EULASUR

Network in Advanced Materials and Nanomaterials of industrial interest between Europe and Latin American Countries of MERCOSUR (Argentina-Brazil-Uruguay)

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D1.1 First EULASUR Summer School

"Properties and Applications of Nanomaterials"
Hotel Amancay, Bariloche, Argentina, 3-8 October 2010

Partners organizers: CNEA, DESY, UPMC
Local Organizers: CNEA, Carlos A. Balseiro and Nicolas Tognalli
Director of the School: Carlos A. Balseiro
Secretary: Ana Emilia Ronco
Latin-American Students Selection Board: Maria Jose Sanchez, Gonzalo Usaj, Maria Luz Martiarena, Nicolas Tognalli, Adriana Serquis

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Project Coordinator: Prof. Carlos Miravitlles Torras
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EULASUR SUMMER SCHOOL AND WORKSHOP
PROPERTIES AND APPLICATIONS OF NANOMATERIALS
OCTOBER 3-8 2010
BARILOCHE, ARGENTINA
EULASUR
NETWORK IN ADVANCED MATERIALS AND NANOMATERIALS OF INDUSTRIAL INTEREST BETWEEN EUROPE AND LATIN AMERICAN COUNTRIES OF MERCOSUR (ARGENTINA-BRAZIL-URUGUAY)
For scholarships and further information please visit:
www.icmab.es/eulasur; or contact: eulasur.bariloche@cab.cnea.gov.ar
SEVENTH FRAMEWORK PROGRAMME

Contents Page

Contenido

1. Summary of Summer School

First EULASUR Summer School "Properties and Applications of Nanomaterials" was held as expected from the 3rd to 8th of October at the Hotel Amancay, Bariloche (Argentina).

The geographic location of this hotel, next to the Nahuel Hapi Lake and at 20Km from the center of the city San Carlos de Bariloche, provided incomparable expectations, a unique view and an ideal working environment.

The hotel was a classic mountain hotel, comfortable and cozy, with different rooms for the organization of the conferences, and equipped with WiFi. Breakfast, lunch and dinner were based on traditional local dishes. From a general environment point of view, the hotel was a perfect place where all attendees and students could live together and share the Summer School experience.

From this point of view local organizer has to be congratulated, particularly the Director of the School who chose the location and was permanently available to solve any small inconveniences that could appear.

Altogether, 95 people attended the School, among them students (65), Lecturers, Professors, EULASUR Advisory Board members and other senior staff from project partners, among them 26 came from Europe and 76 from Latin America.

During the School 24 conferences were delivered followed by corresponding debates between Professors and students, and 2 poster sessions were held.

In the points 2 and 3 of this report, titles and a summary of these presentations are enclosed, and Annex 6 contains all presentations delivered whose authors allowed publication. Likewise, Annex 5 includes CVs of all Professors and senior staff who participated in this event.

At the same time, a EULASUR Governing Council Meeting was held as described in point 6 of this report.

Finally, a Workshop organized by Leif-Bloch Rasmussen, Janni Nielsen and Maja Horst from the Copenhagen Business School and Susana Garelik from the ICMAB, was held simultaneously to the Summer School. Divided in 3 different sections "Grounding EULASUR", "Research Perspectives in Projects" and "Scientific Social Responsibility" this Workshop gathered Professors (while they weren't in the plenary conference room) and other senior staff from partners facilitating them to know each other and to participate together in different exercises to develop common potential projects. Point 4 of this report explains in detail this activities and Annexes 1, 2 and 3 include resultant documents of the Workshop and conclusions from Prof. Alejandro Goñi who was required by the Coordinator to write small conclusions.

To sum up, with the School, Workshop, debates for the development of new projects, and scientific discussions at very different levels, we can state that there was an intense interaction

among participants, mainly among the youngest ones, and that time considered was a little short and schedule a little tight as only programmed visits could be done and no free time could be fitted in the schedule. This interaction also favored the planning of student exchanges from BRAU to Europe and viceversa.

2. Summer School Programme

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
9:00		**Spintronics** L. Steren Julie Grollier	**Chemistry & Nano** E. Calvo Sophie Cassaignon	**Business and Nano** J. Nielsen L. Bloch Rasmussen	**Bio&Nano** B. Maggio	**Surfaces and Molecules** O. Grizzi R. Salvarezza
11:00	Coffee Break					
11:30		Julie Grollier	G. Soler Illia	Laura Lechuga	E. Jares-Erijman	Sergio S. Funari
12:30	Lunch					
14:30		**Applications** Paulo Freitas	**Applications** C. Aymonier	**Visit to Labs**	**Applications** Nieves Casañ	**Applications** R. Gehkke
15:30		M. Treguer	F. Williams		F Stefani	**Workshop conclusions and Closing remarks**
16:30	Coffee Break				Coffee Break	
17:00		Understandig Innovation. Coordinators J. Nielsen L. Bloch Rasmussen	Understandig Innovation. Coordinators J. Nielsen L. Bloch Rasmussen		Understandig Innovation. Coordinators J. Nielsen L. Bloch Rasmussen	
18:00	Opening Welcome to Participants and Students	18:30 Jose Rivas	Poster Session		Poster Session	
20:00		Dinner				

3. Summary of Conferences

MONDAY

9:00 Laura Steren "*Spin transport in nanostructures*"
10:00 Julie Grollier "*An Introduction to spintronics*"
14:30 Paulo Freitas "*Spintronic devices for biological and biomedical applications*"
15:30 Mona Treguer "*Gold nanoparticles: properties and applications in physics, biology and catalysis*"
17:00 Lief Bloch Rasmussen & Janni Nielsen "*Understanding Innovation*"
18:30 José Rivas "On the International Iberian Nanotechnology Laboratory"

TUESDAY

9:00 Ernesto Calvo "*Nanochemistry*"
10:00 Sophie Cassaignon "*Morphological control of nanoparticles of metallic oxide : towards the control of the electreochemical properties*"
11:30 Galo Soler Illia "*Properties and Applications of Nanomaterials*"
14:30 Cyril Aymonier "*Coupling chemistry and chemical engineering in supercritical fluids for the synthesis of advanced nanostructured materials*"
15:30 Federico Williams "*Nanotechnology in the steel industry*"
17:00 Lief Bloch Rasmussen & Janni Nielsen "*Understanding Innovation*"
18:00 Poster Session

WEDNESDAY

9:00 Lief Bloch Rasmussen
10:00 Janni Nielsen
11:30 Laura Lechuga
14:30 Visit to INVAP or Centro Atómico Bariloche

THURSDAY

9:00 Bruno Maggio "*Controlled Self-Assembly, Structural Dynamics, and Biocatalysis in Nano-BioSurfaces*"
11:30 Eli Jares-Erijman "*Nanoparticles for biological applications*"
14:30 Nieves Casañ "*Electroactive Materials, Intercalation and Electrochemistry, for Bio Applications*"
15:30 Federico Stefani "*Visualizing and controlling vibrational wavepackets of single Molecules*"
17:00 Lief Bloch Rasmussen & Janni Nielsen "*Understanding Innovation*"
18:00 Poster Session

FRIDAY

9:00 Oscar Grizzi "*Surface characterization in ultra high vacuum*"

10:00 Roberto Salvarezza "*Self-assembled monolayers as structural and functional elements in Nanotechnology*"
11:30 Sergio Funari "*Potential of SAXS for characterization of nanomaterials*"
14:30 Rainer Gehrke "*Metal deposition on nanostructured polymer surfaces*"
15:30 Workshop conclusions and Closing remarks

Spintronics

The first topic covered in the Summer School has been Spintronics (Spin Transport Electronics). The incorporation of magnetism (spin changing) in the field of electronics (current changing) is one of the current challenges of nanotechnology. The advances in nanomaterials preparation and manipulation in the past 30 years had led to huge improvements concerning the magnoresistance of materials, especially the discovery of the Giant Magnetoresistance (GMR) effect, which has been crucial for the development of competitive Spintronic devices. Laura Steren and Julie Grollier introduced this emerging research field, covering the basics of the GMR effect and how it can be applied in Spintronic devices. They have also reviewed the different materials and nanostructures used in Spintronics, from the first coupled multilayers with current in the plane (CIP) to the spin valves and the use of tunnel junctions and semiconductors with current perpendicular to the plane (CPP). Regarding to the materials, the use of perovskite oxides and manganites as substrates has been showed (where a change in the oxide composition results in a change in the physical properties of the GMR), and also the use of organic molecules to prepare organic Spintronics (biocompatible devices).

Julie Grollier, in the second talk, explained her work in the use of the spin transfer effect for microwaves (MW) generation. Using this technique, tuneable oscillators can be obtained, where a change in the magnetic field results in a change of the emission frequency. This emission is extremely pure and high frequencies (up to 40GHz) can be directly obtained. The main drawbacks of this MW generation are the weak emitted power and the need of a large magnetic field, but several modifications of the systems using synchronised arrays and vortex oscillators are being studied to solve these limitations.

To finish with the Spintronics topic, Paulo Freitas explained the possibilities of these devices concerning its applications. Magnetoresistive (MR) sensors are characterized by high sensitivity to measure small changes in magnetic fields. Most of its commercial applications are in data storage devices, but recently there are high efforts to build MR-based biochip platforms, for the detection of a wide range of biological events (DNA matching, cancer cell counter, brain signals measure,...).

Chemistry & Nano

To start with the Chemistry & Nano topic, Mona Treguer has introduced the basics of the nanoscale chemistry by explaining the specific properties of nanoparticles (NPs) compared to bulk materials. She has focused on NPs high surface and optical transparency, and how they can show different properties by controlling its size and its shape, and also adding a chemical function on the surface for a further material synthesis or self assembly. After this introduction, she presented her work in gold NPs, and how they can interact with atomic oxygen, CO, H_2 or NO (while bulk Au cannot), and when ultrasmall NPs (less than 2nm) are synthesised, very interesting properties are detected such as metallic/semiconductor behaviour or the reaction with O_2. Several potential applications for these gold NPs can be considered, such as optical applications (the existence of Surface Plasmon Resonance can be used for information transport), biomedical applications (ideal size to travel inside human body, biocompatible and stable, diagnosis and imaging, photo and radiotherapy) and catalysis (highly effective oxidation of CO).

Inside this chemistry block, Ernesto Calvo got deeper into self assembly, explaining the different types of recognition between two molecules. Self assembly can be static or dynamic, and can be achieved by anchoring procedures, supramolecular recognition (i.e. hydrogen bond), coordination and layer by layer deposition. In the case of surfaces preparation, different physical and chemical properties can be obtained by controlling the type of interaction between layers. Sophie Cassaignon focused on the synthesis and the structural and morphological control of titanium and manganese oxides NPs. She explained three synthetic strategies: (1) alkalinisation at low temperature, (2) thermohydrolisis in acidic medium, and (3) redox controlled synthesis. NPs design will mainly depend on the strategy used (kinetic or thermodynamic control), ion concentration and temperature.

Following talk, by Galo Soler, has also introduced the importance of molecular chemists in nanotechnology, whose main role is the preparation of precursors that may latter have an extended connection to form aggregates in a controlled way. These will go through surface functionalization and control of the size, shape and philicity of the nano building block. After the introduction, he explained the templating concept and his work on the preparation of mesoporous materials using micelles as templating agents to generate materials with different porous size (2-50nm). This kind of materials has potential applications as membranes, sensors and catalysts.

A different method for the synthesis of nanostructured materials has been presented by Cyril Aymonier, who works in the synthesis of NPs in supercritical fluids (SCF). Two main processes have been considered: (1) organic particle design based on physical transformation (solute + SCF), and (2) inorganic particle design based on chemical transformation (reagents + SFC). He also explained the evolution of the method to supercritical microfluids to increase precision in reaction conditions (reproducibility), allow fast screenings and online characterization, use less volume, and obtain NPs with narrower distribution size.

In terms of industrial applications, Federico Williams has made a very good insight on how nanotechnology can have an impact in all kind of industries. The preparation of new materials with specific properties, such as high resistance, self-healing or antibacterial surfaces may contribute to the improvement of well established materials in mature industries. As the main example, he explained his contribution to the steel industry, by protecting steel mandrels with 5-10nm Cu^{3+} NPs layer to increase their lifetime (increasing the resistance at high temperatures and pressures) more than 10%. In the same field, he explained (1) a method to mark the mandrels for traceability (resistant to working conditions) using an electrochemical system based on electroplated nanostructured metals, (2) the use of fluorescent NPs for wear detection (different colour at different depth of the mandrel), and (3) the preparation of self lubricating coatings, by using multilayer materials and oil containing microcapsules.

Business & Nano

Janni Nielsen and Lief Bloch Rasmussen were in charge of this topic to show another face of nanotechnology implications: its impact on society. J. Nielsen focused her talk on scientific social responsibility. She started with some cases and events that increased the lack of confidence of society towards scientific community, followed by a detailed example of a vain attempt to insert Information technology (IT) in rural India, a project which completely missed the target. By these examples, she showed the importance of understanding the target group and to keep people and society aware and up to date of changes and possibilities (of nanotechnology in our case). By the other hand, L. B. Rasmussen centred his talk in a more technical way, giving some conceptual guidelines for design, innovation and entrepreneurship, emphasizing the importance of collecting data to know the people. He reviewed the process to develop and start new projects, and the importance of the equilibrium between economic growth and competitive advantage with sustainable development and social cohesion. To finish, he highlighted the power of IT new capabilities and the recent impact of social networks, which must be considered as a tool for the project development.

Laura Lechuga talk has been a good example of how a new technology developed in a lab can be transferred successfully to the industry to be commercialized and used by people. In her case, the objective has been the development of a point of care device (lab-on-a-chip) with on-chip detection using optoelectronic based biosensors. These devices will allow different health analysis in real time at any place, taking action immediately and without going to a hospital. A market analysis for this kind of devices is really positive, with not only diagnosis applications but also environmental control, food safety or homeland security, with a high impact in society and economics.

For the development of the device, a multidisciplinary research is required, with a previous selection of the technology that will be used such as the kind of sensors (i.e. SPR), the detection (i.e. evanescent wave detection) and other considerations.

When the device is working, one of the possibilities to introduce it in the market is the creation of a spin-off company to produce and commercialize the product. To build the company, a

strong financial support as well as a team of business experts is needed. Then, the process may go through the creation of a prototype followed by finding an industrial partner to start its industrialization.

She told her experiences in the creation of two spin-off companies (SENSIA and BIOD) and showed some recommendations to overcome with this process.

Bio & Nano

The first insight in the Bio&Nano topic has been made by Bruno Maggio, who presented the use of the bottom-up approach for the organization of biosurfaces from the nanoscale to the supramolecular response. To control the transmission of events from the molecular to the supramolecular level, and of the related biochemical and cellular events, it is necessary to understand the structural dynamics of the formation, segregation and distribution of lipid and protein domains on biomembranes. B. Maggio showed his work in this area, on how it is possible to control the size, shape and organization of the domains at the interfases, and what are the effects regarding their biological activity.

The following talk carried out by Elisabeth Jares-Erijman was fundamentally about the use of Quantum Dots (QDs) for biological issues. QDs can be excellent probes for imaging structures and functions of living cells due to their narrowband emission, brightness, photostability, broadband absorption, water-media possible and biocompatibility. Elisabeth showed her work on the surface functionalization of QDs with ligands that can recognize specific targets and track processes in living cells, for example, QDs carrying epidermal grow factor and track how it is bound to its receptor on the cell surface. She also devoted a small part of the talk to explain the uses of the FRET (Förster Resonance Energy Transfer) to get information about the cellular processes using QDs as FRET donors.

Nieves Casañ, in the third talk of the topic, began with an introduction about electroactive materials and its properties and potential applications in energy storage or sensors. She showed some of her work in this kind of materials, such as hybrid organic-inorganic materials based in Polyoxometalates and conducting organic polymers, or the ability of the structures of $AgCuO_2$ and $AgCu_{0.5}Mn_{0.5}O_2$ to reversibly host the lithium ion. After this introduction, she talked about the possible biological application of these kinds of materials to the nervous system. An example of a current application is the production of deep brain electrostimulation to reduce 90% of Parkinson symptoms. However, the efforts are now in finding efficient ways to regenerate or grow neural cells using biocompatible materials, and some preliminary results were showed using polymer encapsulated Iridium oxides.

Fernando Stefani divided his talk in two parts. The first part, has been an explanation of a method for observation and manipulation of vibrational wave-packet interference in individual molecules at ambient temperature. This single-molecule approach can give information about biomolecular interactions, cellular processes or the dynamics of supercooled liquids. In his experiments, he embedded a photostable chromophore in a thin polymer film in low

concentration to allow individual molecules to be spatially resolved in an epifluorescence confocal microscope, where they were excited with a sequence of up to four phase-locked laser pulses. At the second part of the presentation, he showed some applications of gold NPs, for the manipulation of light (taking advantage of the plasmotics to generate optical antennas, nanoscale light emitters or nanostar biosensors), heat (heating immobilized gold NPs on living cell membranes to move them, melting the membrane in a controlled way and generating paths), and forces (attaching NPs using colloidal interactions for laser printing) at the nanoscale.

Surfaces & Molecules

Oscar Grizzi started the topic Surfaces&Molecules by presenting the importance of controlling and characterizing surfaces: in nanoscale materials there's a lot of surface area, it can be functionalized and it is the part of the material or the particle that will communicate with other entities. Surface properties are defined by the composition, the atomic structure, the electronic structure and may be modified by the response to an external excitation. The surface can be a product of a self organized grow (mesoscale force fields, kinetic limitation) or a product of a self assembly process (several types of forces/interactions between molecules and surfaces). There is a range of tools to characterize this systems, depending on what (electrons, ions, photons, fields,...) will interact with the surface, for example microscopy techniques (direct image, local information), diffraction techniques (simple and fast for interatomic distances and positions, symmetry of surface) or spectroscopy techniques (composition, electron transfers,...). After reviewing some techniques for surface study, he showed an example of the determination of a free thiol on a metal surface.

Next talk by Roberto Salvarezza, was more focused on the preparation of well defined surfaces by taking advantage of organic chemistry and coordination chemistry flexibility. He talked about self assembly monolayers (SAMs) with organic molecules such as thiol or dithiol SAMs on metals (Au, Ag, Cu, Pd, Ni). These molecules have (1) a "reactive head" (a sulfur) which is absorbed on the metal surface (different proposals for the absorption position and mechanism has been discussed), (2) an hydrocarbon chain, and (3) a terminal group (another sulfur in the case of dithiols) that determine surface properties, can react with other organic molecules to change these properties, or can stabilize NPs.

Leaving the preparation of surfaces, Sergio Funari presented the potential of X-ray Scattering (XS) for structural analysis. He started with an introduction of synchrotron radiation, how photons interact with matter and how electron density (form factor) and crystallographic planes (structure factor) contribute to the scattering phenomena. He continued explaining how to extract information from peak position (dimensions, structure), intensity (amount of long range order) and peak broadness (extension of long range order). After this introduction, he showed several examples of the combination of SAXS (Small Angle XS) and WAXS (Wide Angle XS) to get structural evidences of different kinds of samples, using SAXS to see if there is long range order, and WAXS to see if molecules are organized (short range order). To finish, he

explained the next steps of these techniques in solution scattering for structural biology and for *in situ* analysis.

Understanding Innovation

In the Understanding Innovation sessions, moderated by Janni Nielsen and Lief Bloch Rasmussen, several groups of students discussed some topics concerning the scientific social responsibility.

In the first session, the debate was about how research projects are grounded in society. Very few projects have specific dedication for ethical, legal or environmental concerns about nanotechnology, and it is crucial to change this aspect by listening to the future users of this technology. Also, diffusion at all levels must be done to keep people up to date of the innovation, changes and implications of new developments.

In the second session, researchers and professors from the workshop presented three project proposals that they had developed during the first two days of the school. The projects were (1) the development of sensoring devices for different cases of application, (2) building a sustainable house, with efficient energy generation and storage and new materials for low environmental impact, and (3) real time in situ characterisation of materials and functional surfaces. After these presentations, groups of students were made to play a sort of role game activity. Each group was a different perspective: economic (is the project a good investment?), political (does it contribute to social welfare?), citizen (does it improve ordinary life?) and production (does this contribute to production and job creation?), and from this perspectives, each group had to choose the best project and report back the reasons of the election.

The final two sessions where centred on the creation of new project proposals. First of all, each group of students made a draft of a project idea and presented it to the rest of students. Then, the process of creating a formal project description was explained and the project drafts were analysed to fit in a more complete description.

4. Workshop Programme and Activities

Working Groups Activities

Monday October 4.th at 9.00 a.m. – 12.30 p.m. (break 11.00 – 11.30) ***Theme*: GROUNDING EULASUR**	**Responsible**	**NOTES**
• Welcome • Introduction to the workshop • Identifying ground • Presentation and reporting	Leif Bloch Rasmussen (LBR), Janni Nielsen (JN), Maja Horst (MH), Susanna Garelik (SG) - and EULASUR partners and other participants	
Tuesday October 5.th. at 9.00 a.m. – 12.30 p.m. (break 11.00 – 11.30) ***Theme: RESEARCH PERSPECTIVES IN PROJECTS***		
• Good morning • Introduction to work • Mind mapping project ideas • Presentations and dialogue • Reflection • Critical Dialogue • Plenum and open dialogue • Introduction to the theme on Thursday: Beyond the good research idea • PentaHelix -model	LBR JN JN and Participants LBR with the support of JN and MH, JN MH LBR	
Thursday October 7.th. at 9.00 a.m. – 12.30 p.m. (break 11.00 – 11.30) ***Theme: SCIENTIFIC SOCIAL RESPONSIBILITY*** - ***Who should be involved in the projects?*** - ***What shall their role be?***		
• Good Morning • Introduction to the work • One project idea • Establishing groups • Presentation Lisbon strategy model • How do these criteria influence projects? • Presentation: Short stories • Presentation: Project organization	LBR JN Participants LBR MH and JN participants	
Friday October 8.th. at 9.00 p.m. – 12.30 p.m. (break 11.00 – 11.30) **Theme: Conclusions from the work shop: The way ahead!**	LBR, JN	
Conclusions and dialogue **Road Map for the way ahead** **Home work until next summer school/work shop**	LBR, JN and participants LBR	

See attachments 1 and 2 and 3 for further information on group work, resultant projects and conclusions.

5. Poster Session

Two poster sessions were held during the Summer School. Abstracts of posters presented can be seen at Annex nr7.

6. EULASUR Governing Council Meeting

Taking advantage of having almost all partners together in the Summer School, and as considered in the Project, a meeting of the EULASUR Governing Council was held on October 4th at Hotel Amancay.

As special guests from the EULASUR Advisory Board, Raúl Conde from the University of Mar del Plata (Argentina), Alberto Nieto from the University of La República (Uruguay) and Daniel Lupi, President of the FAN (Argentine Foundation of Micro and Nanotechnologies) attended this meeting and the Summer School. CVs of these gests can be seen in Annex5.

Meeting Agenda, as well as meeting minutes approved by all partners are attached to this report, please see attachments number 8 and 9. Presentations delivered by each partner are enclosed in the meeting minutes.

7. Other Institutions who supported the event (different from the EC)

Comisión Nacional de Energía Atómica – Argentina

Fundación Argentina de Nanotecnología

Red Materiales Nanoestructurados, PAE 22708 – ANPCYT

Centro Interdisciplinario de Nanociencia y Nanotecnología, PAE 37063-ANPCYT

8. Conclusions

It can be stated that the Summer School and Workshop were a complete success, from a social and scientific-technical point of view.

The high number of students, Professors and senior researchers, living together in these nice circumstances, under such comfortable environment during one week, surrounded by such spectacular nature, generated strong personal and group interactions that we expect to be extended and consolidated during the development of EULASUR project.

First significant result has been the resulting funding demands for short exchanges of young PhDs in order to motivate and prepare longer period exchanges afterwards.

The technical and scientific high level of the attendees and Professors (see CVs attached) has enabled attendees to know the main breakthroughs of the last years in their corresponding

specializations. Conferences and lectures covered a balance between the high teaching level and the explanation of the last breakthroughs in each of the subjects presented.

Likewise, spirit of conviviality allowed us to explore different possibilities to implement a major integration in the future within certain areas and groups of research, fulfilling then, one of the objectives of EULASUR project.

Finally, the parallel Workshop organized by Leif-Bloch Rasmussen, enforced the potential integration of research efforts, trough the realization of some exercises for the preparation of common research projects. These exercises were considered a complete success concerning methodology and evaluation by all the students.

Annex 1: Workshop Groups Work and results

First day Groups, Oct. 4, 2010

Group 1

Why are we in the EULASUR project?

Proposal derived from EULASUR

- Application:
  - solar cells
  - sensors & ambient chemicals
  - electrodes bio
- Materials:
  - conduction nanostructures
- Techniques:
  - sers – atomic resolution
  - speckele scattering
  - electrodeposition
  - nano-encapulation (chemical)
- Multinational spin-off

Where do we want EULASUR to go?

- New synergies/contacts + interaction opportunities (symbiosis)
- Transcending basic research thinking, projecting towards a product, technique
- Performing more than the addition of individual parts + creativity, new modes of thinking
- Learning from others: state of new developments
- ASK: New classification schemes - or NO classification in interdisciplinary areas will allow new ideas
- European equation double sided

Group 2

Why are we in the EULASUR project?

- New collaboration networks

- To get new habilities and tools for technological transfer
- To enjoy the landscape

Where do we want EULASUR to go?

- To promote collaboration projects in strategic areas

- To help us to generate new spin-off companies and encourage scientist to involve in technological transfer issues
- Get a common language between researchers and businessmen

Group 3

Why are we in the EULASUR project?

- Exchange of knowledge, know-how and interaction between the partners that could lead us to new ways of collaboration
- Exchange of methodology for in situ investigations and characterization, nanofabrication, development of new nanostructured materials, thin film …

Where do we want EULASUR to go?

- To set up an environment among the partners to realize experimental conditions
- Define the systems that should be employed

Group 4

Why are we in the EULASUR project?

- To get in contact with different people with different backgrounds – researchers, business and technology management specialists, and companies' representatives. We find very important the involvement of different governments representatives as well
- To get in contact with "nano" researchers from different countries both in South America and Europe, with the innovation vision that other specialists from both regionas could give
- To explore the possibility of joint projects among specialists of the network

Where do we want EULASUR to go?

- To promote the creation of an innovative platform in "nano", that could gather researchers, business and technology management specialists and companies, to produce commercial products using all their skills in an efficient and fluid way, with the support of government
- As a roadmap to (1), to design a methodology to identify subjects, both relevant and with high commercial applications perspectives, where the platform could focus
- The best way to make this platform work is through the cooperation in other funded projects that could involve many of the participants of the EULASUR project. The identification and cooperation with other institutions is most welcome, since it can enrich our visions and skills

Group 5

Why are we in the EULASUR project?

- Because we know people involved in it who created the opportunity for us to enter it
- Common interests in some issues
- Promote knowledge valuation in our societies

Where do we want EULASUR to go?

- End with a close relationship with firms and NGOs
- Create a network between research centers and firms (especially SMEs) which may act as "seed" for a huge "crystal" to grow on it after the project ends

Students' appreciation of the project proposals from seniors

Oct. 5, 2010

Projects for appreciation:

1. Sensor devices. Implants for medical purposes
2. Nanohouse
3. Surface sensors

Economic Perspective

On project 2.

- Long term investment
- Small devices for devices
- Move it away from the east coast (evt. Salto)
- Is already working

On project 3.

- Doesn't have a direct application
- Someone else (ex. Government) should invest in that

On project 3.

- We think that none of the cases are profitable
- The 1st. example may be profitable (you have to narrow down to one disease)
- Immediate (5-10 years)
- Everybody cares more about health

Political Perspective

Project of choice: Building of an autonomous house

Lack of energy resources and pollution is a global problem. This project will help society as a whole and not just individual persons. This is a bigger impact in society.
In this project we will like to:

- Improve quality of materials and the time of construction
- Design and materials should be appropriate for each weather conditions

However it should take into consideration that:

- Toxicological studies need to be made

- Changes of people lifestyle should be gradual and educated (social education plans)
- New regulations that regulates nanotechnology and materials
- This project should be thought as a neighborhood issue and not as individual homes
- The house should be cheap as it can
- Need to prove that's gonna be safe.

As a second place the project of choice is no. 1. Sensoring devices. Is a short time project and can help different aspects of individuals. People is gonna be proud for the medical systems.

Citizens Perspective

Eliminate 3 and 1.
Choice 3: too difficult to understand. What would be the results: unknown
Choice 1: some devices already exists

Our choice is 2:
Solve poor's problem
→ Upgrade existing houses /building new houses
→ Sources of official information on where to find means to program the upgrade and where to go to execute it
→ Intelligent house
  → conservation
  → storage
  → convertion into other sources of energy
→ Adoptable to choices of individuals and site of building
→ Integration, but with individual elements
→ Upgrade: Take upgrade into account of incorporation of new future technologies

Production and labour perspective

We think that the best project is 3.

Real time in situ characterization will improve not only the research but also fabrication processes. A lot of industries/companies will be able to take advantage of the improvements of this kind of analysis to improve the fabrication processes, saving production time and lower the costs of specific problems; therefore they will be able to employ more people.
Projects like 1 and 2 will also take advantage of this project.
Besides, also several industries will benefit from this project.

Student project ideas, Oct. 6. 2010

Group 1.

1) Food nanotechnology
    - Help production of different processes in food industry. For instance: purer juice industry (TiO_2) → sivefoetant
    - Sensor for tracebility of the food process. For tracking the coal chain break down be if it has been exposed to high temperature

   Farmers production (cheap ones)
   → sensor for checking gross propierties and cattle health
   → for vineyard production and other areas
2) Water
   Water purification and salt destilation. The big relation surface/area of NP's and functionalities of the surface can be good for these
3) Improved clothes
   Smart clothing. Autocleaning and lighter clothes
4) Processing waste
   In each house a device that can convert garbage into energy. Also radioactive garbage processing!!
5) Coffe Cup
   A cup that contains coffee and it can be also used to eat after you have drunk the coffee.

Group 2.

→ Water in-house renewable
- Filters
- Water pipes

→ Equipment to blind people take them to bus
→ Diagnosises/Treatment/Cure HIV/Cancer
→ Bioprotectors for cancer prevention
→ Internet
- Stock control of goods ware-houses and stores by means of traceable nanoparticles

→ (medicures)
→ Easy, cheap and … detection of ….. on water sources
→ Remote access of internet and education of isolated villages
→ Researchers involved with society education

Group 3.

- Improve and develop catalysts applied in paintings, coatings and asphalt, that could be potentially used widely polluted big areas
    - The benefits are really global, and everyone is effected

- Long effect benefits
  → Self-cleaning
  → Anti-fouling
  → Nanti-catalytic
  } concepts applied in different areas
- Requirements
  - Catalyst must be cheap (TiO_2? Alternatives?)
  - New materials will be applied in polluted areas
  - Uses solar energy at ambient temperatures to be activated
  - Test the toxicity to prevent health problems
  - Long lifetimes
    → when to be replaced?
    → sustainable → continuation in time
  - As the problem is already known by everyone, we could check the societal and industrial aprovement
  - Multidisciplinarity
    → bio
    → nano
    → engineering

Group 4.

Develop new scaffolds incorporating NPs with drug functionalities

-Applications for in vivo & in vitro

-In situ characterization

-Drugs: antibiotics

growth promotion (hormones?)

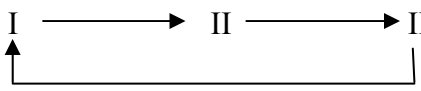
anti-cancer – TNF – tumoral neurosis factor

mercaptopurine = antileukimia

Annex 2: Workshop Resultant Projects description

Title of project: NANO-HOME – Nanostructuring a sustainable house
Responsible for writing and networking (lobbying):
Why do we want this project? Globally we are facing natural changes which will require radically new thinking and solutions in the fields of energy, environment and economics all of them involving radical changes in our way of life and social organization. This project will explore how nano technology can offer alternatives in terms of materials, processes, know how, knowledge and method that can modify substantially those aspects. Nano-home is unique because it innovates social and technical organizations of very recent and emergent technologies. It also spans boundaries and bridges disciplines, knowledge, regions, continents and culture.
What should be done - phases? We will focus on technical factors that will constitute a test case for the main parameters that make a house sustainable. Concurrently we will explore the social factors that constitute a sense of belonging and enable citizens to embrace emerging technologies, allowing the house to grow into a home. The technical and social factors will be explored through iterative life cycles and by embedding social organization in the design. Steps for grounding the project: Mapping of pre-existing knowledge, know how and products/processes (nano-technology and classical) Pre-assessment of social factor and conceptual models of belonging, sense-making, acceptability and cultural singularities Virtual house design including energy generating storage, water management, efficiency optimization
How should it be done – methods, knowledge? The project will based on new pragmatism as a way of exploring and experimenting. The project will develop sustainable houses by exploring, redesigning and devoping nano know how.
Who should do it - stakeholders? In general based on the PentaHelix model for the co-creation of innovations and value in society. Researchers from material sciences, social and human sciences, ICT – and architects, dedicated citizens, autonomous groups of citizens, politicians, NGOs and business. Tech transfer people from relevant areas.
When shall it happen – timeline, milestones? December 13. 2010 – basic tasks reported and decision go/no-go April 2011 – reporting on second round and first drafting of project description September 2011 – reporting on third round and 2. Draft March 2012 – fourth round and loose ends to finish project application
Where should it take place – geographically, virtually? Virtual house as the co-creation of physical prototypes. 1.st prototype house in Latin America

2nd prototype house in Europe
Capital needed – finances, ICT, cultural, social etc. Start-capital from European and Latin American national funds in order to create the application; around 150.000 Euros. Eventually EU budget-line money. Social and cultural capital should be provided through the PentaHelix model as a way of co-creation among stakeholders.
What consequences might be foreseen – should be investigated? Society's, citizens and researchers prudence ('fear') of nano technology. Nano technologist's ethical concerns on their work with complexity beyond human grasp + concern on intangibles and exaggerated promises of 'saving the world'. Politicians lack of visions on nano technology.
Related projects: Other project on the 'house of the house' should be studied in order to secure joint efforts.
Date: 1.st prototype house in Latin America 2nd prototype house in Europe Signature:
Alternatives

Title of project: Polymer metallic nanocomposite for surface sensors
Responsible for writing and networking (lobbying): Rainer Gehrke
Why do we want this project? Obtain new materials – new nanostructures for new devices (for use in plasnomic wavetube and substrate sers.
What should be done - phases? I. Design and simulation II. Fabrication of extractors, synthetization III. In situ, ex situ, characterization
How should it be done – methods, knowledge?      this procedure is done at least 3 to 4 times
Who should do it - stakeholders? Interested scientists Muktidisciplinary researchers Business people
When shall it happen – timeline, milestones? Whole project duration: 3 years

New material ready in 3 years! (for at least 3 or 4 iterations)
Where should it take place – geographically, virtually? Labs in Europe (Germany, Spain) and Latin America Argentina, Uruguay, Brazil). Travel (face-to-face meetings; skype communication for skype meetings; collaborative working environments (CWE) for joint work
Capital needed – finances, ICT, cultural, social etc. Mainly: 1. Personnel 2. Consumables 3. Equipment 4. Travel and organization
What consequences might be foreseen – should be investigated? Reinforcement of scientific links between Latin America and Europe
Related projects:
Date: rainer.gehrke@desy.de; alejandro fasciszewski (afscizweski@cnea.gov.ar) (CNEA Buenos Aires); rfaccio@fq.edu.uy/hpardo@fq.edu.uy; goni@icmab.es (A.R.Goñi); wagner@fisica.ufmg.br Signature:
Alternatives

Title of project: Nanotechnology based portable devices for monitoring cattle diseases
Responsible for writing and networking (lobbying): Ana Laura Zamit (azamit@cnia.inta.gov.ar)
Why do we want this project? Monitoring infection diseases in cattle allows prevention to take place, thus improving productivity in cattle industry. Also it helps control strategies on certain pathogens such as mouth disease virus, BSE, BVDV, among others.
What should be done - phases? 1) Choose of a portable high throughput and cheap technology with high sensitivity and specificity or the main pathogens. 2) Select the main virus/bacterium pathogens of cattle industry to be monitored, direct or indirectly (detect antigen or/and antibody) 3) Optimize conditions for multiplex analyses of complex mixture such as blood or

sera. 4) Validate with each bd? standard assay
How should it be done – methods, knowledge? Concerns (knowledge): - Cost-benefit of device based on nanotech - Selection of oie pathogens - Validation - Field assays with farmers/vegetarians → social aspect/legal
Who should do it - stakeholders? Through Argentine-European teams. INTA should be the Argentinean partner. Related to its experience in cattle pathogens studies and diagnosis. Expertise from European partners could be related to the development of the nanobased device.
When shall it happen – timeline, milestones? It shall happen as soon as possible, maybe within the next two years. Could be a 3-4 year project.
Where should it take place – geographically, virtually? The European partner designs the device based on requirements for assaying antigen/antibodies in blood samples. The Argentinean counterpart assays the device in the farms by the farmers/medvet themselves.
Capital needed – finances, ICT, cultural, social etc. For travelling, consumable, human resources formation on nanotech, production and validation, business etc.
What consequences might be foreseen – should be investigated? Applicability in small farms or/and big farms by farmers. Legal aspects of each assay. It should take into consideration farmers' resection on the use of such a device.
Related projects:
Date: 10/10/07 (yy/mm/dd) Signature: Ana Laura Zamit, INTA, Argentine
Alternatives

Annex 3: Workshop Conclusions

When I came to Bariloche to attend to the First EULASUR Workshop, I was not really aware of the very ambitious goal set by the people of the Copenhagen Business Center, the organizers of the event. To my big surprise, I found me sitting together with people from many countries and different scientific backgrounds throwing ideas around, aiming at putting up the basis for coordinated research projects, that should be able to obtain funding from the European Community. Out of an initial crowd of thirty people, we were divided into three groups to work on the projects under the professional guidance of the Danish colleagues. After getting us to know each other better regarding our different expertise, we started to giving form to several project ideas, from which we all should decide about the most promising ones. Even though I really believe that it takes much more than a week of heavy work to set up a successful research project from scratch, I was again positively surprised that, by the end of a week, we were able to present at least three sort of seeds for an international research project between groups from European as well as Latin American institutions. There were three proposals, corresponding to each work group. One concerned the development of many different sensor devices for medical applications based on the functionalization of cantilevers.

Another proposal concerned the development of an autonomous house to be built in pour and isolated regions like the Argentinean Patagonia that should combine state-of-the-art nanotechnology for the sustainable production of energy, totally ecological materials and the most efficient working systems for cooling, heating, etc. The third project proposed to setting up a research platform to investigate the physical properties of nanocomposites made of metallic nanostructures embedded in a polymeric matrix. The main idea was the improvement of the light-matter coupling in thin films, in order to obtain devices of higher sensitivity for molecular recognition using optical/plasmonic working principles. Out of these three, the one dealing with the polymeric/metallic nanoparticle composites got in a final form that can be considered as a preliminary version of a project. Finally, I would like to emphasize a point onto which the organizers always paid much attention: The involvement of young people for the development of the different projects.

Youngsters attending to the Summer School, which ran in parallel to the workshop, dedicated at least one full day to actively participate in the development of the projects delineated by the senior researches in the framework of the Workshop.

Alejandro Goñi

ICMAB-CSIC

Annex 4: List of Participants

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Annex 5: CVs of lecturers and senior attendees

Antonio Arciénaga

Scientific Coordinator - Ph Doctor in Economic of Innovation, Complutense University of Madrid, Faculty of Economic Science and Management, Spain.

Safety and Health Engineer, National Technological Universidad, Buenos Aires Regional Faculty, Argentina. Industrial Engineer, National University of Salta, Argentina.

Nowadays Position: Professor of post-graduated courses in the National University of "3 de Febrero", Buenos Aires Province, Researcher of the National University of Luján (Argentina).

Experience in design and evaluation of initiatives to promote regions of knowledge.

Cyril Aymonier

Doctor Cyril Aymonier (35 years old) is a researcher of the French National Centre for Scientific Research (CNRS) working at the Institute of Condensed Matter Chemistry of Bordeaux (ICMCB). He studied chemistry and chemical engineering at the "Ecole Nationale Supérieure de Chimie Toulouse (ENSCT)" where he received his diploma of engineer in chemistry in 1997. He obtained his PhD in chemical engineering from University of Bordeaux (2000) where he focused on supercritical water oxidation of wastewater under the guidance of Pr F. Cansell. He did a postdoctoral stay in Freiburg (2000-2002, Germany) with Pr R. Mülhaupt (in connection with ATOFINA company) and Pr S. Mecking where he helped to develop novel approaches to design hybrid organic/inorganic nanoparticles. Now he is in charge of the group Supercritical Fluids of ICMCB. His current research interests concern the chemistry in supercritical fluids applied to materials science. He is designing advanced nanostructured materials mastering the nanostructuration of materials in surface or in volume. He published 54 scientific articles in international Journals and cosigned 8 patents.

Hernán Bacarini

Innovation Management - Master in Innovation Engineering- Bologna University- Italy. Vice-rector (freely elected among students, graduates, professors and management staff) and Professor at the National University of Luján (selected by public contest). Ex Director of the Programme "Incubadoras, Parks and Poles" - Commission Scientific Researches – Buenos Aires Province Government.Vice-coordinator of the Executive Commitee of EULASUR project. Regional Co-ordinator in Latin America of UNINVEMP-LAM project University Entreprise/Industry - 6to. Framework Programme 6 (2006 -present). Ex General Director of Technology in Buenos Aires Autonomous Government. Main member at the Committee of Argentina Federal Board of Science and Technology – COFECyT. Member at UBATEC S.A. Board. Former President of Business Incubators, and Technology Parks Association in Argentina. Member of the Scientific Committee in the 1st World Conference of Business Incubators (Brazil, 2001).

Nieves Casañ

Professor Nieves Casañ is Head of Solid State Department at the Institut de Ciència de Materials de Barcelona (ICMAB) of the Spanish Research Council (CSIC). She originates from Georgetown University Chemistry Department and is also member of ACS and Sigma Xi from 1986 and has been member of the Electrodeposition Committee from the Electrochemical Society. Her research is involved in electrochemistry of functional materials and novel oxides as well of thin layers of electroactive in energy and biological systems. She participates in the master of functional materials of UAB, and is an expert counseling the Spanish Ministry of Science and Technology. She has been awarded Volkswagen-CSIC price.

Ricardo Juan Faccio Sgiorovello

Highest degree: Ph. D. Chemistry. Degree: Chemical Engineer. Position: Assistant Professor of Physics, Level I SNI-ANII & level III PEDECIBA. e-mail: rfaccio@fq.edu.uy. Web: http://cryssmat.fq.edu.uy/ricardo/ricardo.htm. Scientific production: 13 articles in the period 2005-2010. Referee of 9 Journals. Awards: Two best poster award (2005 and 2006), one highlighted article in 2009.

Susana Garelik

Susana Garelik is the Director of the Knowled Transfer Unit (UTK) at the Institute of Materials Science in Barcelona (ICMAB-CSIC). She is a Chemical Engineer and Master in Materials Science. She started his work at the CSIC in 1987 as Research Engineer at the Crystal Growth Lab in ICMAB on Chemical Vapor Deposition of thin films of structural materials and organic materials. She published 15 scientific articles in international Journals. On 1997 she founded the UTK at the ICMAB where she has developed a deep expertise in technology transfer, science popularisation and international relations with scientific institutions.

Rainer Gehrke

Dr. Rainer Gehrke is a senior scientist at DESY (Deutsches Elektronensynchrotron) in Hamburg, Germany. He is responsible for the synchrotron radiation instrumentation dedicated to small angle X-ray scattering and represents the in-house research at DESY in the field of soft matter science. The used experimental techniques especially involve in-situ characterization of nanostructured surfaces by means of time resolved studies during processing. The results have been published in numerous international journals.

Julie Grollier

Julie Grollier, 35 years old, is engineer from the French « Ecole Supérieure d'Electricité » and « Ecole Normale Cachan ». Her thesis, supervised by Albert Fert, was dedicated to the study of a new phenomena in spintronics : the spin transfer effect, which allows to control the direction of magnetization in nano-objects by injection of a dc current. After 2 years of post-doc, (with B.J. van Wees in Groningen University, Netherlands, and C. Chappert in I.E.F., France), she was recruited by C.N.R.S in the Joint Unit CNRS/Thales, Palaiseau, France. Together with her colleague Vincent Cros, she is in charge of the team « Spin transfer induced microwave dynamics ». She was rewarded in 2010 the « Jacques Herbrand » prize from the French

Academy of Science. She obtained the same year one of the prestigious European Research Council E.R.C. Starting Grants to start a new project on memristive devices. She is co-author of 30 papers published in international journals, among which 3 are cited more than 100 times.

Maja Horst

Maja Horst, PhD, is associate professor at Copenhagen Business School in Denmark, where she conducts research within the area of Science and Technology Studies with particular emphasis on Research Communication and Research Management. Inspired by her academic work, Maja Horst has also conducted experiments with science communication through the creation of two installations designed to communicate her own social scientific research. For this work, she was in 2009 awarded the Danish Science Minister's national communication prize. As PI Maja Horst has been awarded 3 grants from the Danish research councils and been a co-investigator on 4 grants. Concurrently, Maja Horst has been the Director of the Doctoral School of Organization and Management Studies at CBS since 2007.

Laura Lechuga

Prof. Laura M. Lechuga is Full Professor of the Spanish National Research Council (CSIC). She is the Head of the Nanobiosensors and Bioanalytical applications Group in the Centre for Nanoscience and Nanotechnology (CIN2, CSIC). The principal focus of her research programme is the technological development of photonic and nanomechanical biosensors and their integration in portable lab-on-a-chip platforms. She has published over 130 articles, book chapters and conference proceedings, has 9 patents and patents applications (2 licensed) and has presented over 60 invited research papers at international level. She has been the driving force for the establishment of one spin-off company (SENSIA, SL, www.sensia.es) integrated in the holding GENETRIX and in MONDRAGON Corporation. In 2010 she has been co-founder of a new spin-off (BIOD, SL). More information in: www.cin2.es/biosensores

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Research interests: Molecular biophysics of biomembranes. Self-assembled polymorphic nano-bio-structures and nanosurfaces of controlled topography, lipid-protein monolayers and bilayers. Phase domain structuring and dynamics. Vectorial orientation of amphiphilic interfaces.

Carles Miravitlles

Profesor Carles Miravitlles Torras is a Research Professor at the Consejo Superior de Investigaciones Científicas (CSIC). Director and Founder of the Institute of Materials Science of Barcelona (ICMAB of CSIC) from 1986 to 2008, and director of the Eduardo Torroja Institute of the Cement and Construction in Madrid (IETcc of CSIC) from 2008 to 2009. His Scientific interest is in Structural Crystallography and in X-ray diffraction, principally in direct Methods for Solving Crystal Structures. Is the president of the Spanish Crystallographic Committee, and member and former vice-secretary of the Academy of Sciences and Arts of Barcelona, is also member of the European Academy in the Chemistry Section. He published more than 300 scientific articles in international Journals.

Alvaro W. Mombrú

Alvaro W. Mombrú, Feb. 8 1966 Montevideo, Uruguay, married 3 children, MSc Chem. Universidad de la República (UdelaR) 1991, MPhil Solid State Chem. University of Sussex UK 1994, PhD Phys. UdelaR 1999. Professor of Physics, School of Chemistry UdelaR (2001-), Director of Department (2003-), Director of the Pando Technology Pole (2007-), President of Governing Board Pando Science and Technology Park (2010-), National Focal Point in NMP (EU FP7) (2010-). Third level researcher at the National Researchers System and 5th degree researcher at PEDECIBA –Uruguayan organization-. Author of 83 peer-reviewed articles and one patent (18 articles in last 5 years). Awarded with the Roberto Caldeyro Barcia Prize in Chemistry 2000, the Canning Award 1992 (British Embassy) and the Weizmann Prize in Chemistry 1991.
Scientific interests: Materials Chemistry and condensed matter Physics, nanomaterials, Crystallography, synchrotron radiation and neutron powder diffraction, biomaterials.

Janni Nielsen

Professor at Copenhagen Business School, Center for Applied Information and Communication Technology. Janni Nielsen has been project manager on/collaborated on many international and national research/industry projects e.g. EU financed MANICORAL, KA-CHE financed by the medical industry, DIT financed by Danish Strategic Research Council. JN teach courses in Innovation and entrepreneurship, design of visual interaction, innovation and ICT at CBS. JN is member of editorial board/reviewboard for journals: eMinds, Journal of Industrial Engineering and Management, ARTIFACT and Digital Creativity.

Alberto Nieto

Alberto Nieto is Professor of Immunology at the School of Chemistry of the Universidad de la República (Uruguay)(1986-). Founder and former Director (2004-2007) of Pando Technology

Pole (Uruguay), is currently Head of its Biotechnology Unit (2008-). Former Dean of the School of Chemistry (1998-2002; 2002-2006). Founder and first President of the Uruguayan Immunology Society(1988 – 1999) , former President of the Latin American Association of Immunology(1996 – 1999), Council member of the International Union of Immunological Societies (2000-2002) and former Vicepresident of the International Foundation for Science (Sweden) (2000-2002). Highest level researcher of the National Research System as well as of the Basic Science Development Programme. His areas of interest have been Parasite Immunology (1986-2004), Biotechnology R&D (2005-) and Innovation for Development (2005-). He produced more than 130 publications including scientific papers in international journals, scientific books/chapters, patents and newspaper articles on S&T.

Iolanda Olivato

Master of Science in "Nanotechnology" (December 2005), with a thesis on the "Evaluation of Carbon Nanotubes Toxicity" and in Medical Biotechnology (November 2004), with a thesis on "The Construction of adenoviral vectors for cancer gene therapy application and evaluation of their effectiveness in liver cancer and adrenal cortical cancer models". She spent a short period in Belgium to coordinate a research on toxicity potential of nanotubes at Nanocyl (www.nanocyl.com). Dr Iolanda Olivato has strong experience in DNA recombinant techniques and cell coltures. Her main research interests are nano-biotechnology; risk assessment of emerging sciences, in particular for the human cardiopulmonary effects on nanoparticles and risk perception. Since 2006 , she works for Veneto Nanotech (www.venetonanotech.it) and she is involved in different research projects and activities on nano-ecotoxicology and risk management at national and international levels. She is responsible for the project area, in particular for the management of both international and Italian projects within the company.
She collaborates with Nanofab (www.nanofab.it) as technical consultant for the production and analysis of Dna-microarrays.
She published some articles and attended several conferences both on nanotoxicology and social aspects. Dr Iolanda Olivato is currently a reviewer of the Nanotoxicology Journal.
She is involved in both national and international networks: PNIC-Federchimica (Italy) www.federchimica.it; Nanosafety cluster Group and NanoFutures (EU level) www.nanofuteres.eu.

Helena Pardo Minetti

Education (highest grade): Ph. D. in Material Chemistry, School of Chemistry, Universidad de la República (UdelaR), Montevideo, Uruguay, 2007. Present Positions: Assistant Professor, Department of Physics, School of Chemistry, UdelaR, since 2008, First level researcher in Material Science of the National Research System (SNI), National Agency of Research and Innovation (ANII), since 2008, Researcher at the Program for de Development of Basic Science (PEDECIBA), since 2007. E-mail: hpardo@fq.edu.uy Publications: 11 articles in the last five years and one patent.

Leif Bloch Rasmussen

Leif Bloch Rasmussen, M.Sc. and Ph.D. in Mechanical Engineering, is Associate Professor in Design of Inquiring Systems at Copenhagen Business School, Denmark.

Leif Bloch Rasmussens main interest is cross-disciplinary processes in networks for design, innovation, entrepreneurship. This interest is based on the idea that the business unit of the future will be the network. The approaches to network innovation are based on philosophy as a practical guide to knowledge creation, utilization and forgetting. Thereby the processes of abduction, induction and deduction is taken to be integrated in action research and field work together with a diversity of stakeholders like companies, unions, universities, public institutions, NGO's, citizens. Leif Bloch Rasmussen has initiated and participated in numerous EU projects on knowledge, technology and innovation.

José Rivas

José Rivas is Director General of the International Iberian Nanotechnology Laboratory (INL), Portugal, and full Professor in Physics at the University of Santiago de Compostela (USC), Spain. His main research interest involves synthesis and characterization of magnetic nanoparticles. Besides his responsibilities at the USC and INL, Prof Rivas is co-founder of a spin-off dedicated to Nanoparticle production, promotes interdisciplinary schools and conferences and plays an active role in Nanotechnology strategy definition as a Member of several committees.

Wagner Rodrigues

Professor Wagner Rodrigues is Professor at the Physics Department of the Instituto de Ciências Exatas of the Universidade Federal de Minas Gerais (UFMG), Brazil, since 1989. He already occupied the chair of Head of the Physics Department, as well the coordination of the Graduation Program in Physics of the UFMG. His scientific interests include Solid State Physics, Materials Science, Surface Science and Applied Physics, with emphasis in Semiconductor Nanostructures. In the last years he has been involved in the initiatives of the State of Minas Gerais to promote innovation and entrepreneurship. He oriented more than 20 graduation students, and published more than 40 scientific articles in International Journals. He has deposited two patents of innovative devices.

Lucía Beatriz Scaffardi

Dra Lucía Beatriz Scaffardi is a Independent Researcher from Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina and Regular Professor at Facultad de Ingeniería, Universidad Nacional de La Plata (UNLP), Argentina. She developed her research activities at Centro de Investigaciones Ópticas (CIOp) in the field of Laser Physics and Laser Spectroscopy for Materials Research, continuously publishing in high IF international journals. Her current interests are optical properties of nanstructured materials, metal nanoparticles and core shell nanostructures. She is currently a member of the Directive Council of CIOp and also of the Directive Council of Departamento de Ciencias Básicas (Facultad de Ingeniería UNLP). She is also a member of Asociación Física Argentina (AFA) and División Fotofísica AFA.

Daniel Schinca

Dr Daniel Carlos Schinca is a Independent Researcher from Comisión de Investigaciones Científicas y Técnicas de la provincia de Buenos Aires, Argentina and Regular Professor at Facultad de Ingeniería, Universidad Nacional de La Plata UNLP, Argentina. Since more than 30 years he has been developing research activities at Centro de Investigaciones Ópticas (CIOp) in the field of Laser Physics and Laser Spectroscopy for Materials Research, publishing the results in high ranked international journals He was member of the Directive Council of CIOp for two full periods and member of the Directive Council of Basic Sciences Dept (Facultad de Ingeniería UNLP). He is also member of Asociación Física Argentina (AFA) and División Fotofísica AFA.

Galo Soler-Illia

Galo J. A. A. Soler-Illia is the head of the Nanomaterials group, Chemistry Dept, CNEA, Buenos Aires, Argentina. Born in Buenos Aires, 31/05/1970, he performed his graduate (1989/93) and Ph D. studies in Chemistry (1994/98) at the University of Buenos Aires (UBA). He was a postdoctoral fellow of C. Sanchez (Univ. Paris 6), in the synthesis and formation mechanisms of mesostructured and mesoporous materials. At present, he is a CONICET Independent Researcher, and Adjunct Professor, Dpt. Inorganic, Analytical and Physical Chemistry, School of Sciences, UBA. Awards: 2006 Young Researcher Award (Chemistry), National Academy of Exact, Physical and Natural Sciences of Argentina; 2006 Houssay Young Researcher Award (Exact Sciences), 2009 Houssay Prize (Chemistry, Biochemistry, Mol. Biology), Ministry of Research, Argentina. Advisor of 3 PhD and 2 MSc thesis, author of 85+ papers with 3000+ citations (ISI).

His main current interests are: Design of complex nanomaterials. Bottom-up synthesis of nano- and mesostructured multifunctional materials with well-defined functions located in space, by combining sol-gel chemistry, self-assembly and surface modification. Applications: thin films, selective membranes, photonic materials, SERS-based detection, optics.

Fernando D. Stefani

Fernando D. Stefani is an Associate Researcher of the National Research Council of Argentina (CONICET), and Assistant Professor at the Physics Department of the University de Buenos Aires (UBA) where he currently running the Nanomaterials Photonics Group (http://nanomaterials-photonics.df.uba.ar/). From 2008 to 2009 he was Assistant Professor at the Physics Department of the Ludwig-Maximilians-Universität München. From 2006 to 2008 he was Research Fellow at the Institute of Photonics Sciences (ICFO) in Barcelona, and previously he worked at the Max-Planck-Institute for Polymer Research in Mainz. His scientific interest comprises all that is related to the interaction of light with nano-objects as well as with single molecules, and its technological applications. Fernando Stefani has published in and acts as reviewer for the most renowned international journals (e.g. Physical Review Letters, Nature, Nano Letters, Physics Today).

Nicolás Tognalli

Nicolás Tognalli is a fellow researcher at the Argentinian Scientific Council (CONICET, 2009-2010) and a teaching assistant at the Instituto Balseiro, Argentina (2004-2010). He has received his PhD in physics in 2008 working in plasmonic nanoestructures for Raman enhanced spectroscopy of organic materials, and his thesis has an honorable mention from the Argentinian Physics Society. He has 15 articles published in international journals, 8 invited talks, more than 20 congress presentations, 1 presented patent and 3 scientific awards, one of them in a business plan competition.

Gustavo Torchia

Gustavo Adrián Torchia received the Ms. and Ph. Degree in Physics from Universidad Nacional de La Plata, Argentina in 1996 and 2000, respectively. From 2002 to 2005, he made postdoctoral stays at the Universidad Autónoma de Madrid and Universidad de Salamanca, Spain, working in integrated photonics and laser writing in optical materials. Currently, he is a member of the National Research Council of Argentina, CONICET as adjoin research working in The Centro de Investigaciones Ópticas (CIOp). His scientific interests are: laser writing of optical circuits, fundamental physics in femtosecond laser interaction with optical materials, nano-particles generation and fragmentation, integrated optical sensors and lasers systems. He is a member of the directive council of CIOp and also Advisor of the CIOp-UNLP SPIE Student Chapter.

Marcelo Trivi

Marcelo Trivi received his MS and PhD degrees in Physics from the University of La Plata, Argentina, in 1979 and 1986, respectively. In 1982 he joined the Optical Research Center (CIOp) and he is currently its Director. He is Principal Researcher of the Buenos Aires Research Council (CICPBA), Argentina and a full professor with the Faculty of Engineering, University of La Plata. He spent 4 years with the Istituto Nazionale di Ottica, Florence, Italy (1988 to 1989 and 1995 to 1996) and is currently a Senior Associate Member of the International Centre for Theoretical Physics (ICTP), Trieste, Italy. He was an invited professor with the Universities and Scientific Institutes of Colombia, Brazil, Mexico, Chile, Peru and Italy.
He is author or co-author over 70 peer-refereed publications in international scientific journals, over 150 conference papers, 4 book chapters, co-editor of a book and 5 patents. He has been Advisor of PhD and Masters Thesis.
His research interests include optical processing, optical metrology, interferometry and dynamical speckle techniques.

Fabian A. Videla

I received in 1991 the degree as electronic engineer.
Currently, I am an assistant professor at Universidad Nacional de La Plata Argentina. My research is carried out at the Centro de Investigaciones Opticas. Currently I'm working toward my Doctorate degree.
My current research interests include particle sizing, light scattering and the study of ablation in metallic nanoparticles and sensors based on plasmonics. I was also working on air pollutant measurements SO2 an NO2 using differential optical absorption spectroscopy (DOAS)

Other activity I had participated was spectroscopy applied to the determination of vegetation index used in agriculture dedicated to fertilizers dosimetry.
I have published 10 articles in scientific reviews and more than 40 presentations (proceedings, poster and oral conferences) in nationals and international scientific meetings.

Annex 6: Presentations delivered

We enclose herewith presentations which their authors made available for publishing in EULASUR website.


Steren 4-10-2010


Freitas 4-10-2010


Horst 4-10-2010


Treguer 4-10-2010


Cassaignon 5-10-2010


Calvo 5-10-2010


Soler 5-10-2010


Aymonier 5-10-2010


Rasmussen 6-10-2010


Casañ 7-10-2010

Annex 7: Abstracts of Posters presented

Name: Marcos Flávio de Oliveira Silva
Advisor: Wagner Nunes Rodrigues

Decoration of Multi-Walled Carbon Nanotubes with Cadmium Sulfide Nanoparticles and Production of Thin Films

Cadmium Sulfide (CdS) nanoparticles were successfully grown on Multi-Walled Carbon Nanotubes (MWNTs) via a simple chemical reaction. Many CdS-MWNTs samples were produced with different parameters such as temperature and time of the reaction. All the samples were characterized with Transmission Electron Microscopy (TEM), Energy-Dispersive X-Ray Spectroscopy (EDS) and X-ray diffraction (XRD). The obtained images and EDS spectrums show clearly the decoration of the MWNTs by CdS nanoparticles, and the XRD measurements indicate the samples' structure as Zinc Blend type. Thin Films were produced by filtration and with preliminary UV-Vis absorbtion measurements we estimated the band gap of the CdSMWNTs as 2.4eV. This system has a great potential in photovoltaic technology.

DMPC supported bilayers on gold as biosensor platforms

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Supported phospholipid bilayers on solid substrates have attracted considerable interest, both from the fundamental and applied points of view. Besides the use as model systems to study the structure and properties of native biological membranes and to investigate biological processes, they are employed in a variety of applications including biosensing.
We prepared supported DMPC (dimyristoylphosphatidylcholine) bilayers by vesicle fusion on gold modified substrates with a self-assembled monolayer (SAM) of dithiothreitol (DTT). DTT SAMs have proved to form hydrophilic layers that allow vesicle attachement and fusion.
AFM measurements performed in 10mM HEPES buffer + 0,9% NaCl show that only one bilayer is attached to the surface.
Selective permeability of these phospholipid bilayers was tested with two molecular probes. Methylene blue (MB, a redox dye that easily diffuses through cell membranes) incorporation was studied with both cyclic voltammetry and in-situ Raman spectroscopy. Results suggest that the supported phospholipid bilayer is fluid enough to allow MB diffusion as MB redox couple and Raman spectra were obtained.
In other hand, Flavin-Adenine Dinucleotide (FAD, a redox enxyme cofactor that only crosses membranes through specific protein transporters) was also allowed to penetrate the bilayer. No charge transfer processes were detected meanwhile Raman spectra show that FAD was immobilized but it was easily released when a potential was applied suggesting that was only partially anchored to the outer layer.
Finally, when both MB and FAD were in solution simultaneously only MB was detected by cyclic voltammetry.

Key words: supported bilayers, gold, AFM, electrochemistry, SERS
Acknowledgements: CONICET, ANPCyT, FAPESC, CAPES, CNPq/MCT

Effect of cyclodextrins on the self-aggregation of novel thiosemicarbazone antiviral drug candidates

Romina J. Glisoni[1,2,3], Diego A. Chiappetta[1,3], Albertina G. Moglioni[2,3] and Alejandro Sosnik[1,3*]

*[1]The Group of Biomaterials and Nanotechnology for Improved Medicines (BIONIMED), Department of Pharmaceutical Technology, [2]Department of Pharmacology, Faculty of Pharmacy and Biochemistry, University of Buenos Aires. [3]National Science Research Council (CONICET). *Email: alesosnik@gmail.com*

Introduction. Since Domagk *et al* described the activity of thiosemicarbazones (TSCs) against experimental tuberculosis, the antineoplastic, antibacterial, antifungal, antiprotozoal and antiviral activity of a great number of TSCs has been extensively investigated. Moglioni *et al* have designed, synthesized and characterized different TSCs derivatives from 1-indanones. The activity of these novel compounds is being currently investigated *in vitro* against a broad variety of viruses. However, TSCs are extremely poorly water soluble and precipitate very rapidly during the *in vitro* assays, leading to erratic, non-reproducible and unreliable antiviral half maximal inhibitory concentration (IC50) data. Thus, the extremely low aqueous solubility remains a key hurdle towards their biological evaluation. In this context, it is important to design an appropriate vehicle to improve the solubility of these new drug candidates as an essential stage prior to the exhaustive analysis of the antiviral activity. The present work investigated for the first time the mechanisms governing the self-aggregation of TSCs [1] and the effect of hydroxy-propyl-β-cyclodextrin (HPβCD) on their solubility and physical stability in water.

Goals

- To determine experimental and theoretical log *P* values of TSCs.
- To study the aqueous solubility and the thermal properties.
- To characterize the aggregation process of TSCs in water.
- To investigated the HPβCD effect on TSC solubility and stability in water.

Methods. *Preparation of TSC-CD complexes:* HPβCD and an excess of TSC were dissolved in methanol:aceton. The organic solvent was removed by rotoevaporation (15 min, 70ºC). The solid white powder obtained was re-dissolved in water (according to the final CD desired concentration). The solution was stirred (30 min) and then filtered (0,45 µm nylon membrane filter) to remove insoluble TSC. The filtrate was analyzed by UV-spectroscopy. The size, size distribution and zeta potential of the aggregates was measured by dynamic light scattering (DLS).

Results. 1-indanone TSC molecules combine a bulky hydrophobic aromatic ring and a highly hydrophilic thiosemicarbazone group. This structure confers the molecule an amphiphilic character and might account for their aggregation in water [1]. The formation of nano-aggregates in water was suggested by the appearance of a new strong absorption peak at 233-239 nm in the UV spectra and visualized by transmission electron microscopy [1]. Regardless of the relatively low lipophilicity predicted by the theoretical calculations, these compounds displayed extremely low water solubility [1]. DLS confirmed the early formation of nanoscopic particles (120-300 nm) that undergo a gradual size growth to generate larger submicron-structures [1]. The negatively-charged character of the surface was established by zeta potential measurements. Cyclodextrins (CDs) are cyclic oligosaccharides of α-D-glucopyranose containing a relatively hydrophobic nano-cavity and a hydrophilic outer surface. The hydrophobic cavity enables the partial or total incorporation of lipophilic molecules into the cavity. Phase-solubility studies indicated that the solubility of TSCs was dramatically improved by the formation of inclusion complexes with HPβCD. Moreover, HPβCD decreased the self-aggregation of TSCs in solution, and improved the physical stability of the solutions over time.

Conclusions. Overall results support that the complexation of TSC with CDs is an efficient strategy to improve the solubility and their stability in water towards a reliable biological evaluation.

Acknowledgements: RJG thanks a PhD scholarship of the CONICET.

[1] RJ Glisoni, DA Chiappetta, LM Finkielsztein, AG Moglioni, A Sosnik. Self-aggregation behaviour of novel thiosemicarbazone drug candidates with potential antiviral activity. *New J Chem.* 2010, 34, 2047–2058.

LONG-RANGE PROTEIN ELECTRON TRANSFER IN HEME-PROTEIN GOLD NANOPARTICLE HYBRID SYSTEMS

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A key challenge in the development of electronic biodevices is to improve the efficiency of long–range charge transfer. Recent results hint at the possibility of achieving this goal by manufacturing novel materials which combine nanoparticles with biological Samples showing notable AuNP–induced enhancement of the electron transfer rates. This interesting result added new facets in nanobioeletronics, although the enhancement mechanism is not yet completely understood.
Our goal is contributing to eluctidation of such mechanism and optimizing these devices in terms of Raman and electron transfer enhancement for biophysical applications as well as for the rational design of nanobiodevices.
Gold nanoparticles stabilized by water soluble thiols ligands were synthesized according to the Brust-Schiffrin method by two-step procedure. A two-dimensional array of AuNPs was prepared by a crosslinking reaction with a functionalized nanostructured Ag electrode surface.
In other to characterize the water soluble AuNPs and nanoelectrodes arrays SEM microscopy measurements were perform showing a 25% coverage of the Ag surface with gold nanoparticles with a 4nm diameter.
Cytochrome c (Cyt c) was electrostatically immobilized on the 2-D array. The adsorbed protein retains the native structure as judged from the comparison between the Surface Enhance Resonance Raman Spectra (SERRS) of the system and the Resonance Raman Spectra of the Cyt c in solution. SERRS Spectroelectrochemistry of the immobilized Cyt c indicates that is redox active and presents the same E0 value (8 mV vs. Ag/AgCl) as in solution.

Improving delivery of nanovehicles by decorating with CPPs or targeting moieties

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INTRODUCTION

One of the most promising ways to modulate the immune response is the targeting and delivering of antigens to cells of the immune system. In addittion, targeting drugs or pro-apoptotic agents to specific cells, while the immune response is being modulated, would be useful in some diseases such as cancer. However, antigen-presenting cells (APC) are very resistant to intracytoplasmic antigen delivery and transfection.

Cell-penetrating peptides (CPP) such as TAT peptide (TATp) are capable of transporting different molecules through lipid bilayers. In this work we used TAT peptide-modified (TATp-L) liposomal carriers as specific vehicles for enhancing the efficiency of intracellular delivery of rhodamine to mouse APC. Once improved the liposome uptake by APCs, we proceed on targeting liposomes to dendritic cells (DCs), the key-linkers between the innate and the adaptive immunity, and to glioma cell lines as a combined immunological-pharmaceutical approach to treat cancer in the future. Specific targeting moieties included: 1. Mannose which is specifically recognized by APCs, and 2. Vitamin C, since its receptor (SVCT-1) is overexpressed in certain cancer types.

Summing up, we were able to (1) improve rhodamine delivery into macrophages and DCs by using TATp derivatives, (2) target specifically DCs by using Mannosamine derivatives and (3) target glioma cell lines by using Vit.C derivatives.

MATERIALS AND METHODS

Rhodamine-loaded PEGylated liposomes additionally modified with TATp, Mannosamine or Vit.C were prepared. Liposomes consisted of a mixture of PC:Chol:DOTAP:PEG-PE (plain-L) and PC:Chol:DOTAP:**X**-PEG-PE (where **X** could be TATp or Man or Vit.C) in a 60:30:10:2 molar ratio. Rhodamine was used for visualization of liposomes.

Prior to testing *in vitro*, the nanovehicles were characterized as follows: size and size distributions were measured by dynamic light scattering (DLS); ζ-potential of liposome and micelle formulations were measured by a Zeta phase Analysis Light scattering (PALS); and TEM photographs were taken.

RESULTS

The cell uptake of rhodamine-labeled liposomes was significantly improved in case of TATp-L in BALB/c mouse derived MØ and DC. Specific targeting of DC was performed with Man-L. Specific binding of micelles and liposomes to C6 and F98 glioma cell lines was demonstrated while using Vit.C-L and Vit.C-M as well.

CONCLUSION

TATp and Man decorated liposomes enhance penetration and targeting respectively to DCs and might be combined for improving DC-targeted vaccines. On the other hand, Vitamin C liposomes and micelles were able to target cancer cells and can be used as a combination in immune anticancer therapies. Thus, these liposomes can be used as tools for DC-targeted vaccination/ glioma-cell drug delivery combination as a first step in immune therapy against cancer.

ANTIMICROBIAL PEPTIDES IMMOBILIZATION ON NATURAL AND SYNTHETIC SUPPORTS

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OBJECTIVES

Development of immobilized nisin systems focused on the production of antimicrobial agents releasing food grade material using natural and synthetic inorganic oxides as supports.

BACKGROUND

The immobilization of proteins on solid surfaces has an important role in biomedical, technological and environmental applications (1). Natural clay minerals have been used to immobilize amino acids, proteins and enzymes for different biological applications (2). Nisin is a food additive approved by the FAO/WHO and considered GRAS (Generally Regarded As Safe) by the FDA, signifying that its use in food is safe and harmless (3). Natural phyllosilicates are also considered safe food additives by the FDA. To our knowledge, there is no literature regarding the use of clays as supports for the deposition of nisin. Previous studies showed that immobilized nisin conserves a good antimicrobial activity when low hydrophobic supports such as synthetic silica were used. Clays have numerous advantages regarding this application: are inexpensive (due to the abundance of worldwide reservoirs), have a behaviour similar to silica (phyllosilicates), with the added advantage of being able to modulate hydrophobicity by surfactant modification processes, are used as food additives approved by the FDA, have been used as vehicles for controlled release of active ingredients of drugs with very good results (4, 5, 6, 7).

MONTMORILLONITE: THE SORBENT

Montmorillonite (MMT) is a hydrated alumina-silicate layered clay consisting of an edge-shared octahedral sheet of aluminum hydroxide between two silica tetrahedral layers. The imbalance of the surface negative charges is compensated by exchangeable cations (typically Na^{+} and Ca^{+2}). The parallel layers are linked together by weak electrostatic forces. This type of clay is characterized by a moderate negative surface charge (cation exchange capacity, CEC) and a high surface area (8).

NISIN: THE SORBAT

Nisin is a polypeptide bacteriocin produced by *Lactococus lactis* subsp. *lactis* which presents antimicrobial activity against a wide range of Gram-positive bacteria, including many heat-resistant and spore-forming bacteria, such as *Clostridium botulinum* and *Bacillus cereus*. It is also active against other organisms that can cause food spoilage and pathogens associated with foods, such *as Listeria monocytogenes.* Structurally, it is a 34 amino acid polypeptide, presenting cationic and hydrofobic characteristics, (9) with a molar mass of 3500 Da. It presents important functional properties, i.e. acid tolerance, thermo stability at low pH and a specific bactericidal mode of action (10*).*

THE SORBTION

The proposal is to study the immobilization of nisin in clays (montmorillonite). The materials obtained will be characterized using FTIR, RAMAN, RXD, TDA-TG, ZETA POTENTIAL, SEM, and evaluated for potential use as food biopreservatives, measured by the residual antimicrobial

activity against *Listeria monocytogenes,* a pathogen difficult to control in food due to its ability to grow at low temperatures, low pH and high NaCl concentrations.

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Thiol with an Unusual Adsorption-Desorption Behavior: 6-Mercaptopurine on Au(111)

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ABSTRACT

The formation of self-assembled monolayers (SAMs) of thiols on metals has been widely studied, not only for its basic interest, but also for their technological and biological applications. In particular, SAMs of thiopurines and thiopirimidines are of interest because they can help to understand certain highly organized biological structures, such as DNA. Moreover, 6-mercaptopurine (6MP) was among the first agents approved by the FDA for the treatment of cancer, particularly leukemia [1].

In this work, we have been studied and compared both 6MP and Hexanethiol (HT) SAMs on Au with (111) preferential orientation by cyclic voltammetry, scanning tunneling microscopy (STM), X-ray photoelectron spectroscopy (XPS), before and after electrochemical desorption. Also we have been make DFTcalculations of 6MP SAMs on Au(111).

Both Voltammetric and XPS experiments of SAMs HT and 6MP indicate the presence of a thiolate bond, similar to those already reported [2,3] However, STM images in air of 6MP SAMs on Au(111) reveal islands of height equal or less to that of one atomic gold layer [4]. In many cases the islands are aligned along preferential directions. There is a total absence of the gold vacancies usually found in SAMs of alkanethiols on Au (111), as such HT SAMs on Au(111). High resolution images obtained in the regions not covered by the aligned islands show a rectangular lattice with typical distances 0.75 ± 0.05 nm and 0.6 ± 0.1 nm, consistent with a $2\times3\sqrt{3}$, and similar to what was found for adenine on gold [5].
Finally, DFT calculations indicate strong chemisorption via a S-Au bond and additional binding to the surface via aN-Au bond. From DFT data, the positive charge on the Au topmost surface atoms is markedly smaller than that found for Au atoms in alkanethiolate SAMs. The adsorption of 6MP originates Au atom removal from step edges but no vacancy island formation at (111) terraces. Then .we propose that the absence of theAu-S interface reconstruction results from the lack of significant repulsive forces acting at the Au surface atoms.[6]

[1] Peter Karran and Natalie Attard, *Nature Reviews Cancer*, **2008**, 8, 24-36.
[2] Rafael Madueño, Teresa Pineda, Jose M. Sevilla, and Manuel Blázquez, *Langmuir*, **2002**, 18, 3903- 3909.
[3] Boland, T.; Ratner, B. D., Langmuir, **1994**, 10, 3845–3852.
[4] Thomas Boland and Buddy D. Ratner, *Langmuir*, **1994**, *10*, 3845-3852.
[5] Tao, N. J.; DeRose, J. A.; Lindsay, S. M., *J. Phys. Chem.* **1993**, 97, 910-919.
[6] *E. Pensa, P. Carro, A. A. Rubert, G. Benítez, C. Vericat, R. C. Salvarezza, Langmuir*, **2010**, 26, 17068-17074.

Annex 8: Governing Council Meeting Agenda

MEETING AGENDA

EULASUR GOVERNING COUNCIL

4th of October, 18:00h, Hotel Amancay, Bariloche (Argentina)

Confirmed attendance:

ICMAB-CSIC: Carlos Miravitlles, Susana Garelik, Marta Vendrell

DESY: Rainer Gehrke

CBS: Leif Bloch Rasmussen, Janni Nielsen

VN: Iolanda Olivato

UNLu: Hernán Bacarini, Antonio Arciénaga, Florencia Crocci

UdelaR: Álvaro Mombrú

CIOp – CONICET: Marcelo Trivi

INQUIMAE-CONICET: Ernesto Julio Calvo

UFMG: Wagner Rodrigues

CNEA: Carlos Balseiro

Not attending:

UAB: José Luis Briansó

IMPERIAL: John Kilner

UPMC: Clément Sanchez

CNRS-ICMCB: C. Delmas

EULASUR Advisory Board:

Roberto Fernández Prini: not attending for personal reasons

Britta Thomsem: not attending due to European Parliament sessions

Attending:

Alberto Nieto, Ex Director del Polo Tecnológico de Pando (Uruguay)
Raúl Conde, Vicerrector de Relaciones Internacionales de la Univ de Mar del Plata
Daniel Lupi, Presidente FAN

18:00h: **General review of the project by the Coordinator, WP4 and WP5 tasks review** (30 min)

C. Miravitlles

18:30h: **WP tasks review** (10 min. each, 30 min. total)

- WP1 Promoting Interactions: CBS (Leif Bloch Rasmussen, Janni Nielsen) + CNEA (Carlos Balseiro)
- WP2 Exchanges: UFMG (Wagner Rodrigues)
- WP3 Opportunities: UnLu (Hernán Bacarini)

19:00h: **Point of situation of deliverables and administrative and financial reviews** (30 min)

M. Vendrell

19:30h: **Scientific and administrative review of the 1st EULASUR Summer School (Bariloche) "Properties and Applications of Nanomaterials"** (10 min.)

C. Balseiro (CNEA)

19:40h: **Presentation of 1st EULASUR Workshop (Minas Gerais) "From Materials to Products"** (10 min.)

Wagner Rodrigues (UFMG)

19:50h: **Presentation of 2nd EULASUR Summer School (La Plata) "Simulation and Characterization of Materials and Nanomaterials (Multifunctional Ceramics and Hybrids Materials)"** (10 min.)

Marcelo Trivi

20:00h: **Summary and final conclusions**

C. Miravitlles

Annex 9: Governing Council Meeting Minutes

MEETING MINUTES

EULASUR GOVERNING COUNCIL

4th of October, 18:00h, Hotel Amancay, Bariloche (Argentina)

Attendees:

ICMAB-CSIC: Carlos Miravitlles, Susana Garelik, Marta Vendrell, Oriol Vallcorba

DESY: Rainer Gehrke

CBS: Leif Bloch Rasmussen, Janni Nielsen

VN: Iolanda Olivato

UNLu: Hernán Bacarini, Antonio Arciénaga, Florencia Crocci

UdelaR: Álvaro Mombrú

CIOp – CONICET: Marcelo Trivi, Daniel Schinca, Gustavo Torchia, Lucía Scaffardi, Jesica Santillán, Fabián Videla

INQUIMAE-CONICET: Ernesto Julio Calvo, Galo Soler Illía

UFMG: Wagner Rodrigues

CNEA: Carlos Balseiro

Not attending:

UAB: José Luis Briansó

IMPERIAL: John Kilner

ICMCB – CNRS: Jean Etourneau

UPMC: Clement Sanchez

EULASUR Advisory Board:

Roberto Fernández Prini: not attending for personal reasons

Britta Thomsem: not attending due to European Parliament sessions

Attending:

Alberto Nieto, Ex Director del Polo Tecnológico de Pando (Uruguay)
Raúl Conde, Vicerrector de Relaciones Internacionales de la Univ de Mar del Plata
Daniel Lupi, Presidente FAN

1. **General review of the project by the Coordinator, WP4 and WP5 tasks review**
C. Miravitlles made a presentation where following aspects of the project where highlighted:

- History: Background of the project.
- Overall Project: Participant partners, general objectives and main issues of the project.
- Relevant Activities: status of main activities of the project was commented:
  - First Summer School and Workshop in Bariloche (Argentina)
  - Workshop in Minas Gerais
  - Second Summer School in La Plata (Argentina)
  - Workshop in Copenhagen
  - Exchanges
  - Main FP7 project proposals where several EULASUR partners are involved in.
- WP 4 "Dissemination" Point of Situation:
  - EULASUR Website: New functionalities:
    - Exchanges application forms
    - Bariloche Summer School special website and application form
  - EULASUR Newsletters: 2 issues released.
- WP5 "Management": M. Vendrell pointed out some important issues of the project management.
  - **Mid Term Meeting**: the following was agreed between all the partners attending the meeting:
    - Date: December 13, 2010
    - Location: Barcelona (Europe), Buenos Aires (BRAU).
    - Connection between both cities by videoconference
    - Exact hour and location details will be sent to all partners in the following weeks.
    - Meeting organizers: ICMAB-CSIC, UNLu
  - **Grant Agreement Amendment**:
    - Not approved yet by EC.
    - Money from UNICAM to celebrate the Summer School will go to CIOp (partner in charge of the Second Summer School), rest of the money from this "missing" partner will be reallocated into all the partners to cover extra trip expenses.

2. **WP tasks review**
   - WP1 Promoting Interactions: Leif Bloch Rasmussen presented new concepts and ways to create value in the EULASUR network. Ways of work to favor innovation and collaboration among partners which lead the project to a real collaboration platform where new project proposals come up and give continuity beyond 2012.
   - WP2 Exchanges: Wagner Rodrigues delivered a presentation explaining the point of situation of this work package, where even that the policy for exchanges has been written and approved by all partners and the application form for exchanges is available in the EULASUR website, no exchanges have been carried out yet. This means a deviation from the initial project and all partners were asked to plan some exchange for the next months.
   - WP3 Opportunities: Antonio Arciénaga presented the work done in this WP until the moment which goes in different directions:
     - Getting information about National Initiatives & Actors on Nanotechnology & Materials.
     - A list of facilities that give Service to R&D Activities has been done for the interest of all partners.
     - Methodologies to Build International Road Maps are being developed.
     - Set of Different Questionnaires: a) groups of excellence; b) networks and core research issues; c) industrial research priorities; d) facilities available in EU/BRAU; have been prepared.

3. **Administrative and financial issues.**
   M. Vendrell showed a presentation with the essential concepts of the finance in FP7 projects and explaining how to make technical and financial reports.

   Several questions about the type of costs and what costs can be eligible or not came up during the presentation among the partners.

4. **Scientific and administrative review of the 1st EULASUR Summer School (Bariloche) "Properties and Applications of Nanomaterials"**
   C. Balseiro will prepare the conclusions of the School and present them at the end of the event with the Conclusion Remarks.

5. **Presentation of 1st EULASUR Workshop (Minas Gerais) "From Materials to Products"**
   Wagner Rodrigues presented the objectives, main issues and a draft of the programme for this Workshop and proposed dates April 4-6 to celebrate it.

   This Workshop will need to be coherent with the results of the Workshop held in Bariloche and capitalize the value and experience created by it.

6. **Presentation of 2nd EULASUR Summer School (La Plata) "Simulation, Characterization and Optical Methods for Materials and Nanomaterials (Multifunctional Ceramics and Hybrids Materials)"**
   Daniel Schinca introduced the CIOp team who will work in the organization of this Summer School, and presented the objectives and main subjects of the event. After, explained developments that are being accomplished in the programme of the School trying to involve high level researchers from Europe and Latin America.

   Organizers of this School will agree with CBS to dedicate some time

7. **Advisory Board:**
   Raúl Conde, Alberto Nieto and Daniel Lupi showed their full support to the EULASUR project and highlighted the importance of the EULASUR project to bring together researchers from Latin America and Europe to discuss about their interests and find points I common to develop new research in the frame of the FP7 and future European Framework Programmes.

8. **Next steps:** Following activities need to be highly boosted and carried out within next three months:
   - Final report of First EULASUR Summer School in Bariloche, together with the presentations delivered by participants in this school and the parallel Workshop will be sent to all partners and uploaded in the EULASUR website.
   - First EULASUR Workshop in Minas Gerais has to be defined in detail, exact location, dates and participants have to be settled as well as final programme and criteria to grant participants from Europe and Latin America.
   - Each partner has to plan an exchange to be carried out the latest in February 2011. At this date at least 5 exchanges should be done.
   - WP 3 leaders need to make the information gathered and prepared available for all partners and think on how the questionnaires will be distributed and how resultant information will be analyzed.
   - CBS will prepare a document with the basis of future projects to be developed in the frame of the EULASUR project. This document will be sent to all partners and afterwards will be submitted to EC officers.
   - All partners will need a major involvement in the dissemination WP, creating news from relevant activities in their own institutions and sending them to WP leaders to be published in the EULASUR website and newsletter.
   - Amendment should be approved by the EC in the next months. When this happens Coordinator will send new A3.1 budget tables to all partners.
   - These points will be revised and discussed in the next meeting of the Governing Council in Barcelona and Buenos Aires. All partners will be informed about details of this meeting before the end of October.

9. **Attachments:** Presentations delivered by the partners in the meeting.


General and WP4&5 - ICMAB


WP1 - CBS


WP2 - UFMG


WP3 - UNLu


EULASUR Finance - ICMAB


WorkshopBH - UFMG


SummerSchool La Plata - CIOp

Annex 10: Pictures of the event

Hotel Amancay

Hotel Views

Plenary Room

Workshop Room

Big Room

Lobby

Lunch and Dinner

Gala Dinner

Governing Council Meeting

Attendees to First EULASUR Summer School