Invitation/Programme

VDI/DECHEMA/GDCh Expert Forum on Atmospheric Chemistry

05/06 December 2016

DECHEMA Society for Chemical Engineering and Biotechnology e.V., Frankfurt (Main), Germany

New and emerging technologies: Impact on air quality and climate

The 3rd Expert Forum on Atmospheric Chemistry is organized by the Commission on Air Pollution Prevention of VDI and DIN - Standards Committee KRdL - supported by

European Commission

Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit

Umwelt Bundesamt

GDCh Gesellschaft Deutscher Chemiker

ProcessNet Eine Initiative von DECHEMA und VDI-GVC

Foreword

One of the most prominent characteristics of current new and emerging technologies is a reduced demand of energy and an effective contribution to mitigate climate change. This is most efficiently achieved by increased or more effective use of catalysis and/or CO_2 free or neutral technologies. What is quite often forgotten, however, is that climate mitigation – with the exception of direct savings in CO_2 emissions – is closely related to air quality and vice versa. For example:

The introduction of alternative fuels

The introduction of alternative fuels (ethanol, bio-Diesel) is expected to change the particulate emissions from combustion engines and to contribute to peroxyacetyl nitrate (PAN) formation. PAN is a powerful respiratory and eye irritant, present in photochemical smog and – as a result of its atmospheric lifetime – it impacts on the spatial distribution of NO_x.

Emissions of short-lived climate forcers

Emissions such as CO, NO_x, CH_4, ozone, hydrocarbons and soot are also involved in climate forcing and are therefore termed non-CO_2 `short-lived climate forcers (SLCFs)´. Since such emissions are extremely relevant to the air quality in almost all larger urbanizations and megacities in the world, they represent an important case of climate-air quality interaction. For example, the reduction of global soot emissions would cause CO_2 induced climate change to be substantially delayed.

DeNO$_x$ technologies

Attempts to reduce NO_x emissions from Diesel engines by SCR catalysts (selective catalytic reduction) can cause emissions of NH_3 (in Ad-blue technologies) and N_2O to increase. In fact, emissions of NH_3 can be even more relevant for Otto engines with 3-way catalysts compared to SCR systems under certain operation conditions. Additionally, attempts to reduce hydrocarbon and CO emissions by oxidation catalysts have led to increased NO_2 emissions from the oxidation of NO. In Germany, the emissions of NO_2 and NH_3 contribute to exceedances in emission ceilings of these compounds. Moreover, they are inhalation toxicants as well as precursors of secondary aerosols and therefore are of significance for air quality. The emissions of N_2O are climate relevant, although their major sources are from biological activities of fertilizers in soil.

Carbon capture technologies

Carbon capture technologies in power stations rely on the use of various amines to catalyze the capture of CO_2 in aqueous solutions. Such amines may form toxic nitrosamines in the presence of NO_x or are emitted into the atmosphere where they change the atmospheric particulate composition.

Biomass burning

Heating facilities involving wood combustion (pellets) are a substantial source of fine particles and polycyclic aromatics including the toxic benzo(a)pyrene. This causes net savings in CO_2 emissions on the expense of substantial changes in air quality standards.

The VDI/DECHEMA/GDCh Expert Forum focusses on the identification and analysis of the interrelations between air quality and climate change that are associated with various new and emerging technologies. The specific aim is the attempt to quantify such effects with respect to unexpected consequences and their local, regional and global significance. The motivation is the integrated assessment of technologies prior to their full implementations into industrial and/or societal applications.

Speakers

Dr. Peter Behr	Universität Duisburg-Essen, DE
Dr. Jonathan Bloh	DECHEMA-Forschungsinstitut, Frankfurt am Main, DE
Dipl.-Ing. Annette Borowiak	European Commission, JRC, Ispra, IT
Dr. Harald Creutznacher	Landesanstalt für Umwelt, Messungen und Naturschutz in Baden-Württemberg, Karlsruhe, DE
Dr. Christian Ehlers	Forschungszentrum Jülich GmbH, DE
Prof. Dr. Gerd Ganteför	Universität Konstanz, DE
Dr. J. Peter Gerling	Bundesanstalt für Geowissenschaften und Rohstoffe, Hannover, DE
Jan Niklas Geiler	Robert Bosch GmbH, Renningen, DE
Dr. Ingo Hartmann	Deutsches Biomasseforschungszentrum (DBFZ), Leipzig, DE
Dr. Norbert Heeb	Swiss Federal Laboratories for Materials Science and Technology, Dübendorf, CH
Prof. Dr. Eckard Helmers	Umwelt-Campus Birkenfeld der Hochschule Trier, DE
Prof. Dr. Matthew S. Johnson	University of Copenhagen, DK
Prof. Dr. Mark Lawrence	Institute for Advanced Sustainability Studies e.V. (IASS), Potsdam, DE
Prof. Dr. Claus Jørgen Nielsen	University of Oslo, NO
Dipl.-Ing. Claudia Schön	Technologie- und Förderzentrum im Kompetenzzentrum für Nachwachsende Rohstoffe (TFZ), Straubing, DE
Prof. Dr.-Ing. Detlef Stolten	Forschungszentrum Jülich GmbH, DE
Prof. Dr. Frédéric Thevenet	Ecole Nationale Supérieure des Mines de Douai, FR
Dr. Dominik van Pinxteren	Leibniz-Institut für Troposphärenforschung e.V., Leipzig, DE
Prof. Dr. Hans von Storch	Geesthacht, Hamburg, 青岛
Prof. Dr.-Ing. Thomas Willner	Hochschule für Angewandte Wissenschaften Hamburg, DE
Dr. Sabine Wurzler	Landesamt für Natur, Umwelt und Verbraucherschutz NRW (LANUV), Recklinghausen, DE

Programme Committee

Dipl.-Ing. Annette Borowiak	European Commission, JRC, Ispra, IT
Prof. Dr. Hartmut Herrmann	Leibniz-Institut für Troposphärenforschung e.V., Leipzig, DE
Prof. Dr. Thomas Kuhlbusch	Institut für Energie- und Umwelttechnik e.V., Duisburg, DE
	Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, Dortmund, DE
Dr. Sascha Nehr	Verein Deutscher Ingenieure e.V., Düsseldorf, DE
Dipl.-Met. Marion Wichmann-Fiebig	Umweltbundesamt, Dessau-Roßlau, DE
Prof. Dr. Peter Wiesen	Bergische Universität Wuppertal, DE
Prof. Dr. Dr. h.c. Reinhard Zellner	Universität Duisburg-Essen, DE

Poster Contributions

The poster session will provide an opportunity to complement the programme of the oral presentations in an informal setting. The number of poster contributions is limited. Therefore we kindly ask you to submit the provisional title of your poster presentation as soon as possible. You will receive a notification of acceptance or non-acceptance within reasonable time.

Programme

05/06 December 2016
DECHEMA e.V., Frankfurt (Main), Franz Patat Lecture Hall

	05 December 2016
09:00	**Welcome and introduction** Sascha Nehr, VDI e.V.
09:10	**Air pollution and its sources: Clean air for Europe?** Annette Borowiak, European Commission, JRC
	Session 1: Energy, climate, and air quality Chairperson: Reinhard Zellner
09:30	**Deconstruction of anthropogenic climate change: Manifestation, detection, attribution** Hans von Storch, Geesthacht, Hamburg
10:00	**Energy and climate: Visions and reality** Gerd Ganteför, Universität Konstanz
10:30	**Coffee break**
10:45	**Short-lived climate-forcing pollutants (SLCPs) and their roles in the Paris Agreement and SDGs** Mark Lawrence, IASS
11:15	**The implication of the German Energiewende on transportation** Detlef Stolten, Forschungszentrum Jülich GmbH
11:45	**How can advanced alternative fuels support the German energy transition for climate protection?** Thomas Willner, Hochschule für Angewandte Wissenschaften Hamburg
12:15	**Electromobility and the effects on emissions** Eckard Helmers, Hochschule Trier
12:45	**Summary and discussion**
13:00	**Lunch**
	Session 2: Urban air quality Chairperson: Peter Wiesen
14:00	**Air quality monitoring, air quality policy and potential effects on climate** Sabine Wurzler; LANUV
14:30	**Ambient observations of nitrogen oxides and specified hydrocarbons in air masses dominated by traffic emissions in Germany** Christian Ehlers, Forschungszentrum Jülich GmbH
15:00	**Coffee break**
15:20	**Investigation of the fuel property influence on number of emitted particles and their size distribution in a gasoline engine with direct injection** Jan Niklas Geiler, Robert Bosch GmbH
15:50	**User and fuel impacts on emissions during wood combustion** Claudia Schön, TFZ
16:20	**Wood combustion and air quality: Chamber and recent ambient measurements** Dominik van Pinxteren, Leibniz-Institut für Troposphärenforschung e.V.
16:50	**Emission and ambient air relevance of tracers for wood burning** Harald Creutznacher, LUBW
17:20	**Summary and discussion**
17:30	**Poster viewing and informal get-together**

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	06 December 2016
	Session 3: Reduction technologies for air pollutants Chairperson: Hartmut Herrmann
08:00	**Opening of the second day** Wolfgang J. Müller and Jochen Theloke, VDI e.V.
08:15	**Combined reduction of particulate matter and nitrogen oxides from biomass combustion** Ingo Hartmann, DBFZ
08:45	**Gas phase advanced oxidation technology and its applications** Matthew S. Johnson, University of Copenhagen
09:15	**Real driving vehicle emissions** N.N.
09:45	**Efficient filter and deNO_x-technologies for both, diesel- and gasoline direct injection vehicles** Norbert Heeb, EMPA
10:15	**Coffee break**
10:30	**Photocatalytic NO_x-removal – Theory, applications, current research, and limitations** Jonathan Bloh, DECHEMA
11:00	**Photocatalytic oxidation of high flow rate and high concentration effluent** Frédéric Thevenet, Ecole Nationale Supérieure des Mines de Douai
11:30	**CO_2 storage options in Germany** J. Peter Gerling, Franz May, BGR
12:00	**CO_2 separation from waste gases: Kinetics and thermodynamics of the catalyzed uptake in aqueous solutions** Peter Behr, Universität Duisburg-Essen
12:30	**Atmospheric chemistry and environmental impact of the use of amines in CCS** Claus J. Nielsen, University of Oslo
13:00	**Wrap-up and open discussion**
13:15	**End of VDI Expert Forum, Take-away snacks**

Registration

Please use the online registration at: **www.vdi.de/atmospheric-chemistry2016anmeldung**
Early registration **(not later than 24 November 2016)** is recommended since the number of participants is limited.
Your registration will be confirmed as soon as possible. Your invoice will be sent separately.
The registration rates include lunch as well as coffee, tea and soft drinks during the breaks.

Category	**Registration rate**
Regular rate	295 €
Discounted rate (*)	190 €

* Discount applies for representatives of public authorities and universities.

Organization

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General Information

Venue
DECHEMA Gesellschaft für Chemische Technik und Biotechnologie e.V.
Franz Patat Lecture Hall
Theodor-Heuss-Allee 25
D-60486 FRANKFURT (MAIN)
http://dechema.de/en/anfahrt.html

Accomodation nearby
A number of single rooms has been provisionally booked at:

Mercure Hotel & Residenz Frankfurt Messe
Voltastrasse 29
D-60486 FRANKFURT (MAIN)
Phone: +49 (0) 69 79 26 2717
e-mail: h1204-re4@accor.com

The special rate is 101,60 € (breakfast excluded). Should you wish to make use of this offer please contact the hotel until **21 October 2016** indicating the **keyword "EFAC-3"**.

Travel Information

By car

Via Autobahn/Westkreuz to Frankfurt Stadtmitte, turn right at first traffic light after the railway bridge from the city centre in direction Messe (exhibition grounds), on Theodor-Heuss-Allee first left-hand turn-off lane before the railway bridge entrance Varrentrappstraße.

By public transport

From Frankfurt Airport:

- approx. 20 min. by taxi
- S-Bahn: S 8, S 9 (line 8 or 9) to the Main Station (Hauptbahnhof), change to S 3, S 4, S 5 or S 6 (platform 104, underground) to Station "Messe", exit Theodor-Heuss-Allee / Festhalle

From Frankfurt Main Station (Hauptbahnhof):

- approx. 20 min. walk
- approx. 10 min. by taxi
- S-Bahn: S 3, S 4, S 5 or S 6 (platform 104, underground) to Station "Messe", Exit Theodor-Heuss-Allee / Festhalle
- Underground: line U 4 (line 4) direction Bockenheimer Warte to Station "Messe", Exit "Festhalle" and 10 min. walk
- tram/streetcar line 16 or 17 to stop "Festhalle/Messe" and 10 min. walk