# 11th International Heat Flow Calorimetry Symposium on Energetic Materials (HFCS-EM)

**Symposium co-chairs**

Dr. Manfred A. Bohn and Moritz Heil

# Program

Oral and poster presentations
Date: 12 May 2019

Sponsors of the 11th HFC-Symposium

TA Instruments, Eschborn, GE
Newcastle, USA

Fraunhofer ICT, Pfinzal, Germany

Venue

Fraunhofer Institute for Chemical Technology (ICT)
Joseph-von Fraunhofer-Strasse 7
D-76327 Pfinztal-Berghausen
Germany

# List of exhibitors

**NETZSCH Geraetebau**
Wittelsbacherstr.42
D-95100 Selb
Germany

**TA Instruments–Waters LLC**
Helfmann-Park 10
D-65760 Eschborn
Germany

**Thermal Hazard Technology - THT**
1 North House, Bond Avenue
Blechley MK1 1SW
UK

**Fraunhofer Institute of Chemical Technology (Fraunhofer ICT)**
Joseph-von-Fraunhofer-Strasse 7
D-76327 Pfinztal-Berghausen
Germany

International Heat Flow Calorimetry Symposium on Energetic Materials HFCS–EM

Fraunhofer ICT

**11th International Heat Flow Calorimetry Symposium on Energetic Materials - HFCS-EM**

Date May 13th to 16th, 2019
at Fraunhofer ICT, Pfinztal-Berghausen, Germany

| | **Monday, May 13** | | **Tuesday, May 14** | **Session** | | **Wednesday, May 15** | **Session** | | **Thursday, May 16** | **Session** |
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| | | | 11 | | | 8 | | | 7 | |
| | | 08:30 | **Bus departs from Achat hotel to ICT** | | 08:00 | **Bus departs from Achat hotel to ICT** | | 08:20 | **Bus departs from Achat hotel to ICT** | |
| | | 08:40 | **Registration** | | 08:25 | **Organisational remarks** | | 08:55 | **Organisational remarks** | |
| 17:00-19:30 | **Registration** | 09:20 | welcome addresses<br>Sara Pliskin, Ryan Ubelhor<br>co-presidents of Symp. Committee<br>Manfred Bohn | | 08:30 | Ruth Tunnell, QinetiQ, UK<br>A simple question with complex answers - is nitroglycerine compatible with boron potassium nitrate? | **Applying HFC**<br>*Chair:*<br>*R. Ubelhor* | 09:00 | Manfred Bohn, ICT, GE<br>Assessment of ageing state of several db propellants | **Double base propellants**<br>*Chair:*<br>*M. Ramin* |
| | **at Hotel Achat Plaza,** | 09:40 | Nigel Rutter, DOSG, UK<br>Defining the UK methodology for the stability testing of energetic materials | *Chair:*<br>*M. Bohn* | 09:00 | Alan Macdonald, AWE, UK<br>Method to perform microcalorimetry measurements of carbon dioxide adsorbing onto ceria nanopowders | | 09:30 | Lee Goetz, BAE Systems, USA<br>Aessessment of ageing tof two developmental db propellants | |
| | **Karlsruhe (KA)** | 10:10 | **Coffee break**<br>**[Symposium group photo, or 12:30]** | | 09:30 | Amanda Catherall, BAE Systems, UK<br>HFC studies of conventional and novel energetic materials | | 10:00 | Ryan Ubelhor, US-Navy Crane, USA<br>Heat Flow Calorimetry of 70mm Double Base Solid Rocket Motors | |
| | | 10:30 | exhibitor short presentation<br>Netzsch TAI, THT, ICT | *Chair: H. Schimansky* | 10:00 | Alan Macdonald, AWE, UK<br>An investigation into PETN acidity using HFC | | 10:30 | **Coffee break** | |
| 18:00 | **Welcome buffet** | 11:00 | Malin Suurkuusk, TA instruments, SE<br>New accessories and tools for TAM | **Instrumental develop-ment 1**<br>*Chair: H. Schimansky* | 10:30 | **Coffee break** | | 11:00 | Elena Moukhina, Netzsch, GE<br>Selection of experimental conditions and kinetic methods | **DSC and thermal load**<br>*Chair A. Macdonald* |
| 20:30 | **End of the day** | 11:30 | Ryan Ubelhor, US-Navy Crane USA<br>Heat Flow calorimetry and NSWC Crane | | 11:00 | Arcady Kossoy, CISP, RU<br>Kinetics-based simulation of thermal explosion - some examples of experimental validation | **Methodo-logy**<br>*Chair:*<br>*M. Heil* | 11:30 | Arcady Kossoy, CISP, RU<br>Effect of peculiarities of DSC experiment in correctness of the kinetics created | |
| | | 12:00 | Moritz Heil, ICT, GE<br>Evaluation of high temperature ageing of a solid gas generant | **Modelling**<br>*Chair:*<br>*M. Bohn* | 11:30 | Michael Ramin, NC Wimmis, CH<br>Blank determination in heat flow calorimetry | | 12:00 | Virginie Le Gallo, CEA-DAM Gramat, FR<br>Controlled thermal test on high explosive cylinders | |
| | | 12:30 | **[Symposium group photo, or 10:25]**<br>**Lunch break**<br>**ICT cafeteria** | | 12:00 | Manfred Bohn, ICT, GE<br>A way to improve the safe use of closed stainless-steel ampoules | | 12:30 | tbd | |

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| | Monday, May 13 | | Tuesday, May 14 | Session | | Wednesday, May 15 | Session | | Thursday, May 16 | Session |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 13:30 | Bertrand Roduit, AKTS. CH<br>Thermal behaviour of quasi-autocatalytic decomposing solids | **Modelling**<br>*Chair:*<br>*M. Bohn* | 12:30 | Ryan Ubelhor, US-Navy Crane, USA<br>Heat flow calorimetry: Innovations for test and evaluation of high energy systems | | 13:00 | **Closing remarks &<br>Lunch break<br>ICT cafeteria** | |
| | | 14:00 | Bertrand Roduit, AKTS, CH<br>Contin. monitoring of shelf lives by applic of data loggers with implem. kinetic parameters | | 13:00 | **Lunch break<br>ICT cafeteria** | | 14:30 | **End of the symposium & Bus to KA** | |
| | | 14:30 | Fabio Visentin, Mettler,Toledo CH<br>Scale up from Lab to Plant with non-iso-thermal reactions using Reaction Calorimetry | **Instrumental develop-ment 2**<br>*Chair:*<br>*tbd* | | **offsite networking** | | | | |
| | | 15:00 | Jürgen Antes, ICT, GE<br>Reaction calorimetry in flow reactors - fast reaction screening and process design | | 14:10 | **Bus departs to excursion** | | | | |
| | | 15:30 | **Coffee break** | | | | | | | |
| | | 16:00 | Arcady Kossoy, CISP, RU<br>Applying adiabatic calorimetry for study of energetic materials - is it possible? | **adiabatic self-heating, ARC**<br>*Chair:*<br>*R. Tunnell* | 15:15 | **Visit of UNESCO World Heritage site Cistercian Monastery Maulbronn guided tours in GE and English** | | | | |
| | | 16:30 | Manfred Bohn, ICT, DE<br>Kinetics of thermo-chemical decomposition of RDX in cyclohexanone and γ-butyrolactone | | 16:30 | | | | | |
| | | 17:00 | Martyn Ottaway, THT, UK<br>Ultra-high sensitivity ARC testing a link to STANAG 4582 testing | | 17:00 | **coffee and cake on terrace of Ravensburg, Sulzfeld** | | | | |
| | | 17:30 | **End of the day** | | 18:00 | **Symposium dinner, Ravensburg** | | | | |
| | | 17:40 | **Bus departs to hotel, KA** | | 21:30 | **Bus departs to hotel, KA** | | | | |

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| Poster |
|---|
| **<u>Arcady Kossoy,</u> P Grinberg, O. Antonov**<br>**Kinetics-based simulation of thermal explosion - some examples of experimental validation** |
| **<u>Ryan Ubelhor</u>, Daniel Ellison, Cassie Hopkins**<br>**Heat flow calorimetry: Innovations for test and evaluation of high energy systems** |
| **Manfred A. Bohn, <u>Heike Pontius</u>**<br>**Thermal behaviour of energetic materials in adiabatic selfheating** |
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