

# KMM-VIN Newsletter

*Issue 3, December 2010*



*It has become a KMM-VIN tradition to publish the winter issue of the Newsletter each year just before Christmas. On this occasion we would like to wish our Members and all the Readers a peaceful Christmas 2010 and a successful and joyful New Year 2011.*

**Josef Eberhardsteiner**

*Chairman of the General Assembly and the Governing Council*

**Michal Basista**

*Chief Executive Officer*

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## EDITORIAL

The European Virtual Institute on Knowledge-based Multifunctional Materials (KMM-VIN) is an international non-profit association that emerged as an independent institution from the FP6 Network of Excellence KMM-NoE. It is head-quartered in Brussels and is now composed of 39 institutional core and associated members from 14 European States. KMM-VIN offers integrated basic and applied commercial research, educational and innovation activities in the field of advanced structural and functional materials.

KMM-VIN publishes its Newsletter twice a year: in July just before summer holidays and in December at the year's end. We are presenting here the 3<sup>rd</sup> Issue of the KMM-VIN Newsletter. As the structure of the KMM-VIN and its activities are becoming more and more stable so is the editorial form of the Newsletter as can be seen in the column list above.

As always, the most important part of the Newsletter is the current news from the four Working Groups: WG1: Intermetallics, WG2: Composite Materials, WG3: Functionally Graded Materials and WG4: Functional Materials.

To foster bilateral collaboration between KMM-VIN Members an "Offer-Search" collaboration model, matching research partners of common interest and complementary needs, was initiated in 2010. It will be continued in 2011

with potential financial support from the KMM-VIN Research Fellowships programme.

In the column "KMM Projects" the first hand information about the recent project proposals by the KMM-VIN members is presented as well as the updates of progress of the running projects where KMM-VIN is a partner or coordinator. Information on new initiatives and important events with direct involvement of KMM-VIN or its members, such as the Materials Conference accompanying the Polish presidency of the EU in 2011, is provided.

In the column "Cooperation" KMM-VIN's activity in the European Technology Platform on Advanced Engineering Materials and Technologies (EuMaT) is presented.

The programme of KMM-VIN Research Fellowships has become quite popular within the KMM-VIN partnership and will be continued in 2011. To continue the successful educational and training activities of the KMM-NoE project, the former KMM Summer Schools will be reactivated in cooperation with the CISM, Italy. The first KMM-VIN course proposal has been submitted for approval to CISM Scientific Council for 2012.

In "Personalia" some success stories, anniversaries or distinctions of our Colleagues are presented.

*Marek Janas, Editor*

# LATEST NEWS

## MEMBERSHIP CHANGES

Institute for Problems of Strength, National Academy of Sciences, Kiev, Ukraine (IPSUA) has withdrawn from the KMM-VIN partnership. Prof. Krzysztof J. Kurzydłowski (Warsaw), individual KMM-VIN member, has cancelled his membership in KMM-VIN. We thank these Members for their support in the infancy period of KMM-VIN and hope they will continue to promote KMM-VIN in their professional environment.

\*Please note that the proper acronym **TUW** is used for Technische Universität Wien (instead of the previous form TUV).

## BOOKLET

The KMM-VIN Booklet targeted at industrial clients and/or potential KMM-VIN members was printed out in Fall 2010. Copies will be distributed to the KMM-VIN members at the 2011 GA Annual Meeting in Brussels with the purpose to help build up KMM-VIN's position in the industry and academic communities. In the context of KMM-VIN Booklet it is to be reminded that the main industry sectors (end-users) for the KMM-VIN materials are:

- SURFACE TRANSPORT: automotive, rail and maritime (e.g. elements of combustion engines, valve trains, camshafts, brakes, clutches, sensors, actuators, devices for motion control, ...)
- AEROSPACE (e.g. elements of aero-engines, turbine blades, exhaust systems; thrusters, brakes, ...)
- ENERGY: conventional and renewable (e.g. materials for energy sources, transmission, storage, ...)
- HEALTH: biomedical applications (e.g. substitution or repair of lost tissue function; sensors and actuators for control and support of bodily functions, ...).

**International Centre of Electron Microscopy for Materials Science** headed by A. Czyrska-Filemonowicz has been created at AGH (University of Science and Technology, Krakow), with Forschungszentrum Jülich (Germany) as the leading foreign partner.

**E-MRS 2010 Fall Meeting** of the European Materials Research Society (E-MRS) was hosted at WUT, Warsaw on 13-17 September 2010. Two of its 15 parallel symposia were co-organised by our colleagues: WUT (*Carbon dioxide a raw material for sustainable development*) and AGH (*Novel materials, coats and nanoengineering*). At the Session devoted to FP7 the MATRANS project was presented by K. Pietrzak (KMM-VIN).

## FORTHCOMING EVENTS

**KMM-VIN Annual General Assembly 2011** will be held in Brussels on 22 February 2011.

**MATRANS** (FP7), a cooperative research project coordinated by KMM-VIN will conclude the first year of its R&D activities with a technical meeting at Centro Ricerche Fiat (Orbassano) on 1-2 Feb. 2011 (see more details on MATRANS in the column „News from WG3: Functionally Graded Materials”).

**GlaCERCo Initial Training Network** co-ordinated by POLITO (see the column "Projects") will hold its kick-off meeting on 15 February 2011 in Turin.

**Composite Materials.** Symposium of the German Materials Society (DGM) on Composite Materials (co-organised by A. R. Boccaccini, UEN) will be held in Chemnitz (Germany), 30 March-1 April 2011. The call for papers: <http://www.dgm.de/dgm/verbund/>

**3<sup>rd</sup> International Conference on Syntactic and Composite Foams**, co-chaired by A.R. Boccaccini (UEN) will be held in Calabria, Italy, May 29-June 3, 2011. Call for abstracts: <http://www.engconfintl.org/11af.html>

**3<sup>rd</sup> iNTeg-Risk Conference 2011**, "Risk vs. Risk: Managing emerging risk tradeoffs in complex systems" will be held in Stuttgart, Germany on June 6-10, 2011.

**12<sup>th</sup> Conference of the European Ceramic Society (ECerS)** will be held in Stockholm on 19-23 June 2011. Within ECerS 2011 a symposium on Silicates, Refractories, Cements, and Traditional Ceramics is organised by ITC and will be chaired by E. Sánchez Vilches.

**EUROMAT 2011.** European Congress on Advanced Materials and Processes will be held in Montpellier, France, on 12-15 September 2011. A.R. Boccaccini (UEN) coordinates the topic "Materials for Healthcare". In the topic "Joining" a symposium: "Diffusion bonding and characterization" is co-organised by R. Filipek, AGH (University of Science and Technology, Krakow) and N. Sobczak, IOD (Foundry Research Institute, Krakow).

Deadline for abstracts: 31 January 2011, please visit <http://euromat2011.fems.eu/>

**4<sup>th</sup> International Conference on Electrophoretic Deposition**, Fundamentals and Applications (EPD 2011), headed by A.R. Boccaccini, will be held on 2-7 October 2011 in Puerto Vallarta, Mexico, with an organisational support of our colleagues from CIDETEC. Details and call for abstracts: <http://www.engconfintl.org/11abstract.html>.

**DMAir 2011.** ECCOMAS Thematic Conference on Design and Maintenance of Airfields will be organized by TUW, 12-14 September 2011 in Vienna, Austria. The conference webpage is available at <http://DMAir2011.conf.tuwien.ac.at>

**ECCOMAS 2012.** European Congress on Computational Methods in Applied Sciences and Engineering will be organized by TUW, 10-14 September 2012 in Vienna. The congress webpage is available at <http://eccomas2012.conf.tuwien.ac.at>.

## WHAT'S NEW IN WORKING GROUPS?

**"OFFER-SEARCH".** This action was launched in 2010 to facilitate bilateral research cooperation between KMM-VIN members. The concept behind this initiative proposed by Th. Weissgärber was to collect information from KMM-VIN members offering some kind of expertise (Offer) while at the same time looking for some other type of expertise/testing (Search) within KMM-VIN membership.

The first survey among KMM-VIN members resulted in 21 proposals of cooperation. These are placed under the following link:

<http://www.kmm-vin.eu/Collaboration> which is being updated regularly.

This database can now be used by the KMM-VIN members to identify and contact potential partners interested in bilateral cooperation on specific topics in form of joint projects, co-supervised diploma, master or PhD theses.

This database is also a useful source of information when applying for KMM-VIN Research Fellowships. The 3<sup>rd</sup> call for proposals for the Research Fellowships will be opened in February 2011.

### NEWS FROM WG1: INTERMETALLICS

The main research activities in the Intermetallics Working Group have been within the JOINING task and on work concerning the effect of pulsed current treatment (PCT) on the corrosion resistance of materials as well as intermetallics. The investigating partners in the JOINING task are POLITO, UH and AGH. The work is concerned with the development of a glass-ceramic sealant for solid-oxide fuel cells (SOFCs) and aims to hermetically seal the Crofer 22 interconnect and yttria-stabilised zirconia (YSZ) which acts as the anode-supported electrolyte (ASE). Most of the work during the last six months has focused on how the pre-treatment of Crofer 22 affects the interfacial behaviour with the glass-ceramic at 800°C. The investigation has established that a two-hour pre-treatment at 950°C for the Crofer 22 significantly minimises and virtually stops diffusion of Cr and Mn into the glass ceramic when the metal-sealant joints are tested at 800°C for 500 hours. On the other hand, a two-hour pre-treatment at lower temperatures like 900°C leads to Cr and Mn diffusion of up to 10µm into the glass-ceramic. Within the task, there was a one-week visit by Dr Federico Smeacetto to AGH where together with Dr Tomasz Moskalewicz they further investigated the Crofer 22-glass-ceramic interface by TEM for samples that were tested for up to 3000 hours at UH. The results from this part of the study are currently being assessed and they will be the subject of the next paper to be published by the investigators.

The work conducted by UH and IPSUA has shown that PCT treatment improves the corrosion resistance of steel, aluminium and NiTi; in the case of plain-carbon steels improvements of the order

of 50% have been observed. Microhardness measurements have been conducted on the surface of aluminium alloys before and after PCT treatment. It has been observed that PCT treatment results to a more uniform range of microhardness values; this observation needs to be further analysed in order to understand the mechanism of the effect of PCT treatment. The investigators have secured more funding under the Marie Curie In-coming Fellowship call for more investigations in this area.

*Andreas Chrysanthou, WG1 Coordinator*

### NEWS FROM WG2: COMPOSITE MATERIALS

#### New publications

In the present column we report on recent relevant publications which have originated at the Institute of Biomaterials, University of Erlangen-Nuremberg (UEN), Germany, led by Prof. Aldo R. Boccaccini, and on the established collaborative research work in biomaterials between UEN and POLITO.

The special issue: "ICCM-17: Composites in Biomedical Applications" in the journal *Composites Science and Technology* (Elsevier) has been published [*Composites Science and Technology*, Volume 70, Issue 13, pp. 1763-2032]. This special issue was co-edited by Prof. Aldo R. Boccaccini and Prof. Joao F. Mano (University of Minho, Portugal). The 19 papers published in this issue were selected from high quality contributions presented at the 17th International Conference on Composite Materials (ICCM-17), held in Edinburgh, Scotland (UK) in July 2009. The papers cover a broad variety of topics reflecting the numerous applications of composite



materials in the fields of tissue engineering, biopolymer/ceramic nano-composites and biomimetic materials.

The book chapter entitled “Nanostructured biocomposites for tissue engineering scaffolds” co-authored by D. Meng and A. R. Boccaccini, has been published in the volume “*Biomedical Composites*”, edited by Prof. L. Ambrosio (CRC Woodhead Publishing Ltd). Several types of biomaterials, including metals, ceramics polymers are used to fabricate composites for improved tissue engineering scaffolds. The chapter presents a complete overview of current processing technologies available to introduce or engineer nanoscale topography on the surfaces of 3D scaffolds with focus on bioactive composites, considering both bottom-up and top-down approaches.

A review paper entitled “Electrophoretic deposition of biomaterials” has been published in the *J. Royal Soc. Interface* (Boccaccini A. R., et al., *J. Royal Soc. Interface* 7 (2010), S581-S613.). Electrophoretic deposition (EPD) is attracting increasing interest as the technique of choice for processing a wide range of biomaterials, specifically bioactive coatings and biomedical nanostructures. EPD of biological entities such as enzymes, bacteria and cells is also being investigated. The review covers relevant recent work on the use of EPD in biomaterials focusing on (i) conventional bioactive (inorganic) coatings, e.g. hydroxyapatite or bioactive glass coatings on orthopaedic implants, and (ii) biomedical nanostructures, including biopolymer–ceramic nanocomposites, carbon nanotube coatings, tissue engineering scaffolds, deposition of proteins and other biological entities for sensors and advanced functional composite coatings.

The research group led by Prof. Boccaccini at UEN is carrying out extensive research in the field of electric field assisted processing of particulate materials, especially on electrophoretic deposition of nanoparticles and carbon nanotubes for applications in tissue engineering (<http://www.biomat.techfak.uni-erlangen.org>).

Research collaborations originated in the framework of KMM-NoE continue with several KMM-VIN partners, specially POLITO (see below), CIDETEC and ITC.

#### **Research collaboration: Erlangen (UEN)-Torino (POLITO)**

Following the substantial collaboration initiated between IMPER and POLITO in the framework of KMM-NoE, the continuation of joint research activities between POLITO and UEN has been confirmed by the group leaders. In this context, the first visit of an UEN researcher to POLITO was in the framework of a KMM-VIN Research Fellowship 2010 (“Appendino Grant”). A. Hoppe, PhD student based at UEN visited POLITO for 2 months and worked in the field of novel Zn<sup>2+</sup> ion doped bioactive glasses for bone tissue engineering under supervision of Dr. E. Verne (POLITO). Zn<sup>2+</sup> ions are known for

their antibacterial properties and beneficial effects on osteoblast and endothelial cells. In the current project novel silicate glasses and glass-ceramics were developed via doping standard 45S5 Bioglass® (wt. %: 45 SiO<sub>2</sub>, 24,5 Na<sub>2</sub>O, 24,5 CaO, 6 P<sub>2</sub>O<sub>5</sub>) composition with Zn<sup>2+</sup> using an ion exchange process. It is assumed that Zn<sup>2+</sup> ions enter the silicate network substituting for Ca and Na. The bacteriostatic properties of Zn doped bioactive glasses were revealed by detecting a decreased attachment of *Staphylococcus Aureus* on Zn containing samples compared to undoped control. The two research groups continue the collaboration in the field of novel silicate glass systems for tissue engineering and drug delivery. The fabrication of composites, based on the combination of particulate bioactive glasses and biodegradable polymers is being investigated at UEN.

In addition, UEN is a key partner in the newly acquired EU Marie Curie Initial Training Network (ITN) led by POLITO: “Glass and Ceramic Composites for High Technology Applications” (Glacercro). This project will investigate new high-tech glass-based materials (glasses, glass-ceramics, glass- and glass-ceramic composites and fibres) for a range of applications in strategic fields as medicine (bioactive glasses as bone replacement and drug delivery systems), telecommunications (glass devices for broad-band applications), photonics (glass based photonic sensors), clean energy (Solid Oxide Fuel Cells glass sealants) and waste management (vitrification and re-use of wastes). For more information about GLACERCO, see additional information in the “KMM Projects” column of this Newsletter.

Aldo R. Boccaccini, WG2 Coordinator

#### **NEWS FROM WG3: FUNCTIONALLY GRADED MATERIALS (FGM)**

During the last six months, WG3 activities have been predominantly nurtured by two FP7 projects where KMM-VIN play key roles; these projects are MATRANS and BIO-CT-EXPLOIT. It is therefore highly relevant to give an update on what is going on there: The FP7 project MATRANS coordinated by KMM-VIN and involving 9 KMM-VIN members focuses on the development of metal-ceramic functionally graded materials for transport applications. The specific applications targeted in this project include: (i) exhaust and propulsion systems of thrusters (aerospace), (ii) valves in combustion engines (automotive), and (iii) braking systems (automotive). The main objective is to obtain enhanced mechanical properties of these material systems through spatial variations of material composition and microstructure. MATRANS deals with two groups of bulk FGMs: (i) FGMI: ceramics-copper/copper alloys, (ii) FGMI: ceramics-intermetallics. These FGM systems have not yet been used in the transport sectors in question.

The MATRANS methodology, substantially affected by the KMM-NoE experience, is problem-oriented and comprehensive, combining interrelated activities of material processing (core activity of the project), characterisation, modelling, and demonstration.

During the first year of MATRANS execution the starting materials (composite nano and micropowders) have been produced and the 1<sup>st</sup> design samples of FGMI and FGMII systems are now being processed and characterised. In parallel, an extensive modeling programme is being conducted on: microstructure of individual composite layers, FGM I and FGM II graded profiles, effective elastic and thermal properties, microcracking in processing and crack development in service conditions, residual stresses, wear, oxidation and fatigue.

The connection to industry is even closer in the case of the FP7 project BIO-CT-EXPLOIT, where four academic partners (3 from KMM-VIN) produce software prototypes for four SMEs active in the Computer Tomography, Computer-Aided Design, and biomaterials productions businesses. Overarching topic is the improved exploitation of micro and nanoCT images (Fig. 1), by integrating knowledge from theoretical/computational physics and applied (micro)mechanics. Further details will be given in the next newsletter. And finally, the biomaterials activities are expected to be further fueled through a recently granted COST action on the topic (involving various KMM-VIN members), making possible personnel exchange and workshop activities on a much larger scale than it was possible so far.

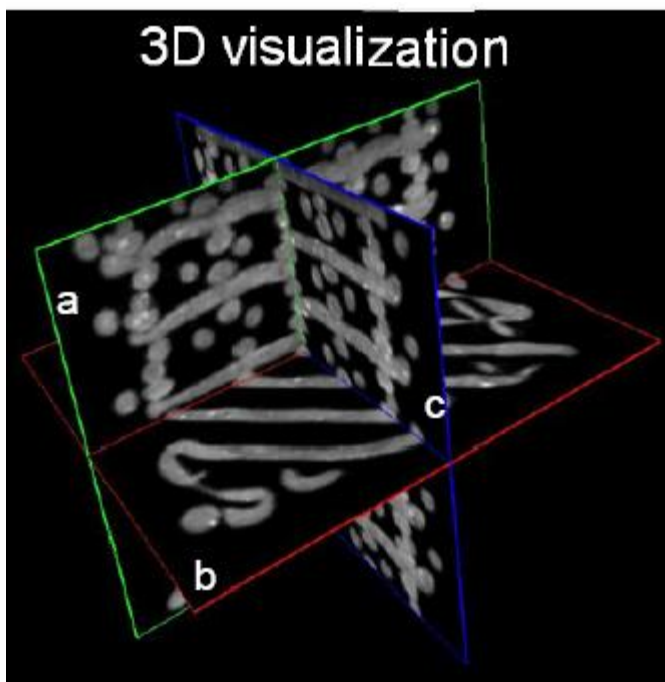


Fig. 1. PLLA-scaffold with 20% weight-percent tricalcium phosphate produced and scanned by WUT

*Christian Hellmich, WG3 Coordinator*

## NEWS FROM WG4: FUNCTIONAL MATERIALS

The Working Group consists of the following eight partners: Fraunhofer IFAM, Cidetec, IPM, Politecnico di Torino, AITEX, Centro Ricerche FIAT, AGH and ITC. Collecting the specific interests and expertise from the partners the main fields of activities can now be summarized:

- materials and processes based on electrochemical techniques
- functional polymers
- biomaterials
- materials for energy storage and energy conversion

The development of functional materials is closely linked with the optimization and modification of production routes as well as joining technologies. A broad range of technologies are available in the KMM-VIN institutions.

POLITO recently developed a new torsion machine (Fig. 2) capable to measure shear strength of joined components. In case of interest for these tests, please get in touch with Andrea Ventrella ([andrea.ventrella@polito.it](mailto:andrea.ventrella@polito.it)) or Monica Ferraris ([monica.ferraris@polito.it](mailto:monica.ferraris@polito.it)).



Fig. 2. Torsion machine to measure shear strength (POLITO)

### In-situ gas analysis in thermal processes

Processing of powder metallurgical components is related to high specific surfaces, in particular in the first stages of the process. Thus, high specific surfaces give rise to carbonization and oxidation during debinding and sintering due to reactions with degradation products of binders and additives. In order to understand and parameterize such processes, at Fraunhofer IFAM Dresden recently a technology for in-situ gas-analysis has been developed (Fig. 3). This technique has been shown to be a strong instrument for the improvement of PM processes.

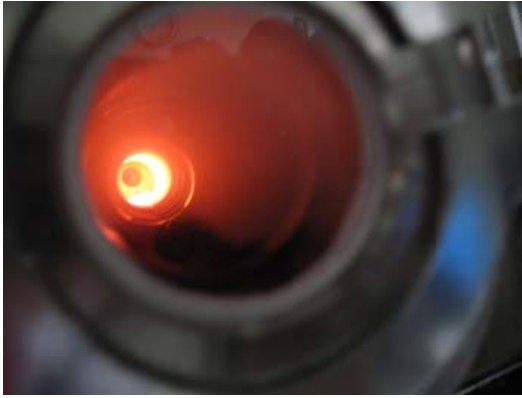


Fig. 3. In-situ gas analysis (IFAM Dresden)

### Biodegradable metals have been awarded a second time

After decoration in 2009, the Fraunhofer IFAM Dresden was now awarded the second time by the "Innovationspreis Medizintechnik" of German Ministry of Education and Science (BMBF) for their development of biomaterials. Together with partners from University Hospital of Großhadern, this year the prize was given for the development of biodegradable cellular metals for use as highly loaded implant materials in bone surgery.

*Thomas Weissgärber, WG4 Coordinator*

## KMM PROJECTS

### MATRANS (FP7)

"**Micro and Nanocrystalline Functionally Graded Materials for Transport Applications**", the first project coordinated by the KMM-VIN (M. Basista) and involving 9 KMM-VIN members. The Project is about to complete the first year of its activities with a technical meeting at CRF (Orbassano/Turin) to discuss the progress of work in WP1: Preparation of Starting Materials, WP2: Processing of FGMs and WP3: Characterisation of FGMs. More details about the R&D scope and applications targeted in MATRANS are given in "News from WG3: FGMs". The Project website:

[www.kmm-vin.eu/Projects/Matrans](http://www.kmm-vin.eu/Projects/Matrans)

### iNTeg-Risk (FP7)

"**Early Recognition, Monitoring and Integrated Management of Emerging, New Technologies Related, Risks**". A large-size project (2008-2013), coordinated by the European Virtual Institute for Integrated Risk Management (A. Jovanovic). KMM-VIN participates as a grouping comprising itself, IPPT, IMRSAS, IMIM and MCL. MERL is also involved in the project independently of the KMM-VIN grouping. The KMM-VIN members in iNTeg-Risk are dealing with emerging risks related to development and use of advanced engineering materials.

The results of the KMM-VIN grouping's effort to date have been summarized recently in the report "Reference solution containing documents, methods and tools for a consistent approach to management of the emerging risks connected with the introduction of new materials into new generation of products and technologies". The Advanced Materials Emerging Risk Assessment (AMERA) method has been proposed as a consistent approach to deal with such emerging risks. The obtained results will be used to prepare the guideline for emerging risk related to new products and materials.

Project website: <http://integrisk.eu-vri.eu>.

### GlaCERCo – ITN (FP7-People) - *new project*

"**Glass and Ceramic Composites for High Technology Applications – Initial Training Network**". Project coordinated by POLITO will start 1<sup>st</sup> February 2011, with 3.9 M€ funding during 4 years; [www.glacercoco.eu](http://www.glacercoco.eu). Among the 10 partners of the project 5 are also members of KMM-VIN (POLITO, UEN, UNIPAD, IPM, MERL), i.e., nearly all the partners from the research/academia sector. The project will offer a multidisciplinary training in the field of new high-tech glass-based materials (glasses, glass-ceramics, glass- and glass-ceramic composites and fibers) with special attention to applications in strategic fields as medicine (bioactive glasses as bone replacement and drug delivery systems), telecommunications (glass devices for broad-band applications), photonics (glass based photonic sensors), clean energy (Solid Oxide Fuel Cells glass sealants), waste management (vitrification and re-use of wastes).

### NASLA (FP7) - *new project*

"**Nanostructured antiseptic coatings**", project for the benefit of SMEs. Partners are: POLITO (coordinator), KTH (Sweden), Bactiguard (Sweden), as well as SMSs: Alce Calidad (Spain), Di.Pro. (Italy), Earsreth (Greece) and Aero Sekur (Italy). Aimed at improvement or development new products currently commercialized by the four SMEs: biomedical implants, agro/food industry equipments, personnel protective systems and food catering equipments.

KMM-VIN partners interested in this activity may contact: [monica.ferraris@polito.it](mailto:monica.ferraris@polito.it)

### MUST (FP7)

"**Multi Level Protection of Materials for Vehicles by Smart Nanocontainers**". Large cooperative project (2008-2012) coordinated by EADS Germany, consortium of 20 partners including a small KMM-VIN grouping consisting of KMM-VIN itself and BioIRC. The R&D activities of BioIRC are on numerical



simulations of self-healing processes by Dissipative Particle Dynamics method. KMM-VIN itself is involved in Dissemination of the project results. Website: <http://www.sintef.no/Projectweb/MUST>

### **ISWA** (FP7) - *new project*

**“Immersion in the Science Worlds through the Arts”**. A CSA project coordinated by UNIVPM (F. Rustichelli) which closed the negotiation phase and will start its work programme in the beginning of 2011 as the draft Grant Agreement has already been sent by the EC to the project coordinator. Among 16 participants from 15 countries are four KMM-VIN members: UNIVPM, IPPT, IMRSAS, and TUW. The project is targeted at young people discovering the common characteristic of the creative process in arts and sciences. Examples of artistic events based on scientific issues will be realized by professionals from the following disciplines: Modern dance, Cinema, Imaging, Literature and will be displayed in several European cities.

### **M-FUTURE 2011** (FP7) - *new project*

**“Materials & Manufacturing of the FUTURE”**. A CSA project coordinated by Wroclaw University of Technology (E. Chlebus). It started 1. Sep. 2010 for a duration of 18 months. M-FUTURE is a CSA project comprising two European conferences: MANUFUTURE 2011 and Future Materials (FUMAT 2011; 22-23 Sep. 2011) as accompanying events of the Polish presidency of the EU. The FUMAT 2011 involves IPPT and WUT as well as KMM-VIN itself. It will address: Materials for Future Energy; Materials for Transport and Environment; Materials in Health, Ageing Society and Bio-application; Materials for Sustainable Development; Societal dimension of advanced materials, Education, Trainings, Increase of awareness. Close collaboration with European Technology Platform on Advanced Engineering Materials and Technologies (EuMaT) and the European Materials Research Society (E-MRS) is exercised in the preparation to FUMAT 2011.

### **EMFforMET** (FP7- MC) - *new project*

**“Application of Electromagnetic Fields for Enhancement of Structural Metal Performance”** - a Marie-Curie project for In-coming Fellowships submitted by A. Chrysanthou (UH) and A. Babutsky (IPSUA) has been accepted and the contract is under final negotiation.

### **EMAGPRO** (FP7) - *under review*

**“Integrating the application of electrical and magnetic fields in the processing of nanostructured and other advanced materials”**, the proposal to the NMP.2011.4.0-1 call on *“New technologies based on physical processing of materials for mechanical and electro-technical applications”* is coordinated by the Catholic University of Leuven. In the consortium are KMM-VIN

members: TECNALIA, CIDETEC and UH. The proposal is under review now.

### **ACOSTAF** (FP7, REGPOT-2011) - *under review*

**“Centre of Excellence and Innovation in Advanced Composite Materials for Structural and Functional Applications”**. This is a mono-applicant proposal submitted by IPPT to further develop its existing research potential and laboratory equipment in the field of advanced composite materials. The ACOSTAF Centre will be a continuation and creative development of the S&T achievements of the EU projects on “Advanced Materials and Structures” (AMAS;FP5) and “Knowledge-based Multicomponent Materials for Durable and Safe Performance” (KMM-NoE, FP6) coordinated by IPPT in years 2000-09. To reach the project objectives a group of 21 Partnering Research Centres from 10 European States with complementary S&T expertise and lab facilities have been invited to the project. Of them 14 are KMM-VIN members – leading centres in composite materials. The proposal is under review now.

### **BIO-CT-EXPLOIT** (FP7)

**“Innovative simulation tool for bone and bone biomaterials based on enhanced CT-data exploitation”**. An SME oriented project that started 1 Dec. 2009. Coordinator Vienna University of Technology (Ch. Hellmich), This project is aimed at enhancement of the competitiveness of four SMEs active in the markets of biomedical engineering and biomaterials design, through outsourcing of research activities to four RTD partners, including the KMM-VIN members: TUW, WUT and UNIVPM.

### **HANCOC** (MNT-ERANet)

**“Hard NanoComposite Coatings”**. The project coordinated by IMRSAS (J. Dusza) is devoted to the development and optimization of a novel technology of thin nanocrystalline, composite superhard coatings. Two KMM-VIN core members are involved in HANCOC: IMRSAS and AGH.

## **OTHER PROJECTS**

### **KomCerMet** (Poland)

**“Metal-Ceramic Composites and Nanocomposites for Aerospace and Automotive Industry”** One of the so-called key projects supported by the EU Structural Funds (2008 – 2012). Coordinated by IPPT (M. Basista). Consortium of 12 partners including 5 KMM-VIN members (IPPT, ITME, IMIM, WUT, AGH). The project is concerned to certain extent with the same material systems as MATRANS but without a gradient of chemical composition. The synergy potential between the two projects is straightforward and will be exploited.

Project website:

<http://www.komcermet.ippt.gov.pl/page.php>

## MPPE COMET-K2 (Austria)

„Integrated Research in Materials, Processing and Product Engineering”. COMET K2 Competence Center „Integrated Research in Materials, Processing and Product Engineering” (MPPE), led by Materials Centre Leoben (R. Ebner).

## FOTOCER (Spain)

“Development of photocatalytic surfaces using readily scalable techniques for use in industry” (2009-2011) is coordinated by ITC and involving CIDETEC.

## COOPERATION

### EuMaT ETP

KMM-VIN continues to be active in the Steering Committee of EuMaT ETP and its WG4: Knowledge-based Structural and Functional Materials.

KMM-VIN also serves as the EuMaT Secretariat organizing the EuMaT meetings, administering the website and occasionally hosting the EuMaT meetings at KMM-VIN Registered Office in Brussels.

One of the highlights of the EuMaT activity in the recent months has been the Open Letter to the European Commissioner for Research, Innovation and Science (Maire Geoghegan-Quinn) and the European Commissioner for Enterprise and Industry (Antonio Tajani). The purpose of this letter was to remind the Commissioners about the importance of materials research and enabling role of materials

for industrial innovation and wealth creation in Europe.

This is a timely action in view of now forming visions and place of materials research in the FP8. The letter is a sort of alliance for materials (A4M) created by a number of European Technology Platforms dealing directly or indirectly with advanced materials.

The signatories of the A4M letter (core partners) were the following six ETPs: EuMaT ETP (M. Falzetti), SusChem ETP (P.-J. Derian), Sustainable Mineral Resources ETP (H. Karas), MANUFUTURE ETP (H. Flegel), TEXTILE ETP (D. Hendriks), ESTEP (B. de Lamberterie).

Besides drawing the Commissioners' attention to the importance of materials in FP8, the other objective was to make a hint to a large research initiative on materials to be shaped up by the A4M Platforms for possible inclusion in the FP8 funding schemes.

## KMM-VIN RESEARCH FELLOWSHIPS and TRAINING

### 2<sup>nd</sup> and 3<sup>rd</sup> Calls

In the framework of the KMM Mobility Programme the **3<sup>rd</sup> Call for KMM-VIN Research Fellowships** intended for PhD-students and early stage researchers from the KMM-VIN member institutions will be open this February; the deadline for applications: March 31, 2011.

Of the eight person-months of the **2<sup>nd</sup> Call** seven have been successfully accomplished, including that granted by POLITO to honour Professors Margherita and Pietro Appendino. The fellowship awarded to Mr Cempura (AGH) for the research stay at IMR SAS has been postponed to 2011 on the request of AGH.

### KMM Summer Schools at CISM will be Reactivated

A one-week KMM-VIN course on “Tissue Engineering Mechanics with Links to Biology, Chemistry and Medicine” will be hosted – similarly as the KMM-NoE Summer Schools were in the past – at CISM (Udine, Italy). This course originally scheduled for 2011 was shifted to 2012 and, if accepted by the CISM Scientific Council, it will be held as a regular CISM course. Exact dates will be announced by March 2011. The course coordinators are Ch. Hellmich (TUW) and A.R. Boccaccini (UEN).



## PERSONALIA

**Prof. Aldo R. Boccaccini** (UEN) has been elected to the Advisory Board of the German Materials Society (DGM)

**Dr. Andreas Fritsch** (TUW) has been awarded the Prix de Thèse of Université Paris-Est, for his Ph.D. Thesis under the joint supervision of Prof. Christian Hellmich (TUW) and Prof. Luc Dormieux (Ecole des Ponts-ParisTech), in addition to the Award of Excellence given by the Austrian Ministry of Science and Research previously.

**Dr. Stefan Scheiner** (currently at University of Western Australia, formerly TUW, Ph.D. completed in 2009, in context of KMM-NoE) has been named the “2009 Outstanding Reviewer” by the highly esteemed Journal of Engineering Mechanics of the American Society of Civil Engineers.

**Prof. Aleksandra Czyrska-Filemonowicz** (AGH) and her team at the Electron Microscopy and Materials' Physical Properties Group were honoured by an award (2009) of Pratt & Whitney Co “For Outstanding Effort in Supporting the Global Materials Solution (GMS) Program”. Prof. Czyrska-Filemonowicz became the head of the International Centre of Electron Microscopy for Materials Science (IC-EM) at AGH, Cracow



Photo 1. Signing of the Agreement on Cooperation between the IC-EM and the Forschungszentrum Jülich. From left: Professors: L. Singheiser, (FZJ), H. Bolt, (FZJ), T. Szmuc (AGH), A. Czyrska-Filemonowicz (AGH).

**Prof. Zenon Mróz** (IPPT) celebrated his 80<sup>th</sup> Birthday in November 2010. He has made milestone contributions to: non-linear and inelastic analysis of structures; optimal design methodology

and sensitivity analysis with respect to material and design parameters; constitutive modelling of inelastic deformation of metals under variable or cyclic loading; inelastic response of geomaterials to monotonic and cyclic loading, rock burst effects, and mechanical response of contacting material interfaces with account for asperity interaction, frictional slip, wear and damage

Prof. Mróz is the author or co-author of 376 papers, 7 books, editor of 7 conference volumes and member of editorial boards of 16 international scientific journals. The ISI database indicate over 4400 citations of Prof. Mroz' works. He supervised 28 doctoral theses, and delivered invited lectures at numerous universities and conferences.



Photo 2. Professor Zenon Mróz (first from the left).

Prof. Zenon Mróz is elected a member of the Polish Academy of Sciences, Polish Academy of Knowledge, foreign member of the Hungarian Academy of Sciences, Lombardian Academy of Sciences, Lithuanian Academy of Sciences. He holds honorary doctorates from the University of Miskolc, Hungary; Faculté Polytechnique de Mons, Belgium; Cracow University of Technology, Poland; University of Waterloo, Canada and University of Minnesota, Minneapolis, USA.

The international mechanics community honoured Prof. Mróz on the occasion of his 80<sup>th</sup> Birthday with three Special Issues of ZAMM (9/10/11 2010). Of thirteen original papers contained therein seven were authored by KMM-VIN members.

## KMM-VIN Members (Institutions)

### CORE

<b>AGH</b>	University of Science and Technology, Cracow, Poland
<b>AITEX</b>	Textile Research Institute, Alcoy-Alicante, Spain
<b>BioIRC</b>	Bioengineering Research and Developing Centre, Kragujevac, Serbia
<b>CIDETEC</b>	Fundación CIDETEC (Centre for Electrochemical Technologies), Donostia/San Sebastián, Spain
<b>CISM Lab</b>	Centro Internazionale di Scienze Meccaniche Spin-off
<b>CUT</b>	Cracow University of Technology, Cracow, Poland
<b>CUTL</b>	Cyprus University of Technology, Limassol, Cyprus
<b>EMINATE</b>	eminate Ltd, Nottingham, UK
<b>FHG</b>	Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V:
<b>FHG-IFAM</b>	Fraunhofer Institute for Manufacturing and Advanced Materials, Bremen, Germany
<b>FHG-IFAM-DD</b>	Fraunhofer Institute for Manufacturing and Advanced Materials, Dresden, Germany
<b>IOD</b>	Foundry Research Institute, Caracow, Poland
<b>IMBAS</b>	Institute of Mechanics, Bulgarian Academy of Sciences, Sophia, Bulgaria
<b>IMIM</b>	Institute of Metallurgy and Materials Science, Polish Academy of Sciences, Cracow, Poland
<b>IMRSAS</b>	Institute of Materials Research, Slovak Academy of Sciences, Kosice, Slovakia
<b>IMZ</b>	Institute for Ferrous Metallurgy, Gliwice, Poland
<b>TECNALIA</b>	Fundación Tecnalia Research and Innovation, San Sebastian, Spain (*Name/Acronym changed)
<b>IPPT</b>	Institute of Fundamental Technological Research, Polish Academy of Sciences, Poland
<b>ITC</b>	Instituto de Tecnología Cerámica - AICE, Castellón, Spain
<b>IPM</b>	Institute of Physics of Materials, Brno, Czech Republic
<b>ITME</b>	Institute of Electronic Materials Technology, Warsaw, Poland
<b>MCL</b>	Werkstoff-Kompetenzzentrum-Leoben Forschungsgesellschaft m.b.H. (Materials Centre Leoben), Austria
<b>MERL</b>	Materials Engineering Research Laboratory Ltd, Hitchin, Hertfordshire, UK
<b>ONERA</b>	Office National d'Etudes et de Recherches Aéropatiales, Chatillon, France
<b>POLIMI</b>	Politecnico di Milano, Milan, Italy
<b>POLITO</b>	Politecnico di Torino, Italy
<b>R-TECH</b>	Steinbeis Advanced Risk Technologies GmbH, Stuttgart, Germany
<b>TUD</b>	Technische Universität Darmstadt, Germany
<b>TUW</b>	Technische Universität Wien, Austria (*Acronym changed)
<b>UH</b>	University of Hertfordshire, Hatfield, Herts, UK
<b>UNIPAD</b>	Università degli Studi di Padova, Italy
<b>UNIVPM</b>	Università Politecnica delle Marche, Ancona, Italy
<b>WUT</b>	Warsaw University of Technology, Warsaw, Poland

### ASSOCIATE

<b>ALENIA</b>	Alenia Aeronautica S.P.A., Italy
<b>CRF</b>	Centro Ricerche FIAT, Orbassano, Italy
<b>EMPA</b>	Materials Science and Technology, Dübendorf, Switzerland
<b>EU-VRi</b>	European Virtual Institute for Integrated Risk Management, Stuttgart, Germany
<b>Saar-Uni</b>	Saarland University, Saarbrücken, Germany
<b>UEN</b>	Friedrich-Alexander Universität Erlangen-Nürnberg, Germany
<b>VGTU</b>	Vilnius Gediminas Technical University, Vilnius, Lithuania

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