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**CeNiDE**

CENTER FOR NANOTECHNOLOGY  
DUISBURG-ESSEN

UNIVERSITÄT  
**DUISBURG  
ESSEN**

*Nano-Competence Inside*



# *CeNIDE - Center for Nanointegration Duisburg-Essen*

*Nano-Competence Inside*

## ***9 Reasons for CeNIDE:***

- Internationally recognized expertise in nanoscience and nanotechnology
- Up-to-date synthesis of custom nanomaterials
- Advanced techniques for the preparation of nanostructures and nanocomponents
- State-of-the-art equipment to perform powerful nanoanalytics
- Nanotech-based solutions for industrial applications
- Strong interdisciplinary approach through bundling of physical, chemical and engineering departments
- Leading member of an international network of competence
- Established project partner for product development and technology transfer
- Dynamic team of highly qualified young scientists

## *CeNIDE generates Future Technologies*



Scale up – nanoparticles for industrial applications  
Plasma reactor for the synthesis of nanoparticles



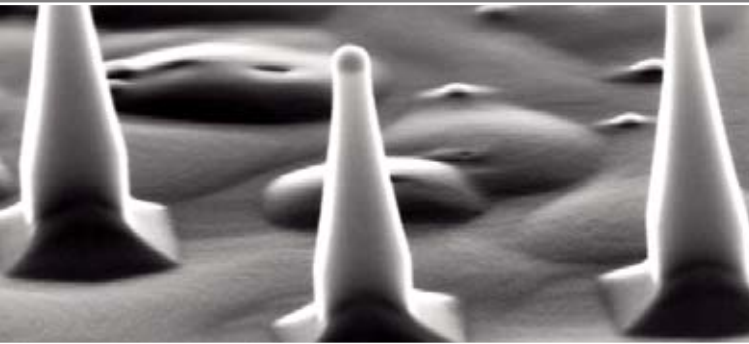
Materials for future light sources  
Photoluminescence of silicon nanoparticles

Leaders from key industries have realized that nanotechnology plays a crucial role, in the pioneering of innovations, especially for the optimization of future products. Material efficiency, novel material properties and the ability to combine functionalities for specific high-tech applications are just some examples that demonstrate the powerful potential of nanotechnology-based R&D.

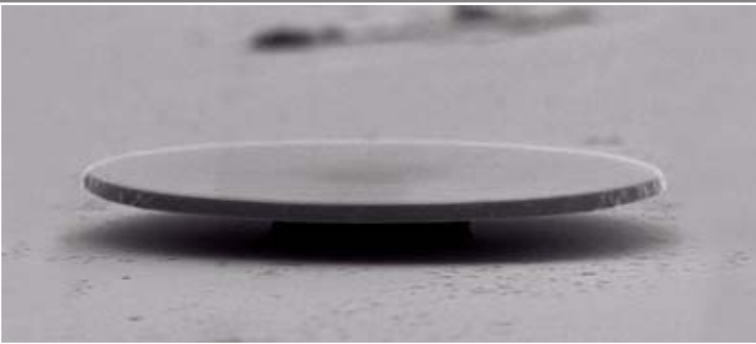
CeNIDE is in a unique position to help companies generate new possibilities. With our headquarter located directly on the University campus, we are a recognized hot spot for international industry, cooperation, initiatives, scientific project management, and competence sharing.

We specialize in the efficient transfer of research results into successful commercial applications – primarily at the interface between nano-and macroworlds.

## *CeNIDE generates Integration*



Novel components for high-performance electronics  
Epitaxial-growth of quantum wires, based on gold nanoparticles



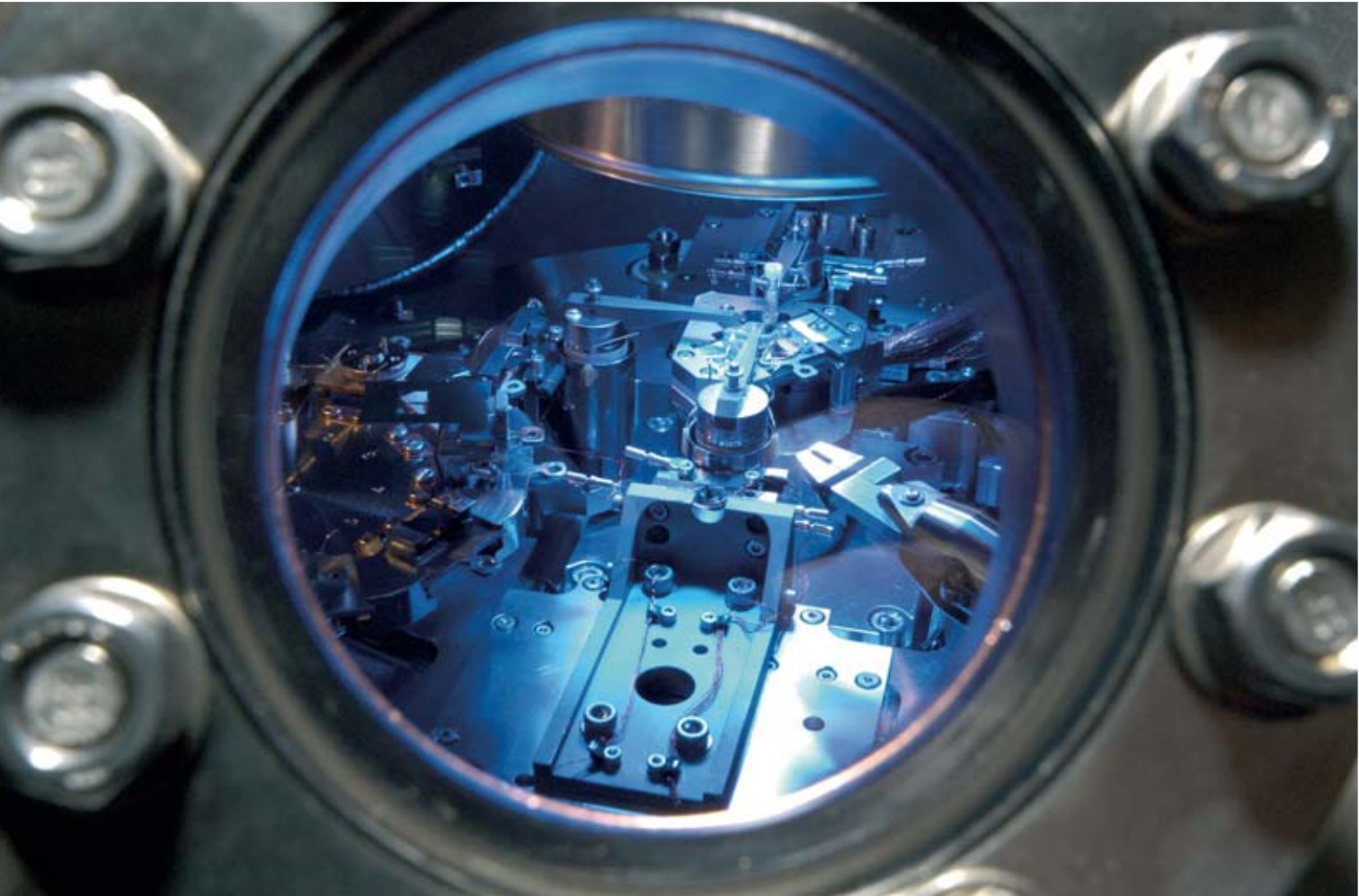
Tailor-made optoelectronic structures  
A GaAs micro-disk with embedded InAs quantum dots

CeNIDE's approach is interdisciplinary and integrative. We combine the diversity of nano-related activities in physics, chemistry and engineering with complementary sciences – medicine, biology and the life sciences – into one network of competence. This sophisticated concept enables us to weave together results from fundamental research in application-oriented product development processes, generating groundbreaking product features based on nanotechnology.

For the benefit of all partners involved – from industry, research centers, partner universities or research institutes – CeNIDE is positioning itself as a strong network partner and efficient knowledge-based solution provider.

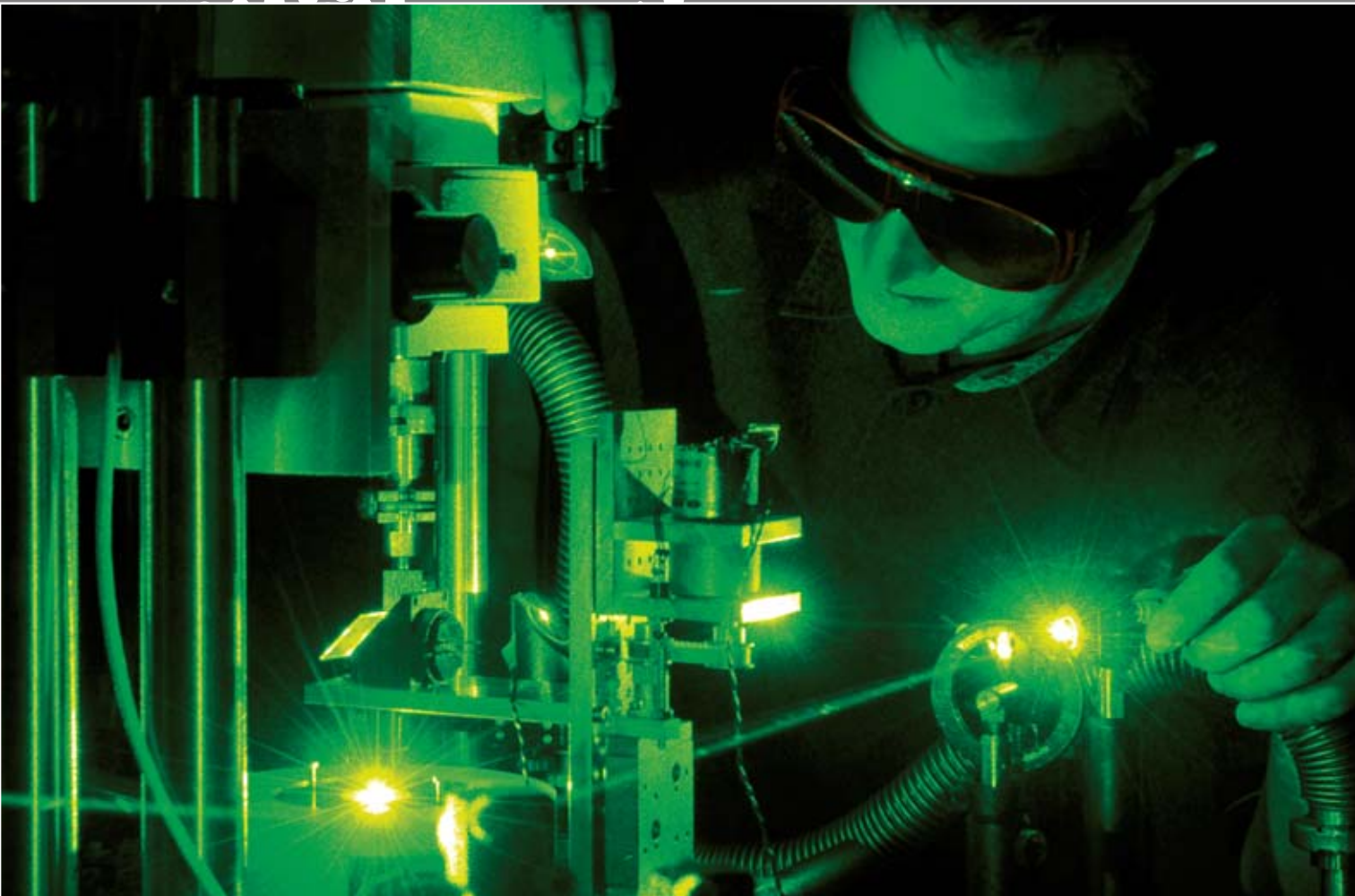
CeNIDE offers a unique portfolio of services in the field of applied nanotechnology research and development, particularly in the pre-product stage. This strategic orientation generates a strong drive of innovative product developments, suitable for all kind of materials-based markets.

*CeNIDE generates Innovation*



Insights into nanoanalytics  
Nanoprobe microscope





Observation of nanostructures  
Setup for the measurement of micro photoluminescence

## *CeNIDE generates Diversity*



Nanoengineering for computer applications  
High-resolution lithography under clean-room conditions



Thin-layer techniques for nanoscale optoelectronic devices  
Molecular-beam epitaxy facility

CeNIDE is well-equipped. We provide an extensive cutting-edge equipment pool for nanoanalytics to meet the many requirements relevant for structure-property relations, as well as challenges along the commercial value chain.

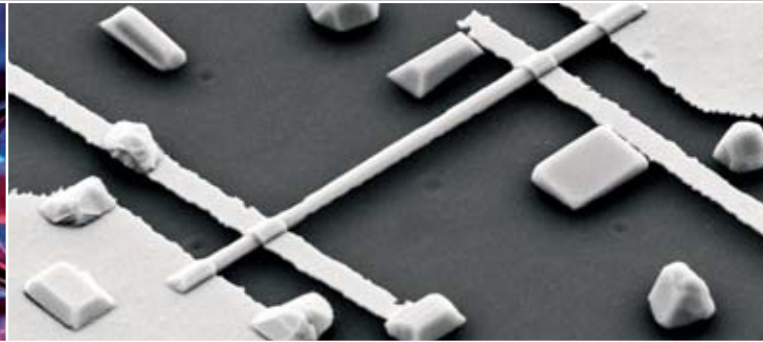
Our competencies cover a wide range of processes and techniques for the production of different nanomaterials, nanostructures, and nanodevices. Additionally, CeNIDE offers state-of-the-art methods for the analysis and the characterization of nanomaterials.

The range of expertise also includes powerful ab-initio, molecular dynamics, and Monte-Carlo methods, suitable for modeling and simulation of nanomaterials and nanoscaled systems.

## *CeNIDE generates Nano-Competence*



Nanoengineering as a tool to realize novel properties  
Tailor-made materials



Quantum wires – solutions for future electronics  
Single-crystal nanowire from silver grown by self-organization

The members of CeNIDE cover a wide interdisciplinary field of competencies, ranging from fundamental research to applications in the fields of physics, chemistry, electrical engineering, information technology, and mechanical engineering. Numerous publications and patents highlight the performance of CeNIDE concerning current nanotechnology research, which is also documented by the involvement in the following Collaborative Research Centers (SFB) of the German Research Foundation:

- “Nanoparticles from the Gasphase” (SFB 445)
- “Magnetic Heterostructures” (SFB 491)
- “Energy Dissipation at Surfaces” (SFB 616)

and the Research Training Group (GK):

- “Nanotronics” (GK 1240)

CeNIDE is involved in numerous research programs funded by different institutions like the German Research Foundation (DFG), the German Federal Ministry of Education and Research (BMBF), the EU, and the Volkswagen Foundation. Additionally, CeNIDE is a well-established partner that supports numerous cooperation projects with several international companies. CeNIDE educates highly qualified young scientists with the novel “NanoEngineering” degree program located at the University of Duisburg-Essen.

## CeNIDE generates Power

### CeNIDE Members and their areas of activity:

Prof. Dr. Burak Atakan - Chemical Vapor Deposition  
 Prof. Dr. Gerd Bacher (Board) - Nanomaterials and Nanodevices  
 Prof. Dr. Volker Buck - Functional Coatings  
 Prof. Dr. Peter Entel - Theoretical Low-Temperature Physics  
 Prof. Dr. Matthias Epple (Board) - Nanobiomedicine  
 Prof. Dr. Michael Farle - Nanomagnetism  
 Prof. Dr. Alfons Fischer - Surface Nanolayers  
 Prof. Dr.-Ing. Heinz Fissan - Sustainable Nanotechnology-Nanoparticle Exposure  
 PD Dr. Nils Hartmann - Functional Organic Templates  
 Prof. Dr. Eckart Hasselbrink - Surface Dynamics  
 Prof. Dr. Angelika Heinzl - Fuel Cell Technology  
 Prof. Dr. Michael Horn-von Hoegen - Morphology and Dynamics of Surfaces  
 Prof. Dr. Dieter Jäger - Nanophotonic Components and Systems  
 Prof. Dr. Peter Kratzer - First-Principles and Statistical Methods in Materials Physics  
 PD Dr.-Ing. Einar Kruis - Nanoparticles, Nanoaerosols and Nanoparticulate layers  
 Prof. Dr. Axel Lorke (Board) - Semiconductor Quantum Structures and Nanoparticles  
 Prof. Dr. Christian Mayer - Nanoparticles and Nanocapsules Based on Organic Matrices  
 PD Dr. Cedrik Meier - Nanophotonics and Nanooptics  
 Dr. Frank-J. Meyer zu Heringdorf - In-situ Surface Microscopy  
 Prof. Dr. Rolf Möller (Board) - Interfaces on the Atomic Scale  
 Dr. Andreas Ney - Magnetic Semiconductors  
 Prof. Dr. Hermann Nienhaus - Reactions at Surfaces and Nanostructures  
 Prof. Dr. Roland Schmechel - Functional Nanoparticulate Layers  
 Prof. Dr. Christof Schulz (Board) - Reactive Flows  
 Prof. Dr. Stephan Schulz - Thin Films and Nanoparticles  
 Prof. Dr. Franz J. Tegude - Materials and Devices for Nanoelectronics and Photonics  
 Prof. Dr. Mathias Ulbricht - Functional Polymer Materials  
 Prof. Dr. Heiko Wende - Elementspecific Magnetic Properties of Nanostructures  
 Dr. Hartmut Wiggers - Nanoparticles and Nanomaterials  
 Prof. Dr. Markus Winterer - Nanoparticle Process Technology  
 Prof. Dr. Dietrich Wolf - Computational and Statistical Physics  
 Prof. Dr. Reinhard Zellner - Nanoparticles and Phase Boundaries

### CeNIDE Advisory Board:

Dr. Andreas Gutsch, Li-Tec Battery GmbH & Co. KG  
 Prof. Dr. Horst Hahn, Forschungszentrum Karlsruhe  
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 Dr. Klaus Streubel, Osram Opto Semiconductors GmbH  
 Dr. Dieter Weller, Seagate Technologies  
 Prof. Dr. Viola Vogel, ETH-Zürich Hönggerberg

## *CeNIDE generates Communication*

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For further information, a full range of project presentations and recent scientific publications please visit our website: [www.cenide.de](http://www.cenide.de)

