

Center for Applied Nanotechnology

Newsletter . Edition 2 – November 2007

In November at Principal Sector Tradeshows

BIO-Europe in Hamburg and NanoSolutions in Frankfurt/Main



Welcome to the Center for Applied Nanotechnology!

In November, CAN GmbH will present itself to experts and the public in Hamburg and Frankfurt/Main at the most important national tradeshows in the nano sector. From 12 to 14 November 2007 BIO-Europe Hamburg will transform the Convention Center CCH in Hamburg into an international meeting place for managers and executives from the pharmacy, technology and finance sectors. On the Frankfurt fairgrounds from 20 to 23 November 2007 approximately 150 national and international exhibitors and ca. 3,500 visitors are expected at the leading European tradeshow for nano applications. For the first time CAN GmbH will be presenting itself in both Hamburg and Frankfurt with a new stand and exhibits from applied research.

“Being a cross-disciplinary technology, the future belongs to nanotechnology for it offers potential for product innovations in nearly all fields of technology,” says Dr. Gerd Bachmann, expert for nanotechnology at VDI Technologiezentrum GmbH. “There is an increasing demand by industry globally for applied nanotechnology research.“ Two years after its founding, CAN GmbH is already established in this field in Hamburg, a center of research. “Thanks to the joint effort of a strong and motivated team, we have been able to meet the high expectations for successful business development,“ reports CAN Managing Director Dr. Frank Schröder-Oeynhausen. “The consolidation phase is over. We now want to build our profile as a center for development and applications and position ourselves for new challenges.” CAN GmbH can be found at the fall tradeshows in the Hansestadt Hamburg and Frankfurt am Main in the following locations:

- **BIO-Europe 2007**, Hamburg 12 to 14 November, CCH, Life Science North Foyer
- **NanoSolutions 2007**, Frankfurt am Main 21 to 23 November, Hall 4.0, Stand B20

For appointments at the tradeshows feel free to contact us.

Contact Gabriela Sterly-Müller, E-Mail: gsm@can-hamburg.de

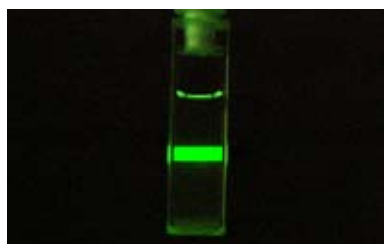
CAN Experiments on Standardized *In Vitro* Toxicity Assays



In collaboration with the University Medical Center Hamburg-Eppendorf, CAN GmbH is developing various standardized *in vitro* toxicity assays for nanoparticles. A key feature of this project is the systematic variation of nanoparticle size, shape and surface properties and determination of the respective influence on interactions with human tissue. CAN GmbH has therefore established test facilities with a variety of cell lines from the skin, respiratory system and bowels. The experimental setup also includes advanced confocal microscopy techniques as well as high throughput screening and electron microscopy. This research area includes generation of a database to allow correlation of biological features (e.g. toxicity and cellular uptake) with structural and chemical properties of the particles. Ultimately, the combination of broad synthetic expertise and the generated biological data will lead to straightforward development of innovative nanoparticle-based biological markers for molecular imaging.

Contact Dr. Tatjana Achenbach (Nanobiotechnology), E-Mail: achenbach@can-hamburg.de

Molecular Imaging for Applications in Medicine and Diagnostics

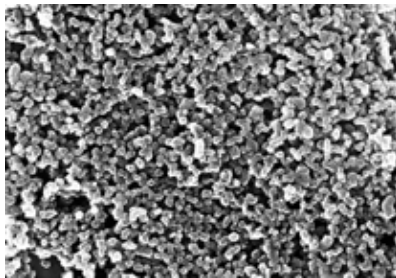


As a partner of Bayer Technology Services, CAN GmbH is participating in the joint project “Luminescent Nanoparticles for Applications in Medical Diagnostic Imaging (LUNA)” funded by the German Ministry for Education and Research. The aim of this project is to prepare luminescent nanoparticles and modify their surfaces in such a way that they dock at (tumor) cells according to the key-and-lock principle. Using imaging techniques it should then be possible to locate these cells, which is important for a targeted therapy. CAN GmbH is responsible for developing a method to prepare nanoparticulate luminescent systems. “We are making use of the fact that tissue is nearly transparent for subranges of infrared light,” reported Dr. Volker Bachmann from CAN. “Particles with a diameter of 20 nm are doped with rare earth elements, making it possible to convert the irradiated infrared light into visible light – a process also known as up-conversion,” said Bachmann. “This technology plays a significant role in molecular imaging, which will become increasingly important in future diagnostic techniques,” explained Dr. Werner Hoheisel, who is responsible for the project at Bayer Technology Services. Responsible besides Bayer for parts of the project are Philips Technology Research Laboratories, the Institute for Clinical Radiology of the University of Münster, the Institute for Physical Chemistry of the University of Hamburg, the Chemistry Institute of the University of Osnabrück and the Fraunhofer Institute for Molecular Biology and Applied Ecology.

Contact Dr. Volker Bachmann, E-Mail: bachmann@can-hamburg.de

Superficial Modifications on the Nanometer Scale

The majority of chemical reactions take place on or involve surfaces. Nanotechnology allows selective manipulation of surfaces on the nanometer scale. CAN's expertise in the synthesis and modification of nanoparticles enables the creation of new surface properties on polymers, metals and ceramics through deposition of thin films and functional layers. "In the biomedical sector it will become possible to selectively influence the behaviour of cells contacting these modified



Nanoporous titanium dioxide coating

surfaces and, for example, to regulate their growth," explained CAN Project Manager Dr. Christoph Gimmler. "These functionalized layers already find use in DNA purification and surgery." Additional functions can be provided through special methods that selectively modify the surface of individual particles making up these films. By coupling specific receptors to the surface of nanoparticle functional coatings are fabricated which specifically and selectively filter and retain components from complex mixtures.

Contact Dr. Christoph Gimmler (Nanoparticle Technology), E-Mail: gimmler@can-hamburg.de

Introducing polymer-based research at CAN



Research activities at CAN GmbH relating to polymer-based nanocomposites focus on melt blending technologies for compounding nanoparticles into a polymer matrix. With a minimum of about 6 cm³ of material necessary for successful composite preparation, our research capabilities are very suitable for investigation of high-cost materials. To improve their compatibility with the host polymer matrix it is very often necessary to modify the surface of nanoparticles. That happens

to be one of the main objectives of our research. Because the nanoparticles used are made of inorganic material, their heat conductivity is much higher than that of polymer materials. Forming a percolation network of nanoparticles in the polymer matrix increases the low heat conductivity of host polymers, thus broadening their field of application. Furthermore, using nanoparticles as anchors for low molecular weight polymer additives can prevent the additives' migration to the polymer surface, fixing them permanently within the polymer matrix. This is an additional field of application for nanoparticles concerning polymer materials.

Contact Dr. Sasa Bondzic, E-Mail: bondzic@can-hamburg.de

CAN GmbH Partners

In good company

Beiersdorf AG www.beiersdorf.com

Eppendorf AG www.eppendorf.com

Olympus Winter & Ibe GmbH www.olympus-owi.de

Evotec Technologies GmbH www.evotec-technologies.com

Nanogate AG www.nanogate.com

Merck KGaA www.merck.de

Free and Hanseatic City of Hamburg, Ministry of Science and Research
<http://fhh.hamburg.de/stadt/Aktuell/behoerden/wissenschaft-forschung>

Hamburger Sparkasse www.haspa.de

Hamburg Chamber of Commerce www.hk24.de

Innovationsstiftung Hamburg www.innovationsstiftung.de

Norgenta North German Life Science Agency www.norgenta.de

Competence Center Hansenanotec www.nanoscience.de/hansenanotec

University of Hamburg www.uni-hamburg.de



CAN GmbH offers companies and research institutions contract research and development services in the area of nanotechnology and participates in national and international research programs. The focus of activities is on the utilization of new findings made in chemical nanotechnology and nanoanalysis, particularly in the areas of consumables, special polymers and health care. The main areas of expertise include, in addition to the characterization of nanostructures, the production of numerous nanoparticulate and nanocomposite materials, the encapsulation of active substances as well as the development of nanoparticle-based biological and medical markers.

CAN GmbH
Grindelallee 117
20146 Hamburg
Germany

P +49.40.428 38 - 49 83
F +49.40.428 38 - 57 97
info@can-hamburg.de
www.can-hamburg.de