

The Austrian NANO Initiative Small Country with Strong Expertise

M. Haas and E. Glenck

Austrian Research Promotion Agency (FFG)
Canovagasse 7, A-1010 Vienna, Austria
margit.haas@ffg.at, emmanuel.glenck@ffg.at
www.nanoinitiative.at or www.nanoforum.at

ABSTRACT

The Austrian NANO Initiative is the multi-annual public funding programme for nanoscale sciences and nanotechnology. It coordinates different action lines at national and regional levels. The Austrian Research Promotion Agency (FFG) runs the programme on behalf of the Ministry for Transport, Innovation and Technology (BMVIT). This initiative is supported by further Ministries, States and funding agencies. The public annual budget is EURO 10-15 m. In 2004, five outstanding clusters consisting of 39 projects were selected after an international evaluation procedure. 11 Universities, 12 companies and 2 Centres of Competence are leading the clusters.

The topics are:

- o diamonds for biotechnological applications
- o new materials for drug targeting, release and imaging
- o integrated organic sensors and optoelectronics
- o coatings for multifunctional surface design
- o nanostructured surfaces and interfaces

Keywords: Austrian NANO Initiative, public funding programme, biotech, organic sensors, coatings, surfaces

1 AUSTRIAN NANO INITIATIVE

Nanotechnology is a strategic focus for Austrian research and industry. The strategic objectives are to strengthen and network the Austrian players in science and industry and to build critical masses by clustering competencies in large scale R&D Projects. Feasibility studies enable the early identification of R&D-project ideas with high potential. Training and education measures will support scientific and industrial staff.

The Austrian NANO Forum is the national information and communication platform open to all players and networks in Austria. A strong financial support for networking activities is therefore provided both in a national and an international context.

Relevant information on the Austrian NANO Initiative is provided under:

www.nanoinitiative.at and www.nanoforum.at

1.1 Strategic Goals

The strategic goals are:

- o Mid/long term cooperation and networking between scientists and companies to develop new technologies and systems.
- o Building critical masses for positioning the Austrian NANO players in international competition.
- o Strengthening the national and international RTD cooperation.
- o Increase the know-how through education and training.
- o Building and expanding infrastructure as well as building centres in basic research and in application-oriented special fields.

1.2 Measures

The Austrian NANO Initiative encompasses 4 programme action lines:

1. Research and Technology Development Project Clusters
2. Networks and Confidence Building
3. Training and Education Measures
4. Accompanying Measures

The NANO Initiative addresses all NANO players from university and research institutions, as well as enterprises located in Austria. International partners are welcome to participate in all Programme Action Lines.

The objective of the project clusters is to develop new processes and applications, building on nanoscience findings. In a project cluster, several research institutions and enterprises cooperate in projects of several years, ranging from basic research to industrial research and technology development. The five outstanding clusters are introduced in chapter 3.

Confidence building activities are relying on new industrial requirements or the valorisation of new R&D results in companies. This exploring activity aims at investigating the possibilities of developing new functionalities and/or new

specifications with a high risk and a high economic potential in a feasibility study.

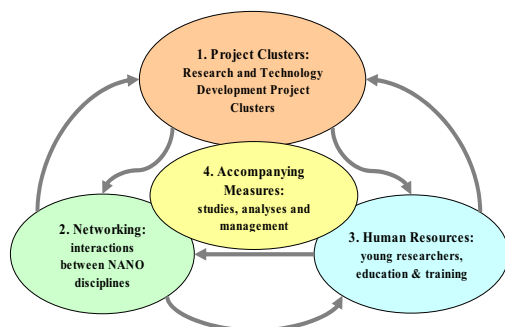


Figure 1: Four Programme Action Lines

Training and Education Measures aim at building up and increasing the human resources required for ensuring the qualitative and quantitative growth of NANO in Austria whereas Accompanying Measures support the strategic orientation of the NANO Initiative.

2 STRONG AUSTRIAN EXPERTISE

One of the main goals of the NANO Initiative is to initiate long lasting co-operations between industry and science. Therefore the first call focused on both the scientific-technological excellence of the projects and on their economic potential to successfully develop technologies or new functionalities. For the period 2004 - 2006 altogether 35 millions EURO are provided for all programme action lines.

3 OUTSTANDING NANO CLUSTERS

The first five successful Austrian NANO project clusters have started their ambitious research and technological development work.

3.1 NaDiNe

The project NaDiNe “Nano Diamond Network” unites seven projects and fifteen partners. The ultra-nano-crystalline diamond (UNCD) has excellent properties to be used as material for biotech applications. The main topics are cell engineering, nano-biosensors, MEMS and NEMS. The Competence Centre Medicine in Tyrol (KMT) coordinates the project cluster together with the company Rho-BeSt coating [1].

3.2 Nano-Health

NANO-HEALTH “Nanostructured Material for Drug Targeting, Release and Imaging” is coordinated by JOANNEUM RESEARCH and focuses on the development of new therapy solutions for diseases such as diabetes and Alzheimer applying innovative nano-particles. The cluster deals with new strategies using nano-techniques to deliver active substances to specific targets and organs [2], [3]. This will open new opportunities in invasive therapy forms, but also will drastically improve the quality of life of the patients.

3.3 Isotec

ISOTEC “Integrated Organic Sensor and Optoelectronics Technologies” – lead by JOANNEUM RESEARCH and the University of Technology in Graz – will open new opportunities in the combination of new organic semiconductors as well as structuring and production methods applicable for sensors and optoelectronics [4], [5].

3.4 Nanocoat

NANOCOAT “Development of Nanostructured Coatings for the Design of Multifunctional Surfaces” is coordinated by the Materials Competence Centre in Leoben (MCL) and focuses on the development of concepts for suitable manufacture technologies to design multi-functional surfaces and interfaces. The focus is put on friction layers with additional functions like auto-lubrication or anti-adhesive effects. The application fields are tool and manufacturing units coatings as well as functional coatings (e.g. consumer goods) [6], [7].

3.5 NSI

NSI “Nanostructured Surfaces and Interfaces” is lead by the NanoScience & Technology Centre in Linz (NSTL). The main topics are biocompatible nano-structures, polymers and nanocomposites as well as metal surfaces and interfaces [8], [9].

REFERENCES

- [1] www.nanoinitiative.at or www.nanoforum.at
- [2] A. Bernkop-Schnürch, A.H. Krauland, V.M. Leitner, T. Palmberger, Thiomers, „Potential excipients for non-invasive peptide delivery systems”, Eur. J. Pharm. Biopharm., Vol. 58, 253-63, 2004.
- [3] M. Junghans, J. Kreuter, and A. Zimmer, “Antisense delivery using Protamine - oligonucleotide – particles”, Nucleic Acids Res. Vol. 28, E45, 2000.
- [4] C. Suess, F. P. Wenzl, G. Jakopic, M. Wuchse, S. Muellegger, N. Koch, A. Haase, K. Lamprecht, M. Schatzmayr, C. Mitterbauer, F. Hofer, G. Leising,

- „Combined XPS, AFM, TEM and ellipsometric studies on nanoscale layers in organic light emitting diodes”, *Surface-Science*, Vol. 507-510, 473-9, 2002.
- [5] M. Gaal, Ch. Gadermaier, H. Plank, E. Moderegger, A. Pogantsch, G. Leising, E.J.W. List, „Imprinted Conjugated Polymer Laser”, *Advanced Materials*, Vol. 15, 1165-67, 2003.
- [6] P.H. Mayrhofer, P.Eh. Hovsepian, C. Mitterer, W.-D. Münz; “Calorimetric evidence for frictional self-adaptation of TiAlN/VN superlattice coatings”, *Surf. Coat. Technol.* Vol. 177-178, 341, 2004.
- [7] J. M. Lackner, W. Waldhauser, R. Ebner, B. Major, T. Schöberl, “Pulsed laser deposition of titanium oxide coatings at room temperature - structural, mechanical and tribological properties”, *Surf. Coat. Technol.* Vol. 180-181, 585, 2004.
- [8] J. Hesse, M. Sonnleitner, A. Sonnleitner, G. Freudenthaler, J. Jacak, O. Höglinger, H. Schindler, G.J. Schütz, "Single molecule reader for high-throughput bioanalysis", *Anal.Chem*, Vol.76, 5960-5964, 2004.
- [9] L. D. Sun, M. Hohage, P. Zeppenfeld, R. E. Balderas-Navarro, and K. Hingerl, “Enhanced Optical Sensitivity to Adsorption due to Depolarization of Anisotropic Surface States”, *Phys. Rev. Lett.* Vol. 90, 106104, 2003.