

## Program at a Glance:

Gas-phase synthesis allows the production of a large variety of complex nanoparticles for various applications and is especially suited for scaling-up, already proven by several industrial processes.

In this two-day international symposium at the University of Duisburg-Essen (UDE, Germany) relevant scalable nanoparticle synthesis processes such as plasma synthesis and flame synthesis are presented, with an emphasis on recent innovations, scaling-up strategies, and applications.

Additional topics are measurement, modeling, and diagnostics as well as functionalization and deposition technology. Also, the sustainability of the processes and materials will be discussed.

This symposium is organized within the frame of the EU FP7 project BUONAPART-E *Better Upscaling & Optimization of Nanoparticle and Nanostructure Production by Means of Electrical Discharges* and the DFG research unit 2284 *Model-based scalable gas-phase synthesis of complex nanoparticles*.

# BUONAPART • E

Better Upscaling and Optimization of Nanoparticle and Nanostructure Production by Means of Electrical Discharges



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[www.buonapart-e.eu](http://www.buonapart-e.eu)



## FOR2284

MODELLBASIERTE  
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KOMPLEXER  
NANOPARTIKEL

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## Further Information & Contact:

### Registration (Deadline: January 6, 2016)

<http://udue.de/HABo1>

If you are interested in presenting a poster, please contact us.

### Contact

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### Venue

University of Duisburg-Essen

NETZ – NanoEnergyTechnologyCenter

Carl-Benz-Straße 199

47057 Duisburg

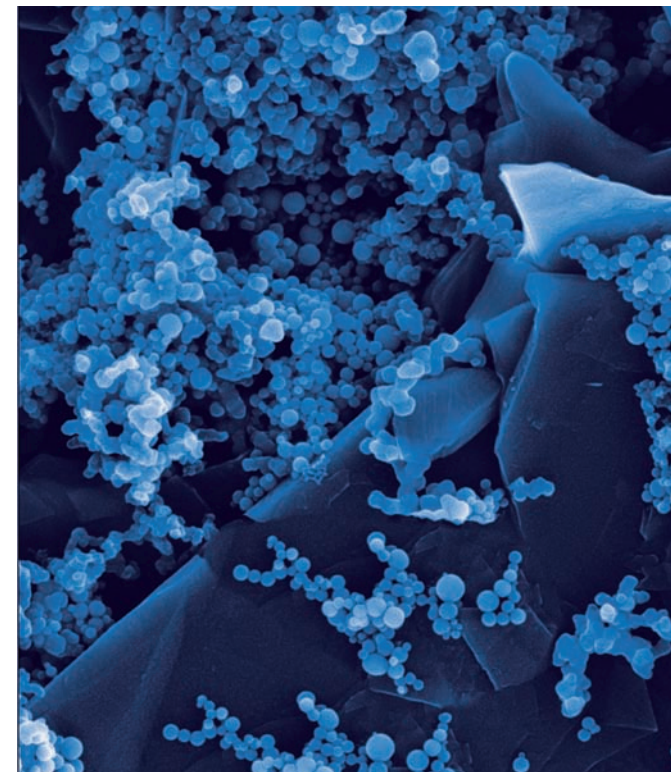
Germany

## Rhine-Ruhr: In the Heart of Europe



The University of Duisburg-Essen (UDE) is located in the Rhine-Ruhr metropolitan region, in the heart of Europe. With more than 11 million inhabitants, it is Germany's largest and Europe's fifth largest metropolitan region. It is named after the Rhine and Ruhr rivers, which are the region's defining geographical features and historically its economic backbone. Its location makes it well connected to other major European cities such as Amsterdam, Paris, London, Munich, Hamburg, Berlin, and Frankfurt. The region has transformed itself from a center for heavy industry into a hub for knowledge, technology, and service, and continues to have enormous economic importance. In 2010 the Rhine-Ruhr region was elected European Capital of Culture.

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UNIVERSITÄT  
DUISBURG  
ESSEN

*Offen im Denken*

**Symposium**  
***Synthesis of functional nanomaterials:  
fundamental understanding, scale-up, and  
design for applications***

**University of Duisburg-Essen, Germany**  
**January 20–21, 2016**

## Wednesday, January 20, 2016

09:00 Welcome by Einar Kruis and Christof Schulz

### Optimization and scaling-up of nanoparticle synthesis

(Chair: Christof Schulz, CENIDE, UDE)

09:15 Metallic nanoparticle synthesis by arc discharge and scale-up approach (Matthias Stein, CENIDE, UDE)

09:45 Ultrafine metal and alloy nanoparticles produced by spark discharges (Andreas Schmidt-Ott, TU Delft, Netherlands)

10:15 *Coffee break and posters*

10:45 Scale-up challenges in flame synthesis (Karsten Wegner, Wegner Consulting, Switzerland)

11:15 Microwave plasma synthesis process: properties, challenges, and scale-up (Hartmut Wiggers, CENIDE, UDE)

11:45 Scale-up of gas-phase synthesis: An industrial perspective (Michael Hagemann, Jürgen Flesch, Evonik, Germany)

12:15 *Lunch and posters*

13:15 Continuous and green hydrothermal reactors for functionalized nanoparticles in energy applications; from lab to pilot scale (Jawwad Darr, University College of London, UK)

### Measurement, modeling, and diagnostics

(Chair: Sotiris Pratsinis, ETH Zurich, Switzerland)

13:45 Model-based scalable gas-phase synthesis of complex nanoparticles (Christof Schulz, CENIDE, UDE)

14:15 Multiscale reactor design: Crystallinity – morphology dynamics of nanoparticles (Beat Buesser, IBM Research, Dublin, Ireland)

14:45 In situ diagnostics of arc and spark discharges (Zsolt Geretovsky, University of Szeged, Hungary)

15:15 Online measurements of size and effective density of dense aerosols (Anssi Arfmann, Tampere University of Technology, Finland)

15:35 *Coffee break and posters*

16:00 Multi-parameter characterization of particle-based functional materials by online measurement technology (Rainer Friehmelt, Bernd Sachweh, BASF, Germany)

16:30 Modeling of nanoparticle synthesis processes (Andreas Kempf, Irenäus Wlokas, CENIDE, UDE)

17:00 Laser-induced incandescence sizing of metal nanoparticles (Kyle Daun, University of Waterloo, Canada)

17:30 *Departure for hotels*

19:00 *Departure to restaurant*

19:30 *Dinner* at Hauptschalthaus, Landschaftspark Duisburg Nord (former site of Thyssen steel works, one of the main historic industrial sites in the Ruhr area)

## Thursday, January 21, 2016

### Post-treatment, functionalization, and deposition technology

(Chair: Andreas Schmidt-Ott, TU Delft, NL)

09:00 Size-narrowing of gas-carried nanoparticles (Einar Kruis, CENIDE, UDE)

09:30 Filtration of pyrophoric metallic nanoparticles (Jörg Meyer, KIT, Germany)

10:00 Aerosol-CVD for the synthesis of core-shell particles (Martin Seipenbusch, Martin Seipenbusch Engineering, Germany)

10:30 *Coffee break and posters*

### Sustainable technology and policies

(Chair: Andreas Schmidt-Ott, TU Delft, Netherlands)

11:00 Life-cycle analysis of processes and products based on metallic nanoparticles (Ron Zevenhoven, Åbo Akademi University, Finland)

11:20 Release, exposure, and safety aspects of synthesis processes based on electrical discharges (Thomas Kuhlbusch, IUTA, Germany)

### Applications of nanoparticles

(Chair: Einar Kruis, CENIDE, UDE)

11:40 Design for applications within BUONAPART-E: From solar cells to blast furnaces (Christelle Denonville, SINTEF, Norway)

12:00 Antimicrobial properties of textiles produced by aerosol deposition (Maria Blanes, AITEX/FOMENTEX, Spain)

12:20 *Lunch and posters*

13:20 Preparation and application of metal-polymer nanocomposites (Julio Gómez, Avanzare, Spain)

13:40 Gas-phase synthesized nanoparticles for lithium-ion batteries (Lisong Xiao, CENIDE, UDE)

14:00 Silicon-based nanocomposites from a scalable gas-phase synthesis process for thermoelectric applications (Gabi Schierning, Leibniz-Institut für Festkörper- und Werkstoffforschung, Dresden e.V., Germany)

14:20 Metal polymer nanocomposites by supersonic cluster beam implantation (Paolo Milani, TU Milano, Italy)

14:50 On the relevance of surface growth and coagulation for applications of nanosilver and aerosol-manufactured photocatalysts (Sotiris Pratsinis, ETH Zurich, Switzerland)

15:20 *Coffee break and posters*

15:45 *Lab tours*

Possibility of visit to BUONAPART-E (pilot plant, individual reactor for optimization purposes, size selection facilities) and CENIDE synthesis facilities (flame reactor, microwave plasma reactor, hotwall reactor)

