

Gas-Phase Synthesis of Functional Nanomaterials

Fundamental Understanding, Modeling and Simulation, Scale-up and Application

September 25–26, 2018

Venue: NETZ, Room 2.42, University of Duisburg-Essen, Carl-Benz-Str. 199, 47057 Duisburg

Directions: <https://www.uni-due.de/cenide/directions.php>

Tuesday, September 25, 2018

12:00–12:30 **Arrival and Lunch**

12:30–12:50 **Welcome**

Christof Schulz (University of Duisburg-Essen)

Lutz Mädler (University of Bremen)

Keynote (Chair: Christof Schulz)

12:50–13:20 **Improving the performance of functional particles by gas-phase structuring**

Alfred Weber, Technical University Clausthal

Fundamentals of Particle Formation and Growth (Chair: Christof Schulz)

13:20–13:50 Gas-phase synthesis of metal oxides – from molecules to particles

Hartmut Wiggers, University of Duisburg-Essen

13:50–14:10 Production of manganese oxide nanoparticles in premixed flames with selectivity in manganese oxidation state

Joaquin Camacho, San Diego State University

14:10–14:30 Mass spectrometric investigation of key intermediates in synthesis flames

Yasin Karakaya, University of Duisburg-Essen

14:30–14:50 Carbon encapsulation of elemental particles by spark discharge

Tayfur Öztürk, Middle East Technical University, Ankara

14:50–15:10 High-temperature rate constants for the reaction of H atoms with tetramethoxy-silane and reactivity analogies between silanes and oxygenated hydrocarbons

Sebastian Peukert, University of Duisburg-Essen

15:10–15:30 Reactive Dimerization of Small Aromatics Drives Soot Nucleation

Reza Kholghy, ETH Zurich

15:30–15:50 Effect of 2-ethylhexanoic acid in the liquid-fed flame synthesis of poorly volatile precursors

Jili Wei, Tsinghua University, Beijing

15:50–16:20 **Coffee Break and Posters**

Modeling and Simulation (Chair: Andreas Kempf)

16:20–16:40 Coupling particle size distribution dynamics with gas and solid phase interactions resolved using detailed chemical kinetics

Peter Lindstedt, Imperial College, London

- 16:40–17:00 Sectional and monodisperse LES modeling of the SpraySyn flame for nanoparticle synthesis
Johannes Sellmann, University of Duisburg-Essen
- 17:00–17:20 Soot light absorption and refractive index during agglomeration and surface growth
Georgios Kelesidis, ETH Zurich
- 17:20–17:40 Structure of laminar, nanoparticle-forming flames: Silica and iron oxide
Irenaeus Wlokas, University of Duisburg-Essen
- 17:40–18:00 Discussion: Open research needs
- 19:00 **Conference Dinner at the Webster Brauhaus** (<https://www.webster-brauhaus.de>)

Wednesday, September 26, 2018

Diagnosics (Chair: Thomas Dreier)

- 8:30–9:00 **Flame synthesis of iron oxide nanoparticles: laser-based diagnostics, particle mass spectrometry and modeling**
Igor Rahinov, Open University of Israel
- 9:00–9:20 Simultaneous OH-PLIF and PS-LIBS measurements of a turbulent flame synthesis reactor
Shuiqing Li, Tsinghua University, Beijing
- 9:20-9:40 Measurements of aerosol size and structure at low-pressure reactors: sampling issues and measurements using a differential aerodynamic particle sizer
Einar Kruis, University of Duisburg-Essen

Scale-up and Application (Chair: Lutz Mädler)

- 9:40–10:10 **Processing and functionalization of nanopowders in fluidized bed reactors**,
Dr. Martin Seipenbusch, ParteQ GmbH
- 10:10–10:40 **Coffee Break and Posters**
- 10:40–11:00 Flame-synthesized $\text{Li}_4\text{Ti}_5\text{O}_{12}$ anode materials for high-power Li-ion batteries
Tommi Karhunen, University of Eastern Finland, Kuopio
- 11:00–11:20 Flame synthesized silica/ceria catalyst supports for the valorization of carbon dioxide
Emma Lovell, University of New South Wales, Sydney
- 11:20–11:40 Large-scale manufacturing of fullerenes, single-walled carbon nanotubes, their derivatives and dispersions for energy and electronic applications
Henning Richter, Hossein Ghiassi, Nano-C, Inc., Westwood
- 11:40–12:00 **Scale-up of nanomaterials synthesis from the lab to the pilot-plant scale: challenges and results**
Tim Hülser, Institut für Energie- und Umwelttechnik e.V., IUTA, Duisburg
- 12:00–13:30 **Lunch and Posters**
- 13:30–15:00 Lab tour NETZ