

Measurement, Analysis and Monitoring of Condensable Gas Components (especially Tar) in Product-Gases from Biomass Gasification and Pyrolysis

International Workshop

June 8th 2011 at 19th EU BC+E, 10.00 – 16.30, ICC Berlin

Financially supported by:



funding program



Federal Ministry for the
Environment, Nature Conservation
and Nuclear Safety

funded by

bioenergy2020+



Workshop Program

Welcome 10:00

Section I 10:15 – 11.15

What to analyze

1. Analytical challenges in biomass conversion by gasification and pyrolysis (M. Kleinhapfl; Bioenergie 2020+, Graz, Austria)

Purpose of measurements, groups of substances to be analyzed, concentration ranges, necessary limits of detection, sampling

How to analyze – the standard principles for gas analysis

2. Analytical tools – principles (Th. Streibel, University Rostock, Germany)

Analytical methods for conventional and online analytical processes :

Gas chromatography, Mass spectrometry (EI / LI) Quadrupole, ion trap, TOF

Fluorescence emission, light Absorption (UV/VIS; IR)

Discussion

Section II 11:15 – 12.30

Wet chemical sampling and analysis – the reference method(s)

3. **Tar protocol** – the “standard method” in condensables analysis (C. Unger, Fraunhofer UMSICHT, Oberhausen, Germany)
4. Use of **SPA** at ECN and tar dewpoint model (Sander Grootjes, ECN, Netherlands)
5. Tar analysis by solid phase adsorption - thermal desorption GC-MS - E. Masson (Critt Bois, Epinal, France), S. Ravel, S. Thiery (CEA, Grenoble, France), A. Dufour (CNRS-LRGP, Nancy, France) presented by F. Defoort, CEA, Grenoble, France
6. Once-through alcohol quench system for online and offline tar analysis. (M. D. Kaufmann Rechulski, PSI Villigen, Switzerland)
7. Simplified sampling method for analyzing benzene. (R. Egeler, V. Schachinger, Stadtwerke Rosenheim, Germany)

Discussion

Lunch break 12.30-13.00

Section III 13.00 – 16.00 online methods

Short presentations of methods and their applications

III A - (Quasi)-continuous online monitoring methods

8. Tar dewpoint analyzer (A. (Bram) van der Drift, ECN, Petten, Netherlands)
9. Tar analyzer TA 120-3 (N. Poboss, University Stuttgart, Germany)
10. *Photo- Ionization Detection (PID) for online tar analysis (BTG, Netherlands; KTH Sweden) not personally present, but method shortly introduced*

Discussion

III B - (Quasi)-continuous online monitoring and analysis methods

11. online FTIR measurements of tar (F. Defoort, CEA, Grenoble, France)
12. Fluorescence and Absorption (C. Baumhagl, University of Erlangen-Nuremberg, Germany)
13. Laser Induced Fluorescence measurements of tar (M. Mayerhofer, TU Munich, Germany)
14. Laser Induced Fluorescence (CON-TAR) (N. Zobel, TU Berlin, Germany)

Discussion

Coffee break ca. 14:30 (20 minutes)

III C - Online analysis methods based on gas chromatography and / or mass spectrometry

15. GC based analysis of tar, ammonia and water (M. Reinikainen VTT, Espoo, Finland)
16. *Molecular Beam Mass spectrometry MBMS (D. Carpenter, NREL, Golden, Co., USA) not personally presented, but method shortly presented*
17. TOF-MS with laser ionization in Pyrolysis process monitoring (Th. Streibel, University Rostock, Germany)
18. Online-GC/MS with electron and laser ionization (Y. Neubauer, TU Berlin, Germany)

Discussion

Discussion and Finalizing 16.00 – 16.30

What do we have available? What is still needed?

Further demand from research side. Demand from industry.

Actions to be taken: State of the art review of the technologies covered within the workshop.

Availability of workshop information. Further meetings/workshops.

End of workshop 16.30

Contacts:

Dr.-Ing. York Neubauer
TU Berlin,
Department of Energy Engineering, FG EVUR
Fasanenstr. 89, D-10623 Berlin

Tel: +49 (0)30 314 24362
Fax: +49 (0)30 314 22157
e-mail: york.neubauer@tu-berlin.de
web: www.evur.tu-berlin.de

Dirk Vetter
Fördergesellschaft Erneuerbare Energien e. V.
(Society for the Promotion of Renewable Energies)
Köpenicker Straße 325, D-12555 Berlin
Tel: +49 (0) 30 - 65 76 27 34,
Fax: +49 (0) 30 - 65 76 27 08
e-mail: dirk.vetter@fee-ev.de
web: www.fee-ev.de