Center for Applied Nanotechnology

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Successful Despite the Crisis

CAN GmbH Ended 2009 as its Most Successful Business Year so far

“Despite the economic crisis and the difficult market environment anticipated for new research and development business, 2009 – our fourth business year – ended as our most successful so far. In addition to ongoing projects, new cooperative and externally funded projects were secured and the focus on the Cosmetics/Flavours, Medicine/Medical Technology and Technical Applications business segments intensified,” said Dr. Frank Schröder-Oeynhausen, Chief Operating Officer of CAN GmbH, in summarising the past year.

Sales revenue and income from project funding in the amount of € 1.3 Mio could be stabilized on the level of the previous year. CAN GmbH managed to strengthen its leading position in technology in the field of nanoparticle synthesis, “Schröder-Oeynhausen continues. “In the past year we applied for six new patents for nanotechnology innovations, thus laying the foundation for professional utilization of this knowhow,” said Prof. Dr. Horst Weller, Chief Scientific Officer of CAN GmbH.

The beginning of the business year 2010 saw the start of “CAN-Internal Projects” which will further expand CAN’s own technology platforms. In these projects designed to last 12 to 18 months focusing on cosmetics, nanoparticle syntheses, encapsulation and bioconjugation findings from university research will be used for development and testing of prototypes. The aim of the projects is to elaborate more unique selling points and generate applications for patents and property rights. Internal projects support not only activities in ongoing external funding projects but also collaborations with our industrial customers.

For the year 2010, the chief officers expect positive developments of sales revenues. The activities of CAN GmbH will increasingly be geared towards economic goals in order to make all business segments profitable in the medium term as units with profit responsibility. For expansion of the sponsor association model we will be looking for new strategic partners in the areas of medicine/medical technology and renewable energies (solar technology, fuel cell technology).

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VIBRANT Kick-off Meeting in Hamburg

On 6th of November 2009 all leading scientists of the VIBRANT consortium together with the EU commissioner Dr. Cristina Gabellieri convened in Hamburg for the project's kick-off. Nine institutions represent the "Axis of Excellence", which runs from Umea in Northern Sweden along the cities of Stockholm, Copenhagen, Hamburg, Bremen, Brussels and Leuven to Barcelona in Northern Spain. The meeting on the nanomedicinal project "VIBRANT" served for getting acquainted to each other and for the coordination of the oncoming research activities. The ultimate goal of VIBRANT is the noninvasive determination of the insulin producing cells of the human pancreas, in order to improve the early diagnosis of diabetes and to gain novel insights into approaches for remedies. In short lectures the top scientists introduced themselves and presented their expert knowledge. Hamburg based Professors Horst Weller, Stefan Foerster and Joachim Thiem cover expertise in nanoparticle and carbohydrate synthesis. Five leading European diabetologists, namely Professors Per-Olof Berggren from Swedish Karolinska Institute, Thomas Mandrup-Poulsen from Danish Hagedorn Research Institute, as well as Willy J. Malaisse (together with his colleague Abdullah Sener) from Free University of Brussels and, last not least, Kathrin Maedler from the University of Bremen participate in VIBRANT. The specialist in medical imaging is Prof. Uwe Himmelreich from the Catholic University of Leuven. Finally, the cross validation of the results will be performed by Professors Ulf Ahlgren (Umea) und James Sharpe (Barcelona) using a highly innovative technology called Optical Projection Tomography (OPT). In charge of the VIBRANT project coordination is Theo Schotten, Ph.D. from CAN GmbH.

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Presenting "VIBRANT" at the Diabetes Fair 2010

With eight million diabetics and four million at risk in Germany, the need for information, prevention and treatment of the No. 1 metabolic disease is increasing dramatically. At the Diabetes Fair 2010 from 26 to 28 February in Münster, CAN Project Coodordinator Dr. Theo Schotten will present for the first time to professionals and the interested public the major EU project "VIBRANT" (www.fp7-vibrant.eu) initiated and coordinated by CAN GmbH. Interested companies in the drug industry involved in research are invited to join the "Industrial Advisory Board" (IAB) associated with VIBRANT. The IAB will receive privileged information on the research topics during the project duration. The aim is to incorporate the expertise in drug

development contributed by the IAB into the late preclinical development of a contrast agent for quantification of the beta-cell mass and facilitate transition to the clinical phase. Participation in the IAB is free of charge.

The Diabetes Fair in Münster will promote an intensive exchange of information among the industry, scientists, physicians, medical professionals and patients in an unusual national forum on the topic of diabetes mellitus. More than 8,000 visitors are expected. The Diabetes Fair offers certified continuing education courses targeting all professional groups (physicians, pharmacists, advisors, etc.) and is supported nationally and CME-tested by organizations and professional bodies. Symposiums published for specific professional groups, meet-the-expert sessions, workshops and interactive prevention forums guarantee continuing education at a high level. For further information: www.diabetes-messe.com

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"A Completely New Thinking about Cosmetics and their Application"

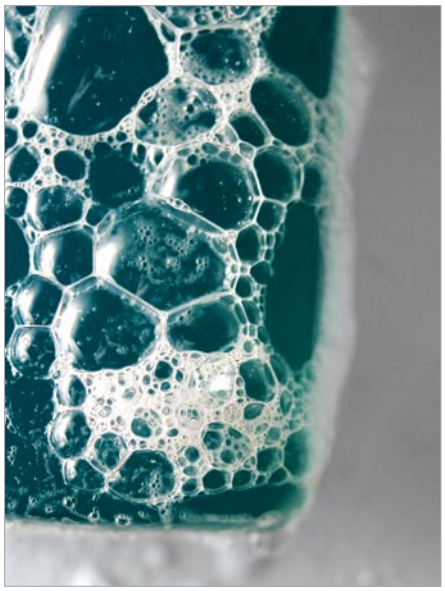
Interview with Dr. Aleksandrovic-Bondzic about Nanotechnology and Cosmetics

Dr. Aleksandrovic-Bondzic, what are your main responsibilities at CAN GmbH?

I am the project leader and focus team coordinator for the Cosmetics Department at CAN GmbH. As the project leader, my job includes coordinating projects with our partners in the industry, developing new ideas for ongoing projects, making plans for laboratory work and seeing deadlines are met. As the focus team coordinator, I coordinate meetings where we as a team develop new ideas and plan studies for CAN that will ensure further development of the Cosmetics Department.

Cosmetics are already almost considered a classsical nano research area – where do you see the biggest challenges in the future?

Nanotechnology in cosmetics emerged over 40 years ago with the use of liposome technology in moisturizing creams. Nanotechnology was first used to increase the shimmer and solubility of certain active materials. Today, however, nanotechnology is much more common in cosmetic products and has many more applications. These range from the already well-known sun care



products containing ZnO and TiO2 nanoparticles that allow production of clear, transparent products to different products containing polymer nanoparticles as delivery systems that enable better penetration of active materials through the skin to the recently launched creams containing gold or platinum nanoparticles as anti-aging agents. The main aim of nanotechnology today is and probably in the future will be to enable cosmetics with better, longer-lasting efficacy that can reach areas "normal" technology cannot. Additionally, nanotechnology could be used to achieve more specific and targeted efficacy for products that are more cosmeceuticals than cosmetics. Future applications of nanotechnology will be found more in the areas of anti-aging and lifting products or in the treatment of special types of skin or skin diseases, including better repair and revitalization of the skin and hair.

What are the typical inquiries that CAN GmbH receives in the area of nano cosmetics from the industry?

We receive different requests from our partners in the industry. Some of them have to do with problem solving, especially in cases where they think that the application of nanotechnology is the solution to a specific problem. Some requests are related to more fundamental research where it is our job to investigate some phenomena or systems and learn more about mechanisms or the behavior of systems. Finally, we also have projects where we are supposed to develop completely new systems or products for our customers based on our knowledge and expertise in nanotechnology.

What legal requirements will the new EU Cosmetics Directive bring with it as of 2012?

Over the last years the discussion on the use of nanomaterials particularly in cosmetics and possible risks to human health has been raised from the scientific level to the legal level. The risk discussion in relation to nanotechnology centers on the extremely small size of nanoparticles and the risk of penetration through the skin or, when taken orally, into other tissues. Therefore the European Commission concluded that in the case of nanomaterials the implementation of legislation needs further elaboration. The use of nanoparticles in cosmetics is to be judged in accordance with the regulations in the EC Cosmetics Directive (76/768/EEC).
At the end of November the EU Member States adopted new rules on the marketing and safety of cosmetics,

grouping the existing 55 directives into a single regulation, strengthening consumer protection:

- The manufacturer or importer of a cosmetic product has to assess the safety of the product prior to placing it on the market and document this. This has to be done taking „into consideration the general toxicological profile of the ingredients, their chemical structure and their level of exposure“ (Art. 7a (1) (d) Cosmetics Directive 76/768/EEC).
- Every nanomaterial should be described in terms of size, physical properties and chemical properties. The quantity of nanomaterials in a cosmetic product should be known, as should be the toxicological profile, safety data and reasonably foreseeable exposure conditions.
- For every cosmetic product that contains nanomaterials, a high level of protection of human health shall be ensured.
- Companies are obliged to print the word ‚nano‘ in brackets after any ingredient which is smaller than 100 nanometres in size, where definition of nanomaterials, according to law, is „an insoluble or biopersistant and intentionally manufactured material with one or more external dimensions, or an internal structure, on the scale from 1 to 100 nm“.

Due to these new rules for nanomaterials, we at CAN take our responsibility for materials that we investigate for further cosmetics application very seriously. We do parallel investigations on the performance of a nanomaterial and its potential toxicity.

Could you give us a peep behind the scenes – what can you tell us about your current work for the cosmetics giant Beiersdorf AG?

Beiersdorf is our biggest industrial partner in the cosmetics area. In the last few years we have worked with Beiersdorf AG on different projects. Up to now we have been developing new ingredients for cosmetic products. Thanks to efficient cooperation with the experts from Beiersdorf AG we have managed to develop new ingredients that show very good properties. They are now in the scaling up process and should be produced on a larger scale very soon. Additionally, we have a project dealing more with basic research on certain ingredients where we use nano-based systems as a model for our investigations.
From next year on another project is planned that should involve further studies on nanotechnology and nanoparticles for potential use in cosmetic products from Beiersdorf.

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CAN Cosmetics Department at a glance

The Cosmetics Department is part of CAN GmbH's Consumer Specialities Business Unit, which encompasses Household Care and Personal Care. The product range includes thickeners, antibacterial nanoparticles, polymer-based encapsulation materials and fluorescent nanoparticles. Extensive knowhow in the production of custom-made nanostructures forms the basis for specialized technological product solutions. Working closely with the customer, CAN GmbH develops nanostructure systems that meet the customer's requirements. For example, self-organization of polymer chains allows production of specific thickeners of interest for many fields of application. Similar polymer-based nanostructures, so-called micelles and vesicles, can be used for encapsulation of fragrances and colorants or – still in theory only – as biologically safe carrier systems for drugs or contrast agents.

Our expertise in nanoparticle and polymer synthesis makes the development of a wide variety of special products possible. By selectively modulating the surface of nanoparticles they can be given special properties. For example, hydrophobic and hydrophilic surface properties play an important role in the formulation of new hair care products. For any inquiries about these technologies or other related fields please feel free to contact the team at CAN GmbH.

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CAN at the MicroNanoTec/Hannover Messe 2010

The world's most important technology fair will be open from the 19th to 23rd of April 2010. This year CAN GmbH will be present at MicroNanoTec in the IVAM Product Market in Halle 6, Stand B3. Featured besides current developments in safety labels (CANdots® Series A, M and X) will be antibacterial functional films and cosmetic products. By organizing the "Micro, Nano & Materials" Product Market, the international association for microtechnology, nanotechnology and new materials (IVAM) will help CAN GmbH create decisive competitive advantages and new industrial contacts (www.ivam.de).

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CAN in Chicago at BIO 2010

CAN GmbH will represent the Northern German nano location at the "BIO 2010 International Convention" (http://convention.bio.org) again this year from 3 to 6 Mai in Chicago at the joint "Life Science Nord" booth. In the USA the CAN GmbH will present the many potential applications of nanobiotechnology to international customers from the pharmaceutical industry and medical technologies area. CAN GmbH will focus specifically on finding project partners and strategic partnerships for the Medical Applications business segment.

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CAN at the Nanotech Conference & Expo 2010

From the 21 to 25th of June CAN GmbH will be in Anaheim at the Nanotech Conference & Expo 2010 (www.techconnectworld.com/nanotech2010), the world's largest trade show for nanotechnology. Now in its 13th year, Nanotech expects over 5,000 attendees and 350 exhibitors. As last year the CAN GmbH is partner of the shared VDI stand.

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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.

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