



Chemical Analysis in Bioenergy Conversion Processes

"Gas Analysis Workshop 2014"

Introduction York Neubauer, TU Berlin

22nd European Biomass Conference and Exhibition, CCH, Hamburg, 26th June 2014

agenda

- Introduction to the gas analysis workshop
- State of the art of gas analysis methods and tools
 - Webinars
 - Wiki
 - Forum
 - Website gas-analysis.info
- Collaboration round robins
- Today's program





gas analysis workshops

- 04/2010 "Workshop zum Messen von Teer Teermessung an Holzgas-BHKW", TU Berlin
- 06/2011 "Measurement, Analysis and Monitoring of Condensable Gas Components (especially Tar) in Product-Gases from Biomass Gasification and Pyrolysis", 19th EU BC+E, Berlin
- 06/2012 "Workshop on Sampling, Detection and Quantification of Impurities in Gases from Thermochemical Biomass Conversion Processes
 - Gas Analysis Workshop", 20th EU BC+E, Mailand
- 06/2013 "Gas Analysis Workshop 2013 Tar & sulphur sampling and analysis", 21st EU BC+E, Kopenhagen
- 04/2014 "Gas Analysis Workshop Berlin 2014", TU Berlin
- 06/2014 "Chemical Analysis in Bioenergy Conversion Processes", 22nd EU BC+E, Hamburg







collaboration

"Coming together is a beginning; keeping together is progress; working together is success.."

Henry Ford (1863 – 1947)







network



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gas analysis working group

- Exchange of information and <u>experiences</u> (webinars / further meetings)
- Making available the current state of the art
- Collaborative work (round robins)
- Improving existing methods where necessary (CEN/TS)
- Create repeatable and reproducable results
- Establish quality measures regarding analytics





Different perspectives

research at

- universities

equipment cost covered via projects, some personnel available, high fluctuation of persons and knowledge

- research centers (fundamental research)

very good infrastructure, established analytical methods available

- research centers (application oriented research and development)

operation of demonstration and pilot plants, high hpersonnel cost for performing extensive measurement campaigns

- industry (research companies, plant developers, plant construction)

proof of function of plants, cost pressure in investment cost

- industry (plant operation)

monitoring of plants, cost optimization in operationvon Anlagen zur Kostenoptimierung im Betrieb, cost of equipment subordinated, if cost savings in operation achievable





exchange of information and experiences (webinars)

- Group of editors (experts on specific topics)
- one webinar one topic
- 2 4 presenters on a topic max
- 1 hour presentation 15 min each
- ,discussion' questions

Presentations will be made available via internet

A podcast would be possible in principle – not yet tested





Webinar on test-gas generators







Webinars



03.07.2014 Prep. WS. 2013 slide 11

Scientific exchange of knowledge and experience – international analysis working group

- Workshops
 - Webinars
 - Collaborative Measurement Campaigns

Topics for webinars:

- wet chemical sampling and analysis procedures
- preparation of round robins
- test-gas generators
- sulfur analysis
- on-line methods
- analysis with µ-GC
- FTIR application
- heavy tar analysis
- SPA sampling und analysis
- determination of water content in gases

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exchange of information and experiences (webinars)

Experts to serve as editors for the webinars needed !

Gas phase tar species

- Update of CEN/TS 15439/tar protocol/ETP
- heavy tars
- SPA sampling and analysis
- On-line methods

On-line gas characterization and of volatile contaminants

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- FTIR application
- sampling + analysis with µ-GC
- Analysis of the water content in product gases

Sulphur measurement

Particle measurement

collaboration - Host site measurements / round robins

Round robin Tests

Several teams/institutions owrk together in a campaign for on- or off-line measurements. Results will be compared and consolidated. The process includes common preparation.

RR. also stands for the analysis of the same sample in a number of laboratories

Host site

An installation (plant), which is suitable for carrying out a round robin test. It belongs to a host who owns and operates it. The plant shall be well equipped with analytical tools. The host grants access to his plant for the campaign.

host site measurements

Round robin test 19th November 2013 at PSI BFB

host site measurements

Organization and funding of the international analysis working group

Organization and funding of the international analysis working group

COST Actions are science and technology networks open to researchers and stakeholders with a duration of four years. COST Actions are active through a range of networking tools, such as workshops, conferences, training schools, short-term scientific missions (STSMs), and dissemination activities.

Program of Challenge Event @ EUBCE 2014 in Hamburg, Thursday, June 26th

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start	end	Торіс
8:00	8:30	Registration
8:30		Introduction and general overview
8:30	8:40	 Background to Gas Analysis Workshops, near and future aims, York Neubauer, TU Berlin
8:45	9:00	- Experiences supporting the IBR (integrated biorefinery) TIGAS project, Rachid Slimane, gti
		- Discussion
9:00		Collaborative work via Round Robin exchanges in the field of sampling, detection
		and quantification of impurities in gases from thermochemical biomass conversion processes
9:00	9:15	- Collaborative work in round robins: Hurdles in preparation, execution and successful performing of
		on-site Round Robins (improved organisatorial, legal, financial, IPR-conditions);
		Markus Kleinhappl, Bioenergy 2020+
9:20	9:50	- Round robin sampling @ PSI Nov 2013 – first results, M. Kleinhappl
10:00	10:15	conference break - free coffee, tea e.g. in exhibition hall
10:00	10:20	- Method comparison GDF-Suez – CEA, Etienne Basset, GDF-SUEZ
10:30	10:50	- Comparing SPA and tar protocol, Stefanie Reil, Fraunhofer UMSICHT Sulzbach-Rosenberg
10:50	11:00	- Discussion
11:00	11:15	break
11:15		Standards and reference methods for on-line analysis methods
11:15	11:25	- Needs for standardization and for validated reference methods, York Neubauer, TU Berlin
11:35	11:50	- Evaluation scale for degree's of difficulties and proposed template for
		Method-(I) cadastre – (II) catalogue-(III) evaluation checklist; M. Kleinhappl
11:50	12:00	- Discussion
12:00	13:00	Lunch break

13:00		Supplementary tools for sampling and for sampling trains and testing
13:00	13:15	- Technological classification of test gas procedures and apparatus (liquid & gas dosage;
		thermodynamic saturation & mass transfer, chemical reactions); M. Kleinhappl & Y. Neubauer
13:20	13:40	- Test gas generation - generation of test gases by chemical reaction, Matti Reinikainen, vtt
13:50	14:15	- Dilution sampling, M. Reinikainen
moved to	webinar	 Procedures in gas volume metering and problems from undetected systematic errors; Limitations in sampling of concentrations < 10 mg/m³ and influence of water; M. Kleinhappl discussion
14:15	14:30	break
14:30		Updates on inline and on-line analysis of tar species
14:30	14:50	- Optical absorption spectroscopy for gas analysis in biomass gasification , Helge Grosch DTU
15:00	15:15	conference coffe break
15:00	15:20	- On-line Tar analyser, Andreas Gredinger, University Stuttgart
15:30	15:40	- Recent work on on-line tar analysis at TU Berlin, Y. Neubauer
		- Discussion
15:40		Summary of main outcomes
		- Extended and ranked list of potential Round Robins
		 Host sites
		 Users
		- further action
16:00		Close

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Gas characterization requirements along the process chain

Into a a fruitful and successful workshop

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