

NINa-News

North German Initiative
Nanotechnology SH

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Dear Reader,



Prof. Dr. Holger Kersten

plasma technology has grown to a cross-sectional technology of tremendous economical and social impact for our modern society. This fact has unfortunately not reached public attention. As a consequence, it is our responsibility to continuously explain and promote the great potential of research and development in the field of plasma technology.

There is a wide range of technological applications of low pressure plasmas. Besides lighting they are important in microelectronics, optics, lasers, IT, packaging as well as medical and environmental technology, energy production and in the automobile and space industries. Recently the importance of plasmas has grown in new fields of application like the generation of nano-structured materials and medical treatment.

Plasmas play a key role in nanotechnology for example for the synthesis of nanoparticles with special chemical, catalytic and thermal properties. The tailored generation of nanoparticles can considerably influence the properties of thin films. In this way surfaces can be functionalized with regard to their electronic, optical, mechanical and antibacterial behavior among others.

While low-pressure plasmas have been investigated intensively for long years, plasmas at atmosphere pressure have recently attracted much attention. This is because of a comparatively low technical complexity, ease of use and lower costs. In addition, the synthesis

Thin material layers can be fabricated with plasmas for example for micro-technology.



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Plasmas enable precise modifications of surfaces. In order to control such processes the physics of plasmas have to be investigated, e.g. with a plasma probe as depicted above.

of nanoparticles at atmosphere pressure is much more efficient and controllable compared to low-pressure plasmas.

The upcoming NINa-workshop at the Leibniz Institute for Plasma Science and Technology (INP) in Greifswald will address the latest plasma science and applications on 7 November 2019, to which I would like to heartily invite you. The INP (www.inp-greifswald.de) is a unique research facility within Germany and Europe with more than 100 scientists conducting leading-edge plasma research and with a well established co-operation with Kiel University.

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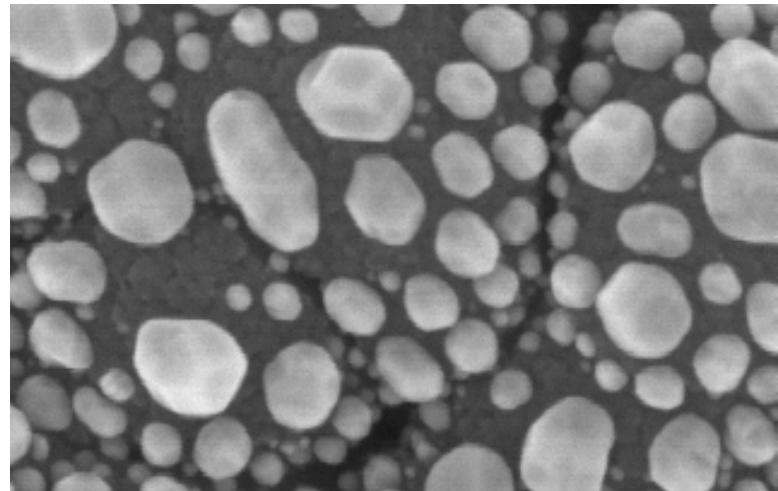
Surfaces with specific functionality are essential for countless applications. Plasma processes can precisely tailor surface properties and allow the synthesis of materials on a nanoscale for numerous technical purposes. The [Leibniz Institute for Plasma Science and Technology \(INP\)](#) in Greifswald is one of the world's leading research facilities in the field of physical plasmas.

The INP is Europe's largest non-university research institute for low-pressure plasmas, employing 190 staff. It promotes the development of plasma-based products and processes besides application-oriented basic research.

The fabrication of nanostructured materials and nanoparticles with plasma processes opens up manifold perspectives in the field of energy storage and conversion. They are for example necessary for the development of new components for batteries and fuel cells or for the hydrogen technology. Furthermore, plasmas are essential in many other application fields like sensor technology, chemical synthesis, medical technology as well as the purification of water and gas.

Plasma tools utilized in the research focus [Materials and Surfaces](#) offer a broad range of possibilities for the processing of materials. Among others, structured surfaces can be generated by selective removal of material and the modification of material interfaces controls their gluability and printability. Plasma-fabricated functional surfaces offer protection against corrosion, heat or mechanical wear and act as optical coatings.

The expertise of the research focus *Materials and Surfaces* encompasses methods for the fabrication, characterization and modeling of nanomaterials. The utilized plasma processes provide metallic, ceramic and graphitic particles and thin films. Physical di-



Gold nanoparticles deposited on layers of porous anatase. © INP

agnostics and modeling allow the investigation and further development of the manifold fabrication processes themselves.

Another focus of interest is the generation of ceramic and metallic nanoparticles as well as carbon nanotubes in liquids. Several projects currently investigate new methods of synthesis of catalysts based on platinum and nickel as well as new electrodes and membranes.

Precise control of the involved plasma processes is essential to reliably produce materials of high quality. Thus, the process plasmas in industrial manufacturing machines are characterized and modeled at INP to correlate them with the actually resulting material properties.

The comprehensive combination of basic science and applied research make the INP the leading institution in Germany regarding plasma science and technology.



Hightech meets art in the far north

Towards a better world driven by a multidisciplinary community of bold thinkers - this is the motto of [Aalto University](#) in Finland. It is a place in which science and art meet technology and economics.

To master the great societal challenges science at Aalto focuses on the seven key areas ICT and digitalization, materials, sustainability, natural resources, business, arts and design.

The Department of Chemistry and Materials Science focuses on micro-, nano- and atomic scale engineering of compounds and materials along with computational research.

Professor Mady Elbahri's group [Nanochemistry and Nanoengineering](#) pursues innovative research on green nanotechnology with respect to design, synthesis and engineering of advanced functional materials for energy and environmental technologies, life science and design.

Functional nanomaterials for numerous applications are generated by a combination of a wide spectrum of methods like the Leidenfrost-technique, electrospinning, physical vapor deposition and biogenic approaches. The innovative materials shall improve energy efficiency, enable the purification of water by sunlight and advance nanomedicine to name some.

Following the Aalto strategy "from research and technology to business", NanoTori has just been established, as part of a successful technology transfer. In addition to innovative nanotechnological approach-

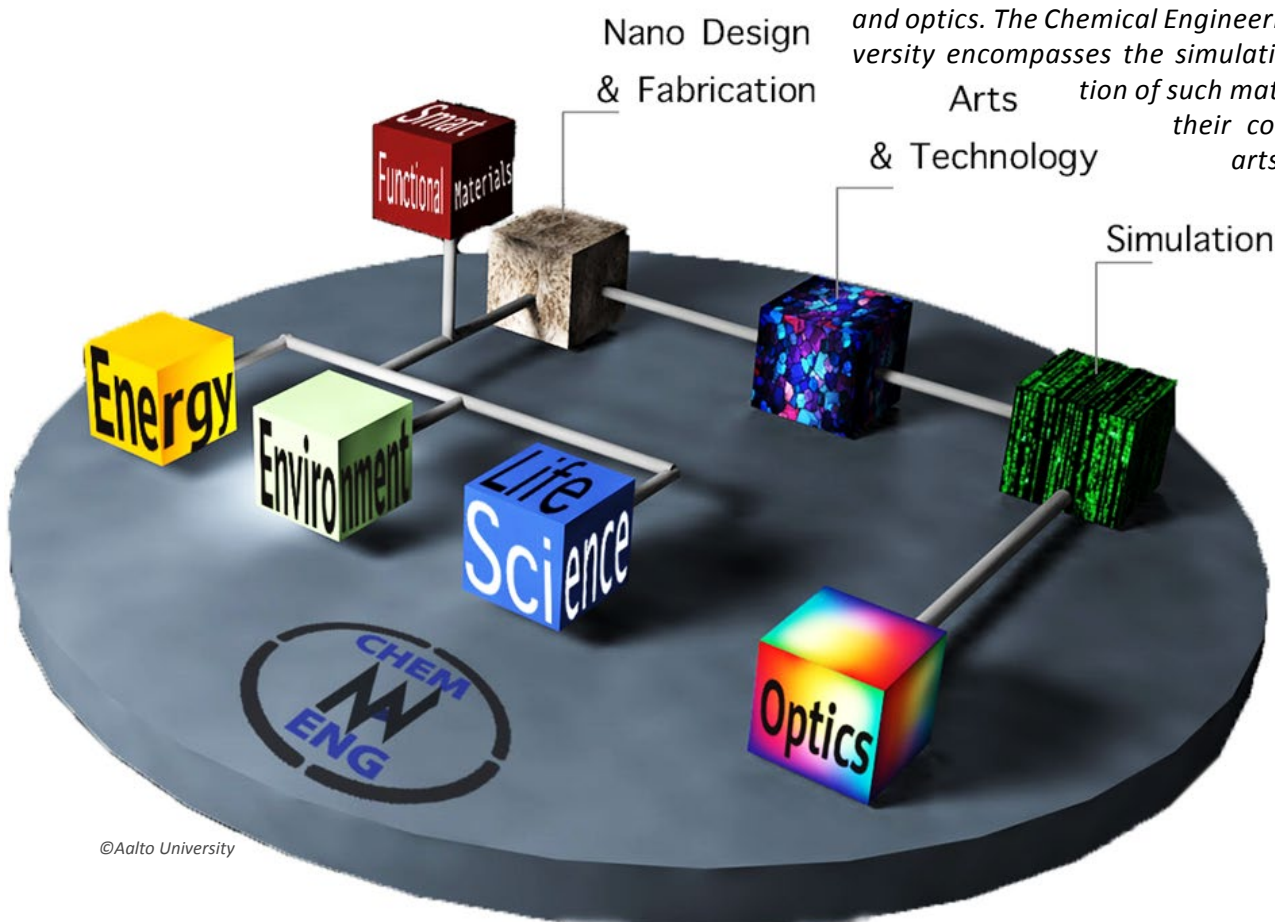


Professor Mady Elbahri develops the nanomaterials of the future at Aalto University in Finland.

es for industry, NanoTori offers pedagogical concepts for teaching complex methods of nanotechnology.

At Aalto University talents collaborate interdisciplinary and internationally to solve the problems of the future. Gathering nanotechnological key players from all over the Baltic Sea Region, among others, in the fields of science, teaching and art provides new perspectives and great opportunities for scientific and educational cooperation and investment.

New smart materials enable innovative solutions in the fields of energy, environment, life science and optics. The Chemical Engineering at Aalto University encompasses the simulation and fabrication of such materials as well as their combination with arts and applied technology.



International conference NIBS 2020 in Hamburg

The fourth conference of the annual international series “[Nanotechnology and Innovation in the Baltic Sea Region](#)” (NIBS) will take place in Hamburg/Germany from 24 to 26 June 2020. The conference is organized by NINa SH and partners. It offers all actors involved in nanotechnology an excellent opportunity for networking in the Baltic Sea region.

Already in the times of the Hanseatic League, people from all over the Baltic Sea region met in Hamburg for exchange. With a view over the tradition-rich Port of Hamburg the Empire Riverside Hotel provides an excellent venue for the exchange of the latest science and developments in the key future field of nanotechnology. Due to its interdisciplinary breadth the advance of nanotechnology depends on the co-operation and networking among all involved stakeholders from science, economy and politics.

Like its predecessors, the fourth NIBS-conference will offer all nanotechnology-stakeholders from the Baltic Sea region a perfect opportunity for international and interdisciplinary exchange. The conference is organized by NINa SH in co-operation with [Kiel University](#), [Kaunas](#)

[University of Technology](#) and the [Mads Clausen Institute](#) from the University of Southern Denmark.

Further information and the registration are provided on the conference website www.nibs2020.uni-kiel.de.

NIBS
conference 2020
Nanotechnology | Innovation | Baltic Sea Region

NINa's Highlights

On this page, NINa SH presents recent highlights from the field of nanotechnology and news from science and industry. You can inform the network about your activities here, too. [Send your highlight to ohrt@nina-sh.de](mailto:Send_your_highlight_to_ohrt@nina-sh.de).

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Focused meeting: plasmas in nanotechnology

7.11.2019 | INP Greifswald | Free participation, registration necessary

Plasmas are essential for many modern products and fabrication processes. They are utilized in nanotechnology for the synthesis of nanoparticles or the modification of surfaces, among others. During the upcoming focused meeting [Plasmas](#)

[in Nanotechnology](#) experts from science and industry will present latest research and activities. The meeting takes place at the [Leibniz Institute for Plasma Science and Technology](#) (INP) in Greifswald on 7 November 2019.

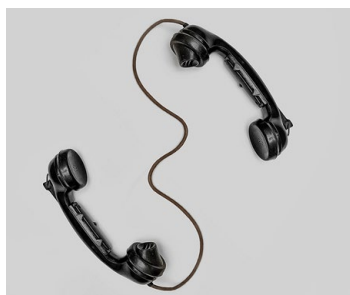
© Sven Janssen, Kiel



Diagnostic assurance in the stables

Horses which are infected unrecognized can lead to costly mass-infections. The state of Schleswig-Holstein supports the project [OPTOCHIP](#) with 525.000 € for the development of a veterinary medicinal point-of-care system. Project partners in Schleswig-Holstein are Professor [Martina Gerken's re-](#)

[search group](#) from Kiel University, the [Fraunhofer ISIT Itzehoe](#) and the company [Krämer Engineering GmbH](#). The partners [Byonoy GmbH](#) and [altona Diagnostics GmbH](#) receive another 563.000 € from the state of Hamburg. The rapid test is going to be ready for production in six years time.



Kiel University of Applied Sciences creates transfer office at IZET in Itzehoe

The [Innovation Center Itzehoe IZET](#) is an incubator for high-tech made in Steinburg. A close co-operation with universities is of key importance for the high-tech site Itzehoe. As a consequence, [Kiel University of Applied Sciences](#) created an office (E-Mail:

transfer-buero@fh-kiel.de) at IZET which acts as a central contact point for partners from the Steinburg region and the university. The intensified scientific exchange will benefit both the university and the high-tech companies in Itzehoe.

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