



Highlights TC Metrology in Chemistry

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Madrid and Tres Cantos, Spain
15 – 18 May 2017



Agenda



- Technical Committee Metrology in Chemistry
- Support Workshop for Designated Institutes
- Joint Research Projects deliver
- Example 1: MetNH3
- Example 2: Biogas



- 28 member countries
- 22 NMIs and 21 DIs (-1) have chemistry programs
- 4 technical subcommittees
(gas analysis, inorganic analysis, electrochemical analysis, organic analysis to be transformed to bio and organic analysis)
- 1 newly installed strategy working group
- 1 annual plenary meeting
(2017 in Warsaw, 2018 in Vienna)
- 1 EMPIR preparatory workshop
(first time 2017 in Berne)

- For designated institutes in the field of chemistry (biology) without recognized calibration and measurement capabilities five years after designation:

SYKE – Finnish Environment Institute
NIVA: Norwegian Institute for Water research
NILU: Norwegian Institute for Air Research
MIRS/...: Laboratory of the Institute for Olive culture
MIRS/...: Laboratory for Cements, Mortars and Ceramics
- Workshop aimed to understand needs and provide support towards international recognition of capabilities

- Good participation of concerned DIs and TC-MC experts
- presentations of DI representatives allowed common understanding of needs and status of calibration and measurement capabilities
- SYKE has successfully participated in an appropriate supplementary comparison; CMC submission in next cycle
- NILU will participate in running BIPM.QM.K1 comparison and submit CMCs within the next cycles
- MIRS institutes need to develop and demonstrate capabilities in upcoming CCQM core key comparisons

Joint Research Projects deliver



Metrology for the Environment:

- Traceability for mercury measurements
- Metrology for high-impact greenhouse gases
- Metrology for ammonia in ambient air
- Metrology for VOC indicators in air pollution and climate change
- Metrology to underpin future regulation of industrial emissions

Metrology for Energy:

- Metrology for Biogas
- Metrological support for LNG custody transfer and transport fuel application

MetNH3 project



- 20 stakeholders from academia/industry
- input to CEN/TC264/WG11
- 30 contributions at relevant conferences
- dissemination to air-quality monitoring networks
- 2 laboratory inter-comparisons
- 2 field inter-comparisons (~ 20 participants)
- 2 project workshops with ~100 participants
- 2 scientific publications, more in preparation
- 3 good practice guides in preparation
- more on project webpage <http://metnh3.eu>



Applied ammonia metrology I



primary gas standards at $\mu\text{mol/mol}$ ammonia fractions

static gravimetry with partial passivation of cylinders



exposure tests diffusive/pumped samplers in adapted CATFAC

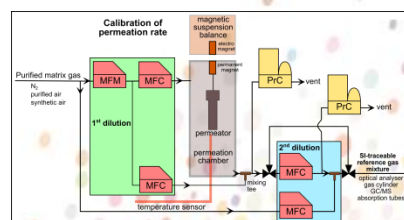
new chemical uptake rates validated in field inter-comparison



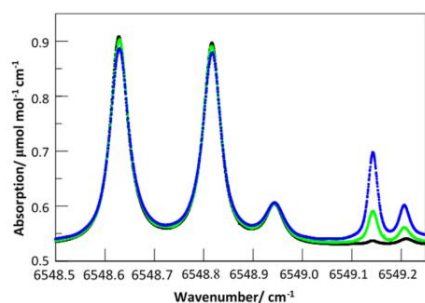
Applied ammonia metrology II



dynamic generation of ambient ammonia fractions 0.5 - 500 nmol/mol ($U < 3\%$)

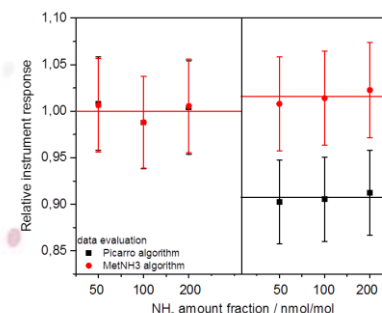


Primary /Transfer Standard: permeation plus dynamic dilution to ambient levels



commercial instrument corrects for found spectral interference

calibration of six optical ammonia analyzers in parallel during field inter-comparison



successful validation of optical transfer standards

Long term monitoring of ammonia level in the field improved by metrology

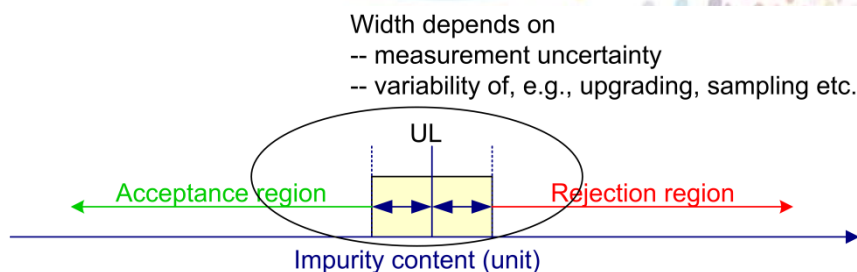
Biogas project



METROLOGY for
BIOGAS



- Contributed to developing a metrological infrastructure for biomethane and biogas
- Project is delivering measurement standards and calibration methods for
 - Contents of key impurities (e.g. siloxanes, ammonia, carbon monoxide, hydrogen chloride, halogenated VOCs)
 - Contents of particulates, water
 - Biogenic methane content
 - Calorific value, density



Highlights and impact



METROLOGY for
BIOGAS



- Direct support for implementation of specification EN 16723 for biomethane and upgraded biogas
- Developed sampling device and sampling methods, being fed into revision of ISO 10715 (Natural gas – Sampling)
- 32 conference presentations and posters
- 13 publications
- 15 standards activities
- 8 trainings



Thank you



**Metrology in
Chemistry**