

NEWSLETTER

Breakthrough of new Networking between European Materials Research Centres

Welcome to the second issue of the ENMat Newsletter. ENMat has been founded in September 2005, to create a powerful network of leading Materials Research Centres in Europe. We expect to stimulate beneficial interdisciplinary activities between members of the network as well as to increase the efficiency of the transfer of results from R&D to industry. We also expect to improve opportunities for participation in activities in the frame of EU-FP7 within joint projects.



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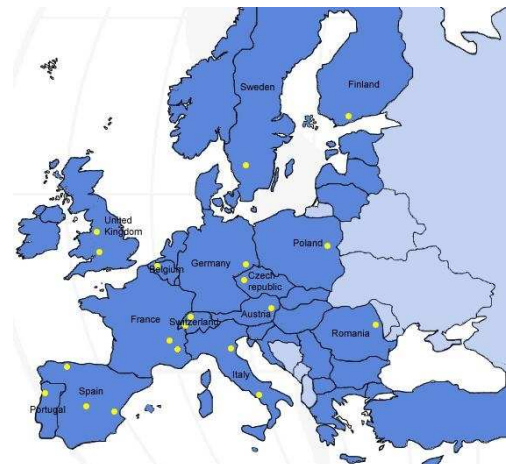
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Members

- AIDICO, Construction Technology Institute, Valencia, Spain
- AIT Austrian Institute of Technology GmbH, Seibersdorf, Austria
- Centre for Materials Science and Engineering (CMSE), Ghent University, Ghent, Belgium
- Centre for Research and Development of Materials and Technologies (CRDMT), Prague, Czech Republic
- Competence Centre for Materials Science and Technology (CCMX), Ecole Polytechnique Fédérale de Lausanne, Switzerland
- Department of Materials and Production Engineering, University "Federico II Napoli", Naples, Italy
- Department of Metallurgy and Materials, University of Birmingham, Birmingham, UK
- EMPA Swiss Federal Laboratories for Materials Testing and Research, Dübendorf, Switzerland
- Fraunhofer Institute for Ceramic Technologies and Systems (IKTS), Dresden, Germany
- French Atomic Energy Commission (CEA), Grenoble, France
- Fundacion ITMA, Llanera, Spain
- Institute of Mechanical Engineering and Industrial Management – INEGI, Porto, Portugal
- Institute of Science and Technology for Ceramics (CNR-ISTEC), Faenza, Italy
- Laboratoire des Multimatériaux et Interfaces, Université Claude Bernard Lyon 1, Lyon, France
- Materials Design Division, Warsaw University of Technology, Warsaw, Poland
- "Petru Poni" Institute of Macromolecular Chemistry, Iasi, Romania
- School of Materials, University of Manchester, Manchester, UK
- SP Materials Research Centre, SP Technical Research Institute of Sweden, Borås, Sweden
- Universidad Complutense de Madrid, Madrid, Spain
- VTT Technical Research Centre of Finland, Espoo, Finland



ENMat Members - CSNMT, Prague

The Czech Society for New Materials and Technologies – SVÚM a.s., Prague. Web page: www.svum.cz

The Czech Society for New Materials and Technologies (ČSNMT) was founded in 1993 as a voluntary association. It now includes 337 individual members and 42 „team” members – Technical Universities, Research Companies, Industrial enterprises, Academia and others – see diagram. Activities are focused on research cooperation, organising conferences and workshops, transfer of new technologies and research knowledge into industry, preparing consortia and solution of national and international projects, promotion of education in materials engineering, etc. One of the founder members is **SVÚM a.s., Prague** – Research and Testing Centre. This company was founded in 1949 as a non profit organization (National research institute for materials - SVUM), from 1994 it is a **fully private company** with 58 employees – 30 of them are scientific and research workers. The company is one of the most respected materials research and testing institutions in the Czech Republic. Main activities:



1. Basic and applied Research and Development

- Metals, Plastics, Composites
- Technology and Heat Treatment
- Advisory services, expertises, supervision
- Machine parts life prediction
- Failure analyses of investment plants, constructional parts and tools

2. Testing of Materials

- Accredited labs according to CSN EN ISO/IEC Standard 17025 (European/Worldwide validity)

- Certificate from GE Aircraft Engines, USA
- Mechanical testing, low cycle, high cycle fatigue, stress corrosion cracking, contact and bending fatigue, thermal fatigue, evaluation of service life of components with defects, optical and scan microscopy
- High temperature corrosion in air and aggressive atmospheres, materials and coatings in corrosive environment
- Creep strength testing, stress rupture tests
- Testing of tribological properties

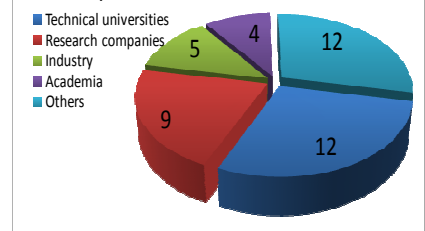
3. Special Technologies and Production

- Quality Management System according to Standard ISO 9001:2000
- Corrosion resistant coating, nanocoating PTFE, TEFLON Products, self lubricating Self bearing foil METALOPLAST
- High Performance permanent Magnets
- Welding + certification body, testing organisation of CWS-ANB (Czech welding society-Authorised national body)

- 4. **Cooperation** with Czech and foreign companies, Research Institutes and Technical Universities. Leading and participation in Czech + International research projects, EU programmes – EUREKA, COST, FP6, FP7, etc.



Membership



ENMat Members - CMSE



Centre for Materials Science and Engineering (CMSE) Ghent University

CMSE

The Centre for Materials Science and Engineering (CMSE), founded in 2000, combines the broad expertise in Materials Science available at Ghent University, Belgium. CMSE is a coordinating organisation of 12 departments in the Faculties of Engineering Science, Science, Bio engineering science and Medicine working together at an **interfaculty** and **multidisciplinary** level. More than 300 persons, including around 50 professors and approximately 180 researchers, are working in the field of Materials Science and Engineering.

CMSE aims at a **cooperation** in the field of materials science and the further development of this domain at Ghent University via activities on different levels (education, research and development, service providing to the industry, technology transfer). CMSE functions as coordinator of joint multidisciplinary national and international research projects and builds a platform for consulting / discussion regarding the vision on education and research in the field of materials science.

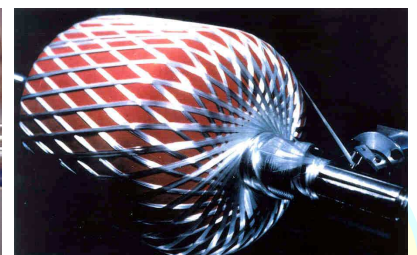
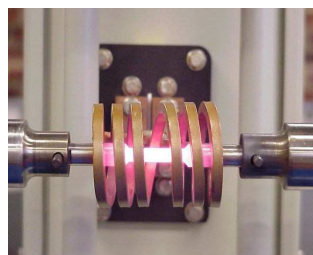
Among the activities of the CMSE are **research** in the field of materials science and the **industrial applications** for a large variety of materials, such as metals, (bio) polymers, ceramic materials, composites, textiles, materials linked to concrete, biomaterials, semiconductors, electronics, coatings, chemicals, wood and wood-based materials. Research results are applied in order to obtain material developments leading to products with a high added value and materials innovation. Interdisciplinary and multidisciplinary research (properties, structure, applications, processing, model-

ing, ...) is stimulated in order to develop new materials, find new applications, optimise materials, ...



One of the objectives of CMSE is the development of a common research infrastructure that can be used by all members. In addition each of the participating departments has at its disposal a wide range of equipment and techniques necessary for the execution of the research mentioned above. An overview of the research infrastructure available at each department can be found through the CMSE website (<http://cmse.UGent.be>). CMSE is one of the founding members of ENMat and its chairman, Prof. Paul Kiekens, has been the First President of ENMat

for 4 years. It is also actively involved in the COST Action MP0701 on polymer nanocomposite materials. On 24th September 2009 a COST Day on “*Biotechnological Functionalisation of Advanced Fibre Reinforced Composites*” (cooperation between COST actions 868 and MP0701) was organised in Ghent in the framework of the International Conference on “*Latest Advances in High Tech Textiles and Textile-Based Materials*” from 23 - 25 September 2009 (<http://www.textileconferences.be>). Next to the plenary session of the COST Day, attended by around 200 people, there were also parallel sessions on “*Advanced Fibre Reinforced Composites*” and “*Nanocomposites*”. The papers of all presentations were published in the conference proceedings.



Web page: <http://www.enmat.eu>

COST ACTION MP0701

The COST action MP0701 on **Polymer Nanocomposites** is now in its third year being in operation for now 30 months. The action is scheduled to last for a total of 48 months. Already 31 out of 35 COST countries have joined the COST action MP0701. This means that each laboratory out of these countries is in principle entitled to participate in the workshops, seminars, conferences, summer schools and scientific exchange programmes. Also participants from 15 Non-COST countries have already participated in the various activities of COST MP0701. A number of conferences and thematic workshops have already been performed in order to facilitate information exchange and to intensify the cooperation between the laboratories. A total of 270 individual scientists and researchers have participated so far. The upcoming workshops and other activities of 2010 are listed in the table below.

Table . List of activities of the COST action MP0701 in 2010 and beyond

| Date | Place | Type | Title |
|------------------------------|-----------------|---------------------------|--|
| June 1st 2010 | Wiener Neustadt | Workshop | Industrial applications of Polymer Nanocomposites |
| September 23rd and 24th 2010 | Novi Sad | Workshop | Nanoparticles Surface (Modified/Unmodified) as a base for the interaction with polymer matrix |
| October 5th and 6th 2010 | Graz | COST day and conference | Food packaging innovations |
| November 30th 2010 | Krakow | MC meeting | 3rd MC meeting of COST action MP0701 |
| December 1st - 3rd, 2010 | Krakow | Conference / Workshop | 4th International Seminar on Modern Polymeric Materials for Environmental Applications/COST Workshop: Environmental impact of polymer nanocomposites - from preparation to recycling |
| April 2011 | Napoli | Training school | Synthesis of hybrid organic-inorganic nanoparticles for innovative nanostructured composites |
| 7-10 June 2011 | Paris | Workshop/ Training School | Multiphase Polymers and Polymer Composites Systems: Macro to Nano Scales |

REFERENCES

<http://www.nanocomposites-cost.eu>
<http://www.cost.esf.org/>

FINANCIAL SUPPORT FOR STSM

Short Term Scientific Missions - STSM

STSM Coordinator: Prof Francesco Branda, branda@unina.it
 Chair of the action MP0701 Dr. Erich Kny, erich.kny@ait.ac.at

Aim

The aim of a Short-Term Scientific Mission (STSM) shall contribute to the scientific objectives of a COST Action. These Missions (Exchange Visits) are aimed at strengthening the existing networks by allowing scientists to go to an institution or laboratory in another COST MP0701 member state actively participating in the COST MP0701 action to foster collaboration, to learn a new technique or to take measurements using instruments and/or methods not available in their own institution/laboratory. They are particularly intended for young scientists (early stage researchers (ESR), a ESR is defined as PhD + max. 10 years).

Duration

The duration of STSM is minimum one week (5 working days) and maximum 3 months (maximum 6 months for early stage researchers).

Financial support

The financial support is a contribution to the expense of a STSM and may not necessarily cover all the costs in each case. The grant should normally cover only travel and subsistence. The financial contribution for a STSM will be a fixed grant based on the Applicant's budget request and the evaluation of the application by the STSM assessment committee. The total grant for a STSM shall normally not exceed 2500 € (3500 € for ESR). An amount of 60 to 90 € is recommended for the daily allowance, in particular for longer stays, and 300 € for the travel. **Any exception needs special justification.**

The Applicant must use the **on-line registration tool**

<http://www.cost.esf.org/stsm>

The applicant will submit his full application to the STSM coordinator of the COST action MP0701, Prof. Francesco Branda (branda@unina.it), **8 weeks before the intended start date of the mission. This should ensure that the full application together with the MC approval can reach the COST office in time.** The application together with the MC approval and the other necessary documents should arrive at the COST Office latest **4 weeks** before the mission starts.

Web page: <http://www.enmat.eu>

The STSM performed in 2008/2009 are shown in the following table.

| Applicant | Sending Institution | Host institution | Period | Topic |
|-------------------------|---|---|-----------------|---|
| Donatella Duraccio | Istituto di Chimica e tecnologia dei Polimeri CNR Napoli (IT) | University of Reading (UK) | 22/9-23/12/2008 | Structure and morphology development during melt crystallization of isotactic polypropylene modified with clay and hydrocarbon resin |
| Kotaro Ishizaki | EMPA – Suisse Federal Laboratories for Materials Science and Technology Thun (CH) | Universidad Politecnica Valencia (ES) | 8-21/9/2008 | Sensor using electrical properties for process control in the production of nanostructured polymer composites |
| Daniel Schick | University of Rostock (DE) | EMPA – Suisse Federal Laboratories for Materials Science and Technology Thun (CH) | 13/10-7/11/2008 | Study of interfacial interactions between nano-sized quasicrystals and a polymer matrix (UHMWPE) during fast selective heating with microwave radiation |
| Ivo Safarik | Institute of Systems Biology and Ecology, 370 05 Ceske Budejovice (CZ) | Plant and Food Research, Lincoln, (NZ) | 6-21/4/2009 | Magnetically responsive nanofibre composites |
| Kikku Fukushima Winkler | Politecnico di Torino – sede di Alessandria, Alessandria (IT) | Universite de Mons-Hainaut, UMH, Mons (BE) | 19/4-31/5/2009 | Fire retardant nanocomposites by reactive processing |
| Magdalena Gizowska | Warsaw University of Technology, Faculty of Chemistry, Warsaw (PL) | EMPA - Materials Science & Technology, Dübendorf (CH) | 1/6-31/8/2009 | Stabilization of nanoalumina suspension in gold electroplating bath for nanocomposite coatings |
| Antonino Falsone | University of Palermo, Palermo (IT) | SciTe B.V., Geleen, The Netherlands, Geleen (NL) | 15/8-15/11/2009 | Characterisation of nanostructured materials by HPer DSC |
| Marta Martins | INEGI – Institute of Mechanical Engineering and Industrial Management, Porto (PT) | Departamento de Química Inorgánica - Universidad de Salamanca, Salamanca (ES) | 16 – 27 /9/2009 | Preparation of nanoparticles and their characterization |
| Anatolijus Eisinas | University of Technology, Kaunas (LT) | Latvian State Institute of Wood Chemistry, Riga (LV) | 8-29 /3/2010 | Surface microstructure and specific surface area of a new filter for epoxy polymer-layered silicate |

WUT - EMPA STSM Exchange

Composites with novel functional and structural properties by nanoscale materials (Nano Composite Materials – NCM)

Report on the stay of a young researcher from Warsaw University of Technology at EMPA with a COST MP0701 STSM grant.



EMPA is an interdisciplinary research and services institution for material sciences and technology development. It is open to various levels of cooperation not only with industry units, but with research institutes and universities as well. Additionally, it contributes to young scientists' development and mobility sharing the experience it gained through the years. The Department of Inorganic Technology and Ceramics of Warsaw University of Technology (WUT) has a long tradition which history began in 1919. The students' education curriculum includes acquiring knowledge of technological processes from both theoretical and practical point of view with particular emphasis laid on physicochemical aspects that govern the processes.

EMPA has been cooperating with WUT since a few years already. However, I am the very first person from my department who took part in the exchange programme.

One of the projects within the STSM COST Action frame in which EMPA – Materials and Science Technology (Switzerland) collaborates with the Department of Inorganic Technology and Ceramics at the Faculty of Chemistry (WUT, Poland) concerns the development of a fabrication method for metal-ceramic nanocomposite coatings obtained by electrochemical means. The work is divided into two parts:

- Stabilisation investigation of ceramic nanoparticles in a plating bath carried out in EMPA Dübendorf,
- Electrodeposition experiments conducted in EMPA Thun.

I divided my work time between the two departments: Laboratory of High Performance Ceramics (EMPA Dübendorf) and Laboratory for Mechanics of Materials and Nanostructures (EMPA Thun). Depending on the research area, I get a feedback from these two groups of the Swiss institute. In both places I received a great support from experienced scientists.

This interdisciplinary project combines topics from colloid science and electrochemistry giving opportunity for experience exchange for researchers from different scientific fields.

ENMat EXPERTISE IN THE FIELD OF BIOMATERIALS RESEARCH

VTT TECHNICAL RESEARCH CENTRE OF FINLAND

Expertise on following biomaterials and biopolymers :

- Novel biodegradable polyesters
- Starch
- Cellulose derivatisation
- Nanocellulose
- Organically modified nanoparticles
- Self-assembled organic coatings
- Hydrophobin proteins
- Organic conductors
- Metallic and ceramic coatings (e.g. thermal spray coatings)
- Biocompatible sol-gel coatings

Actual research domains concerning (bio)polymers technology / Competences :

- Development of Fibre Reinforced Biocomposites and their processing methods
- Development of Biopolymer foams
- Bioelectronics (biomicrosystems, cell culture platforms, arrays for drug testing, MEMS, lab-on-chip)
- Nanobiotechnology (Self-assembled molecular biosensors, surface active proteins, nanocellulose, metallic nanoparticles, carbon nanostructures, combination of top-down and bottom-up techniques, and biological interfaces)
- Biochemistry
- 3D printing of biopolymer scaffolds for tissue engineering (Direct Write Technology)
- Bio-lubrication and -tribology
- Biomimetic surfaces
- Sol-gel chemistry
- Thermally sprayed coatings

BIOMATERIALS AND BIOMECHANICS AT INEGI

INEGI Biomaterials and Biomechanics group is working on the following research topics:

• Regenerative medical devices

Dimensioning of hydrolytic biomechanical damage of biodegradable devices. Research project aiming at the development of a Ligament Augmentation Device, made of a synthetic biodegradable polymer. Simple 1D damage models are studied that will include fatigue, creep, and hydrolytic damage models. These models were adapted and parameterisation was done for the particular case of an Anterior Cruciate Ligament. Parameters were established based on static and dynamic tensile tests to measure strength evolution, Dynamic Mechanical Analysis test to measure viscoelastic properties, Gel Permeation Chromatography to measure the decrease in molecular weight and Differential Scanning Calorimetry to measure crystallinity increase along degradation. This model will be used for the dimensioning and optimisation process of the functional compatibility of the device, by allowing the simulation of the mechanical properties evolution and life time prediction. The models used in this application can be further adapted to other applications with different performance requests, and other complicated 3D geometries. We also supply MEDMAT with 3D models in epoxy resin of bone parts, to produce bone scaffolds made in Bonelike®. We intend to invest and explore other rapid prototyping techniques,

• Reconstructive medical devices

Projects concerning orthopedic prostheses, mainly joint. Equipment available to produce titanium parts by controlled atmosphere casting. Composite manufacturing technologies such as autoclave and hot plate press to produce composite parts of medical devices. Testing facilities to validate the functional compatibility, such as endurance testing on femoral stems, relative displacement between prosthesis and bone, material testing on bone cements, stress shielding analysis using strain sensors, wear studies on acetabular components, etc. Development of medical devices from concept generation, material selection, mechanical simulation and dimensioning, modeling until prototyping.

• Smart biomaterials

Development of smart structures for bone prosthesis. This prosthesis will be able to adapt, by sensing the surrounding environment and actuate in order to prevent loosening. This smart structure will last longer than the actual arthroplasties (10-15 years). These smart structures are composed of a hybrid network of sensors along the surface (optical and electric for measurements of strain, temperature, displacement, etc.), network of electrical actuators (to promote bone growth at the surface), battery and controller. In the ambit of biomedical engineering a smart device should also promote an intelligent response from the biologic host environment. In a recent project a programmed drug release system will be developed. Bioactive systems are being studied to be used at prostheses surface, to locally deliver pharmacies according to needs, to avoid loosening. The goal is to move from the current reconstructive concept of joint prosthesis toward the regenerative concept.

Web page: <http://www.enmat.eu>

BIOMATERIALS RESEARCH TOPICS AT WUT

The BIOGroup is a research group focused on investigation and development of advanced materials for medical application. The main aim of the BioGroup is to develop and initiate new technological solutions for biomaterials, implants, tissue engineering products and drug delivery systems in the purpose of treatment of human diseases as well as for improving health. Especially, the research is concentrated on finding solutions for the cartilage and bone tissue repair and regeneration. Besides the wide range of subjects related to materials and devices for medical application the Biogroup is working on, particular strength and interest are in the following research topics:

- **Biomaterials and advanced scaffolds** for the repair of articular cartilage and bone defects including advances in micro- and nanotechnology to design and process biomaterials (e.g. polymeric and metallic porous structure, biodegradable synthetic polymers as well as polymer-ceramic composites, nanofibres) that can guide, accelerate, and/or act as a temple for tissue regeneration and/or formation;
- **Biomaterials for artificial joints** including development of new materials for implants (artificial cartilage hydrogels and nanotitanium), ceramic coatings (CaP and TiO₂) and study on performance of orthopedic total joint replacement (e.g. hip, knee, elbow, and shoulder implants) through fundamental materials studies including materials testing and implant retrieval analysis;
- **Biomaterials for dental restoration** including optimisation of the microstructure of composites for restorative materials in stomatology with the aim to improve mechanical properties and reduce the contraction during polymerisation by reinforcement of the composites with nanoparticles;
- **Drug delivery systems** including development of nanostructure polymeric coatings for drug delivery devices like coated bone fixation implants.
- **Computational modeling** (e.g. using finite element methods) for biomaterials and implant-tissue systems including computation of stress concentration in non-homogenous materials and biological systems, and scaffold design and optimisation.

BIOMATERIALS RESEARCH TOPICS AT CMSE/UGent

(a) Biotechnological Functionalisation of Textile Materials

The general aim of our research is to functionalise textile materials using modern biotechnology. This will result in new, specific knowledge and technologies to create biotechnologically modified textile materials with unique properties. The application of functional textile (bio) polymers is typically in the field of (bio)medical, safety, care and signalling/detection but also in less obvious application areas such as e.g. tissue engineering, separation technology and potentially even in aerospace research.

The focus of our work is on:

- Biomimetics in textile and fibre engineering.
- Specific enzymatic surface modification to obtain functional structured surfaces, and enzymatic functionalisation of polymeric and biopolymeric textile materials.
- Incorporation of biocatalysts in, or on the surface of textile materials.
- Biotechnological functionalisation using inkjet technology
- Control of biocatalytic action at correct time and length scales is a prerequisite to achieve the desired functionalities. Therefore, sophisticated technologies and processes will be explored in order to design novel production processes for textiles that exhibit the desired functionalities.

Current projects

- BIOTIC – Biotechnological functionalisation of (bio)polymeric textile surfaces.
- NO BUG – Novel release system and bio-based utilities for insect repellent textiles and garments.

More information: <http://textiles.ugent.be/>

(b) Synthesis and characterisation of hybrid organic nanoparticles

Synthesis and characterisation of hybrid organic nanoparticles (30-100 nm), consisting of a polymer shell and up to 70 wt-% biorenewable vegetable oils (e.g. palm-oil, soy-oil, corn-oil, rapeseed-oil, castor-oil, ...). The amount of biorenewable material in the nanoparticles is significant, reducing the cost compared to unfilled nanoparticles while increasing the particle functionality. These nanoparticles can be synthesized on laboratory scale and some are available on industrial scale, as an aqueous dispersion with up to 60 wt-% solid content. At present, these particles are used for improving the barrier resistance and hydrophobicity of packaging materials (paper, cardboard) or textiles, but they have further potential for retention/release of the encapsulated biorenewable oils and oil-soluble pigments.

(c) Biomaterials for dental restoration

- Development and optimisation of bone cements–calcium phosphates
- Development and optimisation of glass ionomer cements
- Evaluation of dental composites
- Study of the fluoride release of materials with regard to caries prevention
- (De)mineralisation of biominerals (such as enamel, dentin and urinary stones)

TECHNOLOGY OFFER - TOPCHIM

Topchim, a Belgian SME, has developed a technology to make water dispersed nanoparticles derived from organic polymers. Starting materials are co-polymers of styrene and maleic anhydride, which upon imidisation form nanoparticles with a diameter of around 100 nm. Due to the organic nature of the nanoparticles the physical properties of the nanoparticles can easily be modified and the interactions between the particles, and between the particles and the substrate is much higher than with inorganic nanoparticles. By applying the organic nanoparticles to a substrate, properties such as printability, gloss and water repellence can be much improved. The nanoparticles provide a certain roughness to the substrate so that a lotus effect is observed. Contact angles with water of more than 140 degrees are obtained. Furthermore, Topchim succeeded in encapsulating active ingredients, such as biorenewable oils, UV absorbers, dyes, biocides and optical brighteners into the nanoparticles. By doing so a water dispersion with a high stability is obtained that turns into a hydrophobic material upon drying.

Further research is being performed within a joint project with the "Centre for Materials Science and Engineering" (CMSE) of Ghent University, funded by the "Institute for the promotion of Innovation by Science and Technology in Flanders" (IWT).

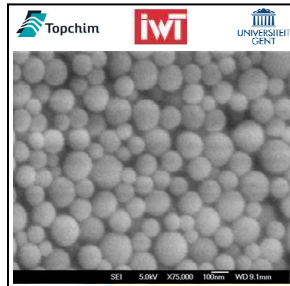
So far, Topchim has focused on the application of the nanoparticles on paper and card board. Now it is looking to the application on new substrates such as fibres, fabrics and nonwovens, glass, metals, wood, concrete, etc. Moreover, these nanoparticles can be combined with several chemicals in order to increase their functionality, opening possibilities for further application in surface treatment.

More info on : <http://www.topchim.be>

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EVENTS

- Summer School on Materials Characterisation : 25-27 August 2010 - A short-course on **Advanced Characterisation Techniques of Materials** at EPFL, Lausanne.
URL : <http://www.ccmx.ch/news/news-single/article/105/31.html>
- **International Aerosol Conference 2010**. August 29 - September 3, 2010, Helsinki, Finland.
URL : <http://www.iac2010.fi/>
- 23rd and 24th September 2010 in Novi Sad, Serbia: COST MP0701 Workshop on "**Nanoparticles Surface (Modified/Unmodified) as a base for the interaction with polymer matrix**".
URL : <http://www.nanocomposites-cost.eu/?News>
- VTT **Functional materials industrial workshop 2010**, 24 September 2010, Espoo, Finland.
URL : http://www.vtt.fi/files/mail/2010_18/
- **2010 TAPPI International Conference on Nano for the Forest Product Industry**, 27-29 September 2010, Espoo, Finland.
URL : <http://www.tappi.org/2010Nano>
- **Nanoparticle products from new mineral resources in Europe**, Workshop, 30 September 2010, Espoo, Finland.
URL : <http://promine.gtk.fi/>
- October 5th and 6th 2010 : A "**COST day on Food Packaging**". Cooperation between COST actions MP0701 on Polymer Nanocomposites, FA0904 on Eco-sustainable Food Packaging based on Polymer Nanomaterials and MPN 527 on Plasma Polymers and related materials. Location: Graz, Austria.
URL : <http://www.matchmaking.at/foodpackaging>
- **2nd International Conference NANOCON 2010** : 12-14 October 2010, Olomouc, Czech Republic.
URL : www.nanocon.cz
- 13th CCT - Ceramics, Cells and Tissues Annual Seminar & Meeting on **Regenerative Nanomedicine. Tissue and Genetic Engineering, and the role of Ceramics** : 17-20 May 2011, Faenza, Italy.
URL : <http://www.istec.cnr.it/eventi.htm>
- COST action MP0701 Workshop and Training School on **Multiphase Polymers and Polymer Composites Systems: Macro to Nano Scales**, 7-10 June 2011, Paris, France.
URL : <http://www.nanocomposite2011.eu/>