Issue 1, February 2009

European Network of Materials Research Centres

NEWSLETTER

Breakthrough of new Networking between European Materials Research Centres

Welcome to the first issue of 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.

Mission

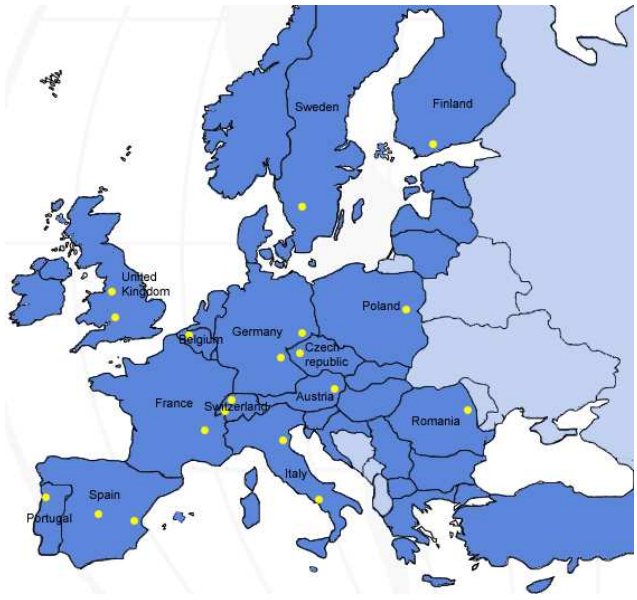
- To encourage and strenghten the creation of knowledge, dissemination of the results and the beneficial use of materials science & technology
- To be the leading network for materials based innovation for students, researchers, engineers and industry in Europe

Objectives

- To create a responsive, flexible, innovative, agile and adaptive network of leading European Materials Research Centres.
- To facilitate co-operation in interdisciplinary research, development and training amongst members - from fundamental research to innovative application.
- To encourage student and staff mobility and networking amongst members and invited or co-operating partners.
- To promote the activities and achievements of the members on a European and global stage.
- To facilitate partnerships amongst members and temporary partners with materials related industries.
- To invigorate Science, Engineering and Technology (SET) outreach through the Network.
- To identify challenges and opportunities in SET and best practice.
- To identify the needs of industry, in particular SMEs, in Europe and implement targeted co-operation by seeking high added value for clients/partners/sponsors.
- To respect the highest ethical recommendations to promote Sustainable Development and to overcome barriers hindering creativity.

Members

- AIDICO, Construction Technology Institute, Spain
- Austrian Research Center, Seibersdorf (ARCS), Austria
- Centre for Materials Science and Engineering (CMSE), Ghent University, Belgium
- Centre for Research and Development of Materials and Technologies (CRDMT), Czech Republic
- Centre of Excellence New Materials North Bavaria, Germany
- Competence Centre for Materials Science and Technology (CCMX), Switzerland
- Department of Materials and Production Engineering, University Federico II Napoli, Italy
- Department of Metallurgy and Materials, University of Birmingham, UK
- EMPA Swiss Federal Laboratories for Materials Testing and Research, Switzerland
- Fraunhofer Institute for Ceramic Technologies and Systems (IKTS), Germany
- Institute of Mechanical Engineering and Industrial Management (INEGI), Portugal
- Institute of Science and Technology for Ceramics (CNR-ISTEC), Italy
- Laboratoire des Multimatériaux et Interfaces, Université Claude Bernard Lyon 1, France
- Materials Design Division, Warsaw University of Technology, Poland
- Petru Poni Institute of Macromolecular Chemistry, Romania
- School of Materials, University of Manchester, UK
- SP Technical Research Institute of Sweden, Sweden
- Universidad Complutense de Madrid, Spain
- VTT Technical Research Centre of Finland, Finland



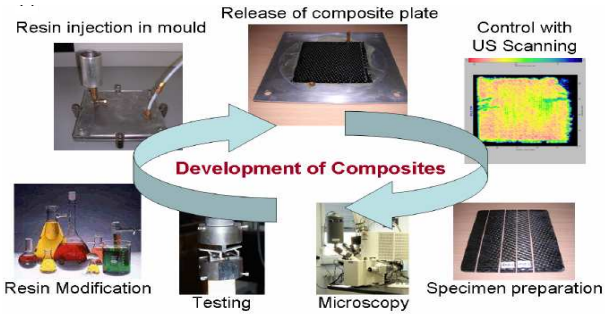
Web page: http://www.enmat.eu

ENMat Members-the Austrian Research Center

The Austrian Research Center- ARC www.arc.ac.at is Austria's largest non-university research institute, with approx. 1000 employees and an annual turnover of about 100M€ in 2007. Founded in 1956, the ARC understands its role as innovation partner of industry and of public organisations. ARC acts as a service provider in the field of application-oriented research and technology development combining a broad interdisciplinary catalogue of skills with specialised know-how. ARC is presently restructuring its R&D focus of activities on the topics of Energy, Mobility, Health and Environment, Safety and Security. ARC´s activities in materials are on materials testing and materials development for Aerospace use and for Lightweight structures. The expertise in Aerospace technology is reflected by a number of established competencies, e.g. a contract to ESTEC acting as one Space Materials Test house since 1989. Due to its wide set of highly specialised facilities, it was accepted by the EU as a major research infrastructure of the EU in the field of Aerospace Materials. It is further engaged as the co-ordinator and test centre of the Austrian Aerospace competence network for composites and lightweight materials and was nominated as the national point of contact to the Aeronautical Research Group of EREA. The development and production of nano powders, surface activation processes, polymer technology and composite testing and development are established working areas. ARC Leichtmetallkompetenzzentrum Ranshofen GmbH (LKR) www.lkr.at is part of Austrian Research Centers and is active in R&D for light metals and light weight structures. LKR has been involved in automotive and aerospace related topics since its foundation in 1994. For example, the developments of metal matrix composites and related joining techniques were researched within European projects. In recent years projects related to Magnesium and Titanium alloys were in the focus of the LKR lead aerospace consortia. Since 2004 LKR started to integrate all projects dealing with mechanical design of structural parts, joining techniques and CAE tools into the new Light Weight Design group which is in cooperation with other ARC divisions in specific projects. Since 2005 LKR is leading the Austrian Light Weight Structures R&D consortium consisting of ARC members and other Austrian research groups. LKR is a scientific partner in the Austrian Aeronautics Research Network for Materials and Engineering and member of AAIG, the Austrian Aeronautics industry Group.

ARC is further involved together with industrial companies and universities in the Competence Centre for electrochemical surface technologies (CEST GmbH) which employs 60 highly specialised scientists. The focus of the work is on surface coatings and surface structuring with electrochemical techniques, on corrosion, on modelling of electrochemical processes and on up scaling of surface coating processes.

Recently a European networking activity in the framework of COST has been started focussing on polymer nanocomposite materials (COST MP0701). Since the start of the action (March 2008) more than 20 countries have signed up for participation. A large conference in September 2008 in Warsaw with about 100 international presentations has been conducted and has been a showcase of the widespread competencies within the network. A special workshop on fire resistant nanocomposite polymer materials was conducted in Porto in November 2008 in cooperation with INEGI.



ENMat Members-AIDICO

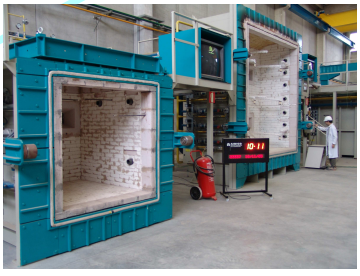
AIDICO- Technological Institute for Construction. Spain

AIDICO (www.aidico.es) is a private non-profit Construction Technology Institute registered at the Innovation and Technology Organisations of the Spanish Science Ministry. It was promoted and created in 1990 by the regional government (IMPIVA-Institute for the Valencian SMEs) with the aim to promote and support the R&D initiatives, increase the Scientific & Technical knowledge as well as improve the competitiveness of the Construction industry in the Valencia Region. AIDICO carries out R&D projects intended to improve building materials, building systems and production processes, as well as the design of procedures capable of simulating and evaluating the characteristics of all these. The technical staff represents about 180 qualified employees working in different areas and technology lines, such as: Certification, Training, Technology transfer and Research on High Performance Building Materials and Products (Polymers, Cement, Geopolymers, Nanomaterials & Smart Materials), Non destructive Methods, Sustainable Construction, Industrial and Natural Stones, e-Building and Security in Construction. It has an infrastructure based on specialized laboratories with accreditation and recognition on the highest levels to carry out chemical and physical characterization at macro/micro/nano levels. Additionally, AIDICO has specialized laboratories for non destructive mechanical characterization, acoustical and thermal characterization, fire resistance characterization, and modelling. Currently, AIDICO has 500 associated companies from the construction world such as construction material manufacturers, quality control laboratories, engineering & architecture bureau and construction technology providers.

The Nanomaterials Unit of AIDICO integrates a multidisciplinary team of 20 researchers and 6 PhD students, working in different research lines: nanoencapsulation for controlled release of active agents, hybrid nanocomposites, nanoparticles for fire protection coatings, active polymers for self-healing applications, nano-pigments, nanoparticles for self-cleaning coatings, conductive nanocomposites, nanoindentation applications.

In the year 2000 AIDICO carried out a feasibility study about the potential benefits of Nano-technology in Construction products. The main conclusion was that Nanotechnology is an 'enabling technology' with a huge technical and developmental potential, and equally huge potential economic benefits in construction products. AIDICO then was the promoter of RENAC (www.nano-renac.com) as a scientific platform that integrates 22 Spanish research groups working in the application of Nanotechnology in Construction and Habitat products.

Some recent examples of AIDICO participation in European R&D projects relevant to the NMP programme are **I-SSB**–the integrated Safe & Smart built Project (FP6-NMP), **MESSIB** Multi-Energy Storage Systems Integrated in Buildings (FP7-NMP), and the IP **I-Stone** Re-engineering of natural stone production chain through knowledge based processes, ecoinnovation (FP6-NMP).



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

ENMat Project — COST ACTION

Web address of COST ACTION:
www.nanocomposites-cost.eu

Polymer nanocomposites with novel functional and structural properties— COST Action MP0701

Polymer Nanocomposites (PNCM) are blends of different polymer matrices with nanometre sized functional particles. The properties of such nanocomposites are remarkably different compared to conventionally filled polymers. Improvement of volume properties (modulus, strength), surface properties (hardness, abrasion resistance, and surface energy), dimensional stability as well as improvements of functional properties e.g. photocatalytic, optical, electrical, magnetic and thermal and improvements of permeability and chemical stability (UV resistance, flame retardancy) have already been demonstrated. The incorporation of only a few percent of nanosized particles makes great property changes and formerly unachievable property combinations possible.
The main Objective of the COST Action MP0701 which has been initiated in March 2008 is to form a European-wide scientific and technology knowledge platform on the topic of nanocomposite materials in order to advance the R&D, the use and exploitation of these innovative materials in Europe with a special focus on SME.

There are many innovative uses of PNCM in industry either already realised or considered:

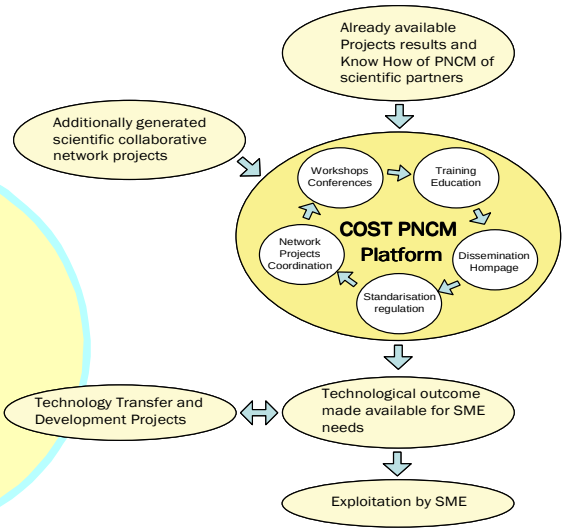
- **Automotive:** paints, windscreens, catalysts, timing belt cover, engine cover, fuel lines, lightweight construction
- **Electronics and Optoelectronics:** adhesives, glues, electrically conductive composites, signal wire shielding, electrostatic painting, interference shielding, photovoltaic cells
- **Medical:** membranes, tubings, stent delivery balloons, bioactive nanocomposites, dental fillings, artificial blood pumps, blood sacs, artificial hearts, orthopaedic applications, elastomeric membranes
- **Packaging (Food industry):** conservation foils, membranes, bottles, containers
- **Aviation:** mechanical engineering, controlled processing, adaptive systems
- **Construction:** High performance nanocomposite coatings, building preservation/ restoration
- **Flame retardant applications:** wire and cable covers, battery char, electrical enclosures, home interior decoration, insulation thermal/acoustic
- **Sports equipment:** tennis rackets/squash rackets, fishing rods, hockey sticks, golf clubs, high performance bicycles, skis & ski poles, training shoes, protective eyewear
- **Oil and Gas:** pipes for steam assisted gravity drainage, oil sand extraction equipment, plastic vessels
- **Energy industry:** ultra capacitors, photovoltaic systems, plastic pipes, electrical insulation

The Cost action MP0701 is structured in 4 different working-groups:

- **WG1 Nanoparticles / Interfaces:** selection of matrix and nanoparticles, production of nanoparticles, surface functionalisation / chemical treatments of nanoparticles
- **WG2 Structure/Property Relationships:** linking nanosized structures to macroscopic functional properties
- **WG3 Characterisation – Modelling – Simulation:** characterisation and measurement tools, simulation and modelling tools
- **WG4 Processing:** primary processing, dispersion, exfoliation, characterisation, properties and performance of components, process control (inline), cost effective methods of processing, standardisation, manufacturing into components, management of health, safety & environmental risk

Who can participate?

Once a country has signed up to the COST action all institutions of this particular country are entitled to participate. The countries which have been signed up so far are: AT, BE, CY, CZ, FI, DE, IR, IT, LV, LT, NO, PL, P, RO, SK, ES, S, CH, TR, UK, GR, IS, HU.
COST is an open network and further countries are welcome to participate. The Cost action is funding workshops, seminars, scientific conferences, short term scientific visits (up to three months in laboratories of other participants) and publications.
Further information can be found on the COST webpage www.esf.cost.org and on the webpage of the COST action MP0701 on polymer Nanocomposites www.nanocomposites-cost.eu



Partner Search

SYSTEX, an ICT project of the Seventh Framework Programme, is a coordination effort based on 12 partners from 5 European countries to build up a new framework and orientation system in the area of e-textiles and wearable micro systems.
SYSTEX aims at collecting technological and non technological information on relevant projects at various levels and classifies them in a transparent data base and information system. Access to this new data pool shall be a true added value for every party involved in intelligent textile systems and is tantamount to a true competitive edge. One of the core targets is to enhance cross-sectoral synergies and to speed up the exchange of research results with the aim of commercialisation. SYSTEX contributes to strengthen the European industrial base and to bring together the fragmented research community with the aim to join forces and foster a more rapid implementation of e-textiles based on nano and micro systems.

Become an affiliated member of SYSTEX

All stakeholders who are interested in the rapid progress of e-textiles, smart fabrics and interactive flexible wearable systems are invited to join the community. SYSTEX applies to experts from industry, research and trade, that share the e-textile paradigm of a full seamless integration of sensing, processing, actuating and communicating functions in a woven or non-woven structure. Miniaturised systems able to sense, diagnose, describe and qualify a given situation, able to interact with the environment and other smart systems are useful in various applications. Core technologies like interface, connectivity, sensing, skin contact, transmission are still issues of further research and testing.
More info on www.systex.org
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E-mail : lieva.vanlangenhove@UGent.be

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

Conferences

18th International Conference on Metallurgy and Materials **METAL 2009** (May 19th-21st, Hradec nad Moravici). Conference is co-organized by Czech Society for New Materials and Technology (member of ENMat). Web address is :http://www.metal2009.com

New Material Forum taking place in Valencia, Spain on 5th & 6th March 2009 http://www.e-unlimited.com/newmaterial

EMRS Fall Meeting, 14—18 September 2009, Warsaw, Poland http://e-mrs.org/meetings/fall2009/

International Conference **Latest Advances in High Tech Textiles and Textile-Based Materials**, Ghent, Belgium, 23 — 25 September 2009 and **COST Day on Biotechnological Functionalisation of Advanced Fibre Reinforced Composites** (COST actions 868 and MP0701) on 24/09/09 http://www.textileconferences.be

ENMAT Expertise

Materials	AIDICO	ARC	CCMX	CENM	CMSE	CRDMT	DIMP	EMPA	IKTS	INEGI	ISTEC	LMI	Petru Poni	SP	UCM	UoB	UoM	VTT	WUT
Biodegradable materials							X						X						
Biofilms					X		X						X						
Biomaterials			X		X		X		X	X	X		X	X		X	X		X
(Bio)polymers	X		X	X	X	X	X	X		X			X	X		X	X	X	X
Carbon nanotubes																	X		
Catalysts							X												
Cement-based materials	X				X		X			X				X					
Ceramic materials	X	X	X		X	X	X	X	X	X	X		X	X			X		X
Chemicals	X				X		X						X	X			X		
Coatings	X	X	X		X	X	X	X	X				X	X	X	X	X	X	
Composites	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X
(Molecular) electronics					X	X	X		X		X								
Intelligent fluids				X									X						
Magnetic materials			X		X		X						X			X			
Metals and metal alloys		X	X	X	X	X	X	X	X	X				X	X	X	X	X	X
Microporous and mesoporous materials							X		X				X	X					
Nanomaterials	X	X	X			X	X		X	X	X		X		X	X	X	X	X
(Non-linear) optical materials	X						X						X						
Semiconductors					X		X		X				X				X		
Sensors			X	X			X		X				X		X	X	X		
Shape memory alloys						X										X			
Smart materials, i.e. actors		X							X	X			X						
Textiles					X		X										X		
Thin films and interfaces	X		X		X	X							X	X		X	X		
Wood and wood-based materials					X		X	X		X			X	X					