	2011-07-08 10:46	No comments.

Biannual report of the project entitled: "Analytical aspects of optimisation of the one-step production of high-quality bio-oil – a petroleomics approach"

Project director: Barth, Tanja, University of Bergen

Post-doc/ scholar: Gasson, James R.

Project duration: 15.08.09 – 14.08.12

Technical contact person in Statoil: Eide, Ingvar

Division head: Grislingås, Arne

Project number: 6455

Objectives:

The main objective of the project is to develop analytical protocols for bio-oil analysis, using advanced mass spectrometry in a petroleomics like approach. The analytical protocols that are developed will be used to support the optimisation of solvolytic conversion of lignin and other refractory biopolymers, and especially for simultaneous depolymerisation and hydrodeoxygenation using formic acid as a hydrogenation agent i.e. the Lignin-to-Liquid (LtL) approach. Different mass spectrometry approaches are to be covered and evaluatated for suitability at UoB, Statoil and U of Kiel. The project will cooperate with complimentary projects that emphasise the organic synthesis and process optimisation aspects, which will provide a range of sample qualities. Comparison with oils from other conversion technologies is also part of the project.

Status:

Data implementation and handling of the recorded MS datasets to be able to extract the target information, which has been a major time consuming factor in the first half of 2011. Due to incompatibility issues of available samples and instrumentation at U of Kiel, the major backbone for the work is now the ESI-MS instrument at Rotvoll. This work is being carried out in close collaboration and communication with Ingvar Eide.

Data implementation has shown to be a challenging issue, as even minor shifts during analytical runs can upset the complex chemometrical implementation and data evaluation thereof. The candidate is working closely together with I. Eide and J. Carlson (Luleå Technical University) on a signal processing approach to improve on these issues and allow the modelling of equally spaced signals in the MS spectra. This looks promising, and ongoing complementary implementation of other analytical data are strongly supporting first findings.

The candidate fulfilled 28 of the 30 required study points for the formal part of his PhD education until this date.

Publications:

-

Presentations:

"Mass Spectrometry Approaches to Analysis of Lignocellulosic Biomass COnversion supported by modern Data Analysis",

J.R. Gasson, T. Barth, M. Kleinert, I. Eide, *3rd Nordic Wood Biofinery Conference*, Stockholm, March 22 - 24, **2011**. (Poster Presentation)

"Identification of homologous series of organic compounds in bio-oils from lignocellulose",

I. Eide, G. Neverdal, **J.R. Gasson**, T. Barth, K. Zahlsen, *3rd Nordic Wood Biofinery Conference*, Stockholm, March 22 - 24, **2011**. (Oral Presentation)

"Deciphering Complex Bio-Oil Mass Spectra with the Help of Chemometrics",

J.R. Gasson, J.E. Carlson, I. Eide, T. Barth, *44th Annual Convention of the German Society for Mass Spectrometry*, Dortmund, February 27 - March 2, **2011**. (Poster Presentation)