EUROPEAN VIRTUAL INSTITUTE ON
KNOWLEDGE-BASED MULTIFUNCTIONAL MATERIALS AISBL

KMM-VIN Newsletter

Issue 2, June 2010

In this Issue:

EDITORIAL

We are presenting the second Issue of our Newsletter at a time when the first three year term of the KMM-VIN official existence has been completed. KMM-VIN organisational structure appears stable as reflected by the recent General Assembly (see the column "Latest News"). Also the editorial form of the Newsletter adopted in the 1st issue is maintained.

The former issue was published at the year's end and the second one appears at the academic year's end, before the summer holidays. However, the forthcoming summer may become challenging for us because release of the FP7 calls 2011 is imminent, the WP 2011 nearly-final topics are already disclosed and November deadlines for the most important funding schemes are not too distant. For that reason the column "KMM Projects" is preceded by a selection of topics from the FP7 Workprogramme 2011 that may be of particular interest for the KMM-VIN Members. More details on the Workprogramme will be available soon on the KMM-VIN website in Members Area.

Important part of the Newsletter is composed of the current news from the four Working Groups: WG1 – Intermetallics, WG2 – Composite Materials, WG3 – Functionally Graded Materials and WG4 – Functional Materials. It is to be noticed that the scope of the WG2, originally on metal ceramic composites, has been extended to better reflect research interests of the WG participants by including e.g. polymer matrix composites, natural fibre composites, nanocomposites.

To boost bilateral collaboration between KMM-VIN Members an "Offer–Search" mechanism, pairing research partners of common interest and complementary needs, has been launched. It will regularly be updated on the website and periodically emailed to the Members.

News about successful proposals of the KMM-VIN members are presented as well as information on progress in projects, in which KMM-VIN is directly involved as partner or coordinator. Information on some new initiatives and important events with involvement of our Members, such as the Polish presidency of the EU in 2011, is given.

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

The programme of Research Fellowships is being continued and was in fact enlarged in 2010 owing to the support from POLITO who have funded "Margherita and Pietro Appendino Fellowships" to be granted through KMM-VIN. The term "Training" has been added to the title of this column since reactivation of KMM-NoE Summer Schools hosted by CISM (Udine IT) is under preparation.

In "Personalia" some news on distinctions, awards and success stories of our Colleagues are presented.

The addresses of the KMM-VIN registered office in Brussels and the remote office in Warsaw are given in the bottom imprints. For viewing the details of the „Offer–Search" programme, the NMP Workprogramme 2011, as well for the description of KMM-VIN members profiles and information on current events the Reader are kindly requested to visit our webpage www.kmm-vin.eu.

We hope that you will find this Issue informative and interesting. We are open to any suggestions you may have as we do our best to make KMM-VIN Newsletter a source of useful and topical information for the Members and all interested in the KMM-VIN activities and services.

Marek Janas, Editor

LATEST NEWS

GENERAL ASSEMBLY

The 5th General Assembly Meeting (Annual GA Meeting 2010) was held on 24 February 2010 in Brussels, convened by the KMM-VIN Chairman J. Eberhardsteiner. Representatives of 25 out of 32 core members were present.

The Annual Report of the Board of Directors on KMM-VIN activities in 2009 (by Michal Basista, CEO) as well as the reports by the coordinators of the four Working Groups: Andreas Chrysanthou, Aldo R. Boccaccini, Christian Hellmich and Philipp Imgrund were presented.

Elections for the next term (2010-2012) of KMM-VIN governing bodies resulted in few personal changes. Franco Rustichelli, (Ancona IT) replaced Gabriella Bolzon as Vice-chairman of the GA and the Governing Council; Dietmar Gross stepped down as the member of GC. The GC is composed now of the GA Chairman Josef Eberhardsteiner (TUV, AT), Vice-Chairman Franco Rustichelli, Rod Martin (MERL, UK) and coordinators of the Working Groups

The General Assembly approved the 2009 accounts and 2010 budget. The GA 2011 will be held in Brussels on 22 Feb. 2011.

Membership changes. The GA has approved applications for membership from:

– Centro Internazionale di Scienze Meccaniche *Spin-off* (CISM Lab) Udine, Italy as core member

– Friedrich-Alexander Universität Erlangen-Nürnberg, Germany as associate member.

The Fraunhofer Institute for Mechanics of Materials, Freiburg, Germany (FHG-IWM) has withdrawn from the KMM-VIN partnership.

KMM-VIN Booklet targeted at prospective industrial clients/partners is presently in print and will be distributed to our Members soon, together with a CD containing details on Members' expertise and specialised research infrastructure.

The 12th International Ceramics Congress was held at Montecatini, Italy, 6-11 June 2010. Andreas Chrysanthou (our WG1 Coordinator) delivered an invited lecture on "Self-propagating high-temperature synthesis of iron- and copper-matrix composites".

CISM (Udine) Scientific Council at its meeting on May 14, 2010 agreed to host the KMM-VIN course on "Tissue Engineering Scaffolds: Fabrication, Properties and Modelling" in summer 2011.

The Annual Conference of the Technology Innovation International Association (TII) was held from 28 to 30 April 2010 in Düsseldorf, Germany. Dr Arnaldo Moreno (ITC), KMM-VIN Technical Director, set out the KMM-VIN's most noteworthy features before the TII audience of over 300 professionals linked to technology transfer and innovation management.

The FP7 cooperative research project **MATRANS**, with KMM-VIN as coordinator, started officially its activities on 1st Feb. 2010. The Kick-off meeting was organized in Brussels on 24 February 2010 following the KMM-VIN Annual Assembly held on the preceding day. The forthcoming meeting of the Governing Council and Executive Board of MATRANS will be held at IPPT, Warsaw on July 6-7, 2010**.**

After the success of the 1st Conference, the 2nd **iNTeg-Risk Conference** on **"**Dealing with multiple and interconnected emerging risks" was held in Stuttgart on June 14-18, 2010 with more than 250 participants.

FORTHCOMING EVENTS

JESI 2010. The 12th Course of the International School on Advanced Material Science and Technology JESI 2010 on "PHYSICS AND CHEMISTRY IN NANOBIOTECHNOLOGY II" will be held at Jesi – Ancona, IT on 7-10 September 2010. It is organised, as always, by the Polytechnic University of Marche, Ancona (UNIVPM) and co-directed by F. Rustichelli (Ancona) anV. Komlev (Moscow).

E-MRS 2010 Fall Meeting. The Annual fall meeting of the European Materials Research Society (E-MRS) will be held at the campus of Warsaw University of Technology (WUT), Poland, 13-17 September 2010. It will include one plenary session and 15 parallel symposia.

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 is now open under the link http://www.dgm.de/dgm/verbund/

EPD 2011. The 4th International Conference on Electrophoretic Deposition will be held in Puerto Vallarta, Mexico, 2-7 October 2011, chaired by A.R. Boccaccini. More details are available under http://www.engconfintl.org/11ababstract.html

WHAT'S NEW IN WORKING GROUPS?

"OFFER–SEARCH" – a new tool to facilitate collaboration in KMM-VIN. KMM-VIN is assisting its members in finding partners who can offer expertise in processing, modelling or testing capabilities in some area(s) on exchange of expertise/capabilities in some other area(s). To this end, an initiative was recently put forward by Thomas Weissgärber (WG4 coordinator) and supported by other WGs coordinators. The purpose of this initiative is 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 VIN membership.

The latest results of the survey of Offer and Search are placed under the following link which will be updated regularly: www.kmm-vin.eu/Projects/Bilateral and, in parallel, emailed to the KMM-VIN members.

This survey is now open to KMM-VIN membership for a follow up. i.e. matching the partners with respective needs/expertise. If you have expertise/testing capabilities sought and you are interested in a bilateral cooperation (e.g. in form of co-supervised diploma, master or even a PhD theses), please contact the respective KMM-VIN member directly and inform the WG coordinators: (a.chrysanthou@herts.ac.uk Aldo.Boccaccini@ww.uni-erlangen.de Christian.Hellmich@tuwien.ac.at Thomas.Weissgaerber@ifam-dd.fraunhofer.de) as well as KMM-VIN CEO (Michal.Basista@kmm-vin.eu) about the further developments.

The first round of this initiative (by 10 June 2010) resulted in 19 proposals of cooperation. As an example, the first two ads are quoted below. For details please visit the webpage given above.

Partner	Offer	Search	Contact data /remarks
FhG-IFAM DD	Manufacturing of PM-Aluminium	Microstructure Characterization (e.g. TEM) and characterization of mechanical properties	Dr. Thomas Weissgaerber Fraunhofer-Institut für Fertigungstechnik und angewandte Materialforschung Institutsteil Pulvermetallurgie und Verbundwerkstoffe, Dresden, http://www.ifam-dd.fraunhofer.de
Univ. Erlangen-Nürnberg (UEN)	Fabrication of highly porous materials for tissue engineering scaffolds	Mechanical characterisation /modelling of mechanical properties	Prof. Aldo R. Boccaccini, Head, Institute of Biomaterials, Department of Materials Science and Engineering University Erlangen- Nürnberg, www.biomat.techfak.uni-erlangen.de

NEWS FROM WG1: INTERMETALLICS

The main activity in the Intermetallics Working Group during the last six months has been within the JOINING task which is concerned with the development of a sealant for solid-oxide fuel cells (SOFCs). The investigating partners are POLITO, UH and AGH. POLITO have developed a new glass-ceramic sealant that can be used to hermetically seal the Crofer 22 interconnect and yttria-stabilised zirconia (YSZ) which acts as the anode-supported electrolyte (ASE). Considering that SOFCs operate at up to about 800°C, the task is quite challenging. The sealant composition ranges between 53-58 mol% SiO_2, 16-18 mol% Al_2O_3, 24-26 mol% CaO and 10-12 mol% Na_2O and has a value of the coefficient of thermal expansion which is intermediate between those for Crofer22APU alloy and the YSZ ceramic.

During the last six months the task has focused on the thermal cyclic behaviour of the glass-ceramic sealant in contact with Crofer22APU which had undergone one of the following different pre-treatments:

1. Polished and pre-oxidised.
2. Unpolished and pre-oxidised.
3. Polished, but not pre-oxidised.

After sealing, the samples underwent various thermal ageing and thermal cyclic tests in air at up to a maximum temperature of 800°C. The initial characterisation results obtained by using SEM supported with EDAX analysis at UH and POLITO as well as TEM supported with SAED and EDS at AGH have shown that Crofer22APU that had been polished and pre-oxidised suffered little or no

diffusion of chromium and manganese into the glass-ceramic. A typical SEM micrograph showing this behaviour is presented in Fig. 1. In addition, it has been observed that sodium tends to diffuse away from the Crofer22APU-glass ceramic interface, thus preventing the likelihood of any adverse reaction between Na_2O and Cr_2O_3 to form the volatile sodium dichromate. However, as mentioned above, these are initial results and further analysis needs to be carried out to gain a better understanding of the influence of the pre-treatment.

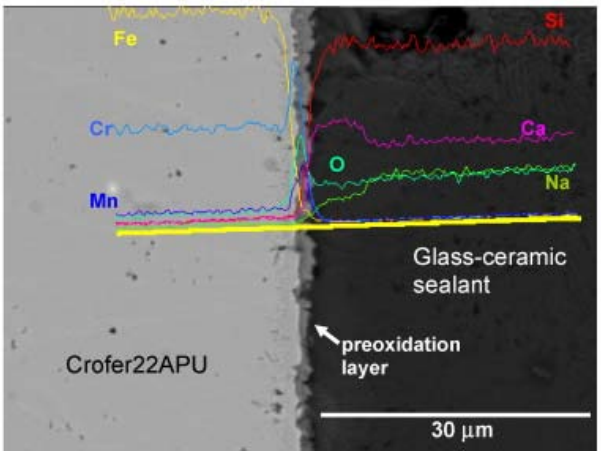

Fig. 1 Elemental profiles at the Crofer22AAPU-glass ceramic interface after 500 hrs at 800°C showing no diffusion of Cr into the glass ceramic (courtesy POLITO and UH).

Future work will also focus on longer treatments at 800°C, up to 3000 hours in order to further investigate whether any reactions at the Croferr2APU/glass-ceramic sealant interface take place. Minor Cr diffusion of up to 10 µm should not be detrimental especially if no volatile products are formed, since the average thickness of a glass-ceramic sealing area in a real SOFC condition should be 150-200 µm.

There has also been continuation of the work investigating the influence of pulse current treatment (PCT) on the corrosion behaviour of intermetallics, steel and aluminium by IPSUA and UH. Results using various types of steel including mild steel and Interstitial-free steel have revealed a significant reduction of the corrosion rate compared to untreated material. The work has also shown that the range of surface hardness values of the pulse current treated samples becomes more uniform perhaps due to a more uniform residual stress. Some results have been published in Materials and Technology 44 (2010) 99–102.

Andreas Chrysanthou, WG1 Coordinator

NEWS FROM WG2: COMPOSITE MATERIALS

The name of the WG2 has been changed, following a decision of the General Assembly 2008, into **„Composite Materials**". That reflects better real research interests of the WG2 participants, which include also polymer composites, natural fibre composites, nanocomposites, etc. and not only metal-ceramic composites.

Update on Research on Photocatalytic Coatings Led by ITC (Instituto de Tecnología Cerámica). Both physical and mechanical properties of materials are significantly improved by reducing their grain size from micro to nanoscale. In the last years, several techniques have been developed or adapted to deposit nanostructured coatings. The development of processing approaches to fabricate such nanostructured coatings was extensively studied in the framework of KMM-NoE, in particular in the NANOCERMET research task.

ITC (Castellon, Spain) is now leading a new research project **FOTOCER**, approved in 2009 (see the note in KMM Newsletter 1) by the Spanish Government (PID-600200-2009-5), which aims to develop photocatalytic coatings for anti-bacterial and self-cleaning surfaces. This project will be carried out in cooperation with other four Spanish research groups, including CIDETEC (Centre for Electrochemical Technologies) another core member of KMM-VIN and ITM (Instituto de Tecnología de Materiales) of the Polytechnic University of Valencia who belonged to the former ERN of KMM-NoE.

Two different deposition techniques will be used to develop nanostructured TiO_2 photocatalytic coatings. ITC will obtain layers by APS (Atmospheric Plasma Spraying) whereas CIDETEC will study their deposition by EPD (Electrophoretic Deposition). EPD is a technique that was investigated substantially during KMM-NoE for deposition of nanoscale coatings, in particular in collaborations between Imperial College London (IMPER) and CIDETEC.

In the first step of the project led by ITC, both substrates and raw materials (based on TiO_2 nanoparticles) will be studied and adapted to each coating process. Then, the deposition of the photocatalytic layers will be optimized and resulting coatings will be fully characterized from the microstructural, mechanical and functional points of view.

This project is expected to provide new methods for obtaining photocatalytic surfaces with better mechanical and tribological properties. Eventually, the developed techniques should be scaled to an industrial process.

Over the last three years, ITC led the **RECAP** project supported by the Spanish Ministry of Science and Innovation. ITC worked along with the Institute of Materials Science of the University of Valencia (ICMUV) and the Institute of Materials Technology (ITM) of the Polytechnic University of Valencia in order to develop high-performance nanostructured coatings on metallic substrates of different nature. This project was completed at the end of 2009 with good results. Nanostructured cermets and ceramic

coatings for wear-resistant applications were developed by atmospheric plasma spraying, parting from both commercial and home-made nanopowders prepared by ITC, ITM and ICMUV. In general, nanostructured coatings presented better properties than conventional ones.

Aldo R. Boccaccini, WG2 Coordinator

NEWS FROM WG3: FUNCTIONALLY GRADED MATERIALS (FGM)

Since emerging from former tasks of KMM-NoE WPR3, the nature of WG3 remains to be of rather dispersed kind. Still, two main threads appear to become more dominant: (i) graded coatings and (ii) biomaterials and biological materials. The activities in the latter field are thriving due to number of collaborative projects involving KMM-VIN WG3 partners on the bilateral and European levels.

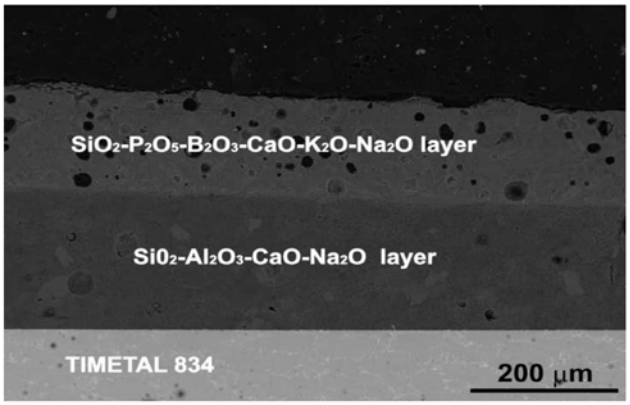

Fig. 2 Oxidation-resistant coating for aircraft engine parts (courtesy AGH)

Details on related activities were highlighted in the 1st Issue of Newsletter so that we here concentrate on the first thread of activities, driven mainly forward by AGH and POLITO. On the one hand, these groups have joined forces to develop protective graded coatings for Titanium-based alloys, having in mind applications in automotive and aerospace industry. The aim is to improve the oxidation resistance, as well as the tribological and mechanical properties of such alloys. Slurry-based processing is key ingredient on POLITO's side, whereas the highly evolved characterization techniques of AGH help in identifying what is unique about these new materials (Fig. 2).

Another activity concerns protective coatings for Ni-base superalloys, for gas turbine components requiring hot corrosion resistance. Besides the obvious practical importance of these studies, they provide the basis for the presence of the involved researchers in international scientific journals in the Surface Technology field.

Great momentum for FGM research in WG3 was gained through the MATRANS project (FP7) launched in February 2010. More about that will be found in the next issue of this newsletter.

Christian Hellmich, WG3 Coordinator

NEWS FROM WG4: FUNCTIONAL MATERIALS

The Working Group 4 was installed in 2009. In the beginning of 2010 the coordinator, Philipp Imgrund, finished his coordinating activity of WG4. At the KMM-VIN General Assembly Meeting held in Brussels on 23rd Feburary 2010 Thomas Weissgärber from Fraunhofer IFAM Dresden was elected as the new coordinator. The WG4 consists presently of eight partners: Fraunhofer IFAM, CIDETEC, IPM, Politecnico di Torino, AITEX, Centro Ricerche FIAT, AGH and ITC. After collecting the specific interests and expertise from the partners the main fields of activities can be summarized as:

- 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. For the development of novel nanostructured metallic or ceramic materials spark plasma sintering (SPS) is a promising technique. With the installation of FCT-HP D 250/1 of the company FCT Systeme GmbH, Rauenstein at Fraunhofer IFAM Dresden, it is possible to fabricate sintered compacts in a product relevant size (max. diameter: 300 mm) for the first time in Europe. This equipment has been extended with the installation of a cooling tunnel in order to increase the productivity and to allow a semi-continuous production of materials.

The reversible storage of hydrogen is a key technology of a future hydrogen-based energy cycle. There is a dire need for safe, volume efficient, lightweight, and inexpensive hydrogen storage technologies, in particular, for portable and mobile applications. In this connection, the working group Hydrogen Technology at Fraunhofer IFAM-Dresden is aiming at the development of reversible hydrogen storage systems up to the prototype level for portable, mobile, and small stationary applications.

Bionica Tech s.r.l., funded on 18 January 2010, operates in the field of high-tech biomedical products for applications in orthopaedic surgery, oral implantology, spinal surgery. Its mission includes the design, development, validation, industrialization, and the introduction into the market of highly technological products based on innovative materials, including composites. BionicaTech s.r.l. is a spin-off company of Politecnico di Torino, Italy, and

exploits the contribution of three associates (Enrica Verné, Silvia Spriano, Chiara Vitale Brovarone), assistant professors of the Material Science and Chemical Engineering Department (contact points: enrica.verne@polito.it, monica.ferraris@polito.it)

At IFAM Bremen, different methods of compounding and processing nanocomposites are being investigated. Potential applications in optics as transparent lenses with modified properties like higher scratch resistance (Fig. 3) or a changed refractive index are addressed by modification of PMMA with TiO_2 or SiO_2-based nanoparticles.

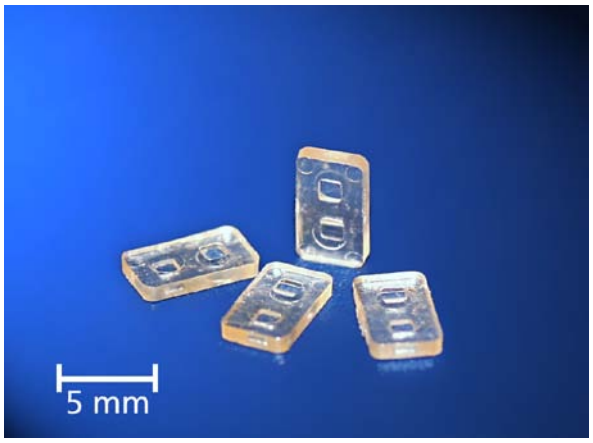

Fig. 3. Optical micro demonstrator: PMMA / TiO_2 nanocomposite (courtesy IFAM Bremen)

In a further project micro injection moulding was developed for manufacturing of a biosensor for measurement of cell forces (Fig. 4a). The process was chosen due to its suitability for net shape mass production.

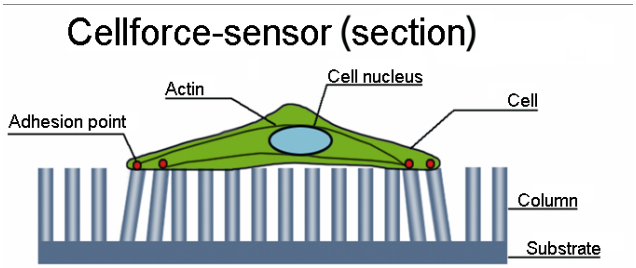

Fig. 4 (a). Sketch of cell force sensor (courtesy IFAM Bremen)

The material requirements were transparency and flexibility, which led to the choice of a thermoplastic polyurethane (TPU). The sensor array consists of 490.000 pillars, each pillar with a diameter of 5 µm and a centre to centre distance of 10 µm (Fig. 4b). Our partners developed an optical system to calculate cell force applied to the pillars as a function of the deflection caused by cell movement or contraction of the cells.

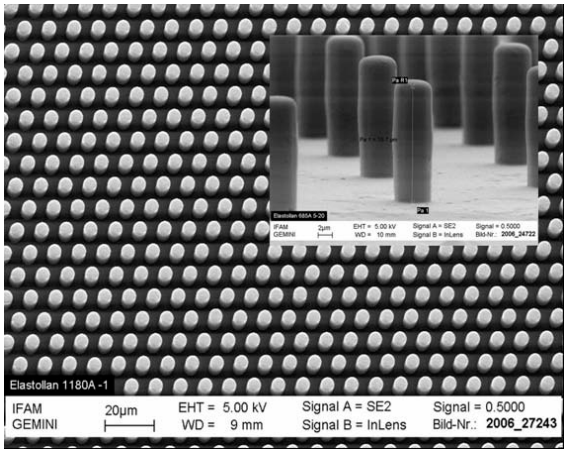

Fig. 4 (b). TPU sensor array by micro moulding (courtesy IFAM Bremen)

AITEX research group on functional materials is focused on R&D into new functions of textile products that would be of interest to the consumer and raise the commercial value of the product. A project dealing with regenerative blankets, in collaboration with Aznar Textil, S.L., concluded with the development of a blanket that can contribute to tissue regeneration in injury cases, and neutralise the bacterial processes by aiding the formation of scar tissue. This new shed-woven fabric has the ideal structure for conferring these properties to the final product.

Another project focuses on regenerative socks. The main objective of this project was the manufacture of socks using chitin fabric (Fig. 5).

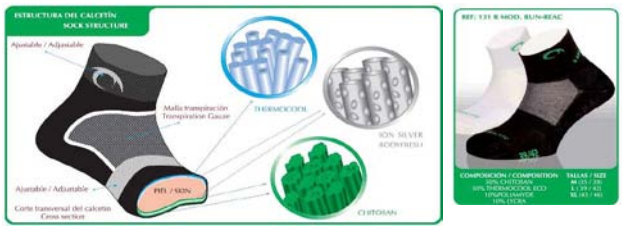

Fig. 5. Manufacturing of socks using chitin fabric (courtesy AITEX)

Other activities at AITEX are dealing with anti-electromagnetic wave visor and the development of new materials for interior lighting.

Thomas Weissgärber, WG4 Coordinator

KMM PROJECTS

FP7 NMP WORKPROGRAMME 2011

Although the FP7 calls 2011 will be officially released by the end of July 2010, the nearly definitive topics proposed in the NMP Workprogramme (THEME 4: Nanosciences, nanotechnologies, Materials and new Production technologies) are already published. Deadline for the first stage of main actions is very close (4th November 2010), so we want to draw the attention of our Members to the selection of topics that seem to be of particular interest for KMM community. To ease identification of the topics their actual WP codes are also given. Further details may be found, on KMM-VIN website www.kmm-vin.eu/ Members Area/Workprogramme NMP.

Deadlines (Stage 1): 4 November 2010 for Funding Schemes:

- Large-scale Integrating Collaborative Projects **L**
- Small or medium-scale focused research projects **S**
- SME-targeted Collaborative Projects (**SME**)

Deadline: 17 March 2011 for Funding Scheme: Coordination and Support Actions (**CSA**)

Activity 4.2 – Materials

- NMP.2011.2.1-1 Research and innovation for advanced multifunctional ceramic materials. *Funding Scheme: **SME***
- NMP.2011.2.1-2 Modelling of ultrafast dynamics in materials. *Funding Scheme: **S***
- NMP.2011.2.2-1 Novel superconducting materials, architectures and processes for electrotechnical applications. *Fund. Scheme: **L***
- NMP.2011.2.2-2 Biomaterials for tissue engineering for age-related cancer and sensory organ diseases. *Funding Scheme: **S***
- NMP.2011.2.3-3 Networking of materials laboratories and innovation actors in various industrial sectors for production process innovation. *Funding Scheme: **CSA** (coordinating actions)*

Activity 4.4 – Integration

- NMP.2011.4.0-1 New technologies based on physical processing of materials for mechanical or electro-technical applications. *Funding Scheme: **L***
- NMP.2011.4.0-4 Organisation of events related to the Presidencies of the European Union actions. *Funding Scheme: **CSA** (supporting actions)*
- NMP.2011.4.0-5 Support to Networks of Excellence with durable integrated structures. *Funding Scheme: **CSA** (coordinating actions)*
- NMP.2011.1.4-5 Coordinated call EU-Russia: Multiscale modelling as a tool for virtual nanotechnology experimentation. *Funding Scheme: **S**. Deadline: 31 March 2011*

MATRANS (FP7)

"**Micro and Nanocrystalline Functionally Graded Materials for Transport Applications**", the first project coordinated by the KMM-VIN and involving either directly (CRF, IFAM-DD and R-TECH) or in a KMM-VIN grouping: (IPPT, IMIM, ITME, TUD, UNIVPM, POLITO) 9 KMM-VIN Members. Started officially on 1 Feb. 2010 with a Kick-off in Brussels on 24 Feb. 2010. MATRANS has entered the 6th moth of its execution and will hold its M6 meeting at IPPT, Warsaw (July 6-7, 2010). The M6 meeting will be focused on preliminary results in WP1: Material requirements and preparation of starting materials and WP4: Modelling and on the progress in other workpackages.
Project coordinating person: Michal Basista, scientific coordinator: Katarzyna Pietrzak. The total EC funding: 3.6 M€ with the KMM-VIN share of 2.38 M€ (coordinator + 9 members).
Project website: www.kmm-vin.eu/Projects/Matrans

iNTeg-Risk (FP7)

"Early Recognition, Monitoring and Integrated Management of Emerging, New Technologies Related, Risks". A large project (2008-2013), coordinated by the European Virtual Institute for Integrated Risk Management (A. Jovanovic). Participates KMM-VIN with its grouping comprising itself and IPPT, IMRSAS, IMIM, MCL as a project partner. Another KMM-VIN member (MERL) is also involved in the project beyond KMM-VIN grouping. The KMM-VIN members in iNTeg-Risk are dealing with emerging risks related to development and use of advanced engineering materials, composite materials. The total share of KMM-VIN grouping (4 members) in the EC funding is 185.5 k€.
Project website: http://integrisk.eu-vri.eu.

MUST (FP7)

„Multi Level Protection of Materials for Vehicles by Smart Nanocontainers". Large cooperative project (2008-2012) coordinated by EADS Germany (Th. Hack); consortium of 20 partners including a

small KMM-VIN grouping consisting of KMM-VIN itself and BioIRC. The KMM-VIN grouping share in the EC funding of the project is 85.2 K€. The R&D activities of BioIRC are concerned with numerical simulations of self-healing processes by Dissipative Particle Dynamics method. KMM-VIN itself is involved in Dissemination activities of the MUST results.
Website: http://www.sintef.no/Projectweb/MUST

ISWA (FP7)

"Immersion in the Science Worlds through the Arts". A successful CSA proposal, now under negotiation, in the 2010 call on "Science and the Arts: an experimental approach", coordinated by Franco Rustichelli (UNIVPM). Among 16 participants from 15 countries are KMM-VIN members: UNIVPM, IPPT, IMRSAS, and TUV. 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. Then, competition in corresponding creation domains will involve European secondary school students, with the final event for the winners organized in Grenoble.

M-FUTURE 2011 (FP7)

"**Materials & Manufacturing of the FUTURE**". A successful CSA proposal, now under negotiation, comprising two conferences: MANUFUTURE 2011 and Future Materials (FUMAT 2011) to be held in 2011 in Wroclaw and Warsaw, respectively, as accompanying events of the Polish presidency of the EU. The FUMAT 2011 involves two core members of KMM-VIN: IPPT and WUT as well as KMM-VIN itself. The FUMAT conference, scheduled for 22-23 Sep. 2011, will address materials solutions to selected Grand Societal Challenges of our times. Close collaboration with European Technology Platform on Advanced Engineering Materials and Technologies (EuMaT) and the European Materials Research Society (E-MRS) is foreseen in FUMAT 2011.

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), EC funding 900 K€. This project will enhance 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: TUV, WUT and UNIVPM.

HANCOC (MNT-ERANet)

"Hard NanoComposite Coatings". The project is devoted to the development and optimization of a novel technology of thin nanocrystalline, composite superhard coatings. In HANCOC participate two KMM-VIN core members: IMRSAS and AGH. Duration 3 years, coordinator Jan Dusza (IMRSAS)

NATIONAL PROJECTS SUPPORTED BY THE EU STRUCTURAL FUNDS (SF)

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 total project budget is 6.3 M€, of which the KMM-VIN members' share is 4.4 M€. The project is concerned in part with the same materials systems as MATRANS but without a gradient of chemical composition. Synergy potential between the two projects is large and will be made use of.
Project website: http://www.komcermet.ippt.gov.pl/page.php?2

SF Projects of IMRSAS (Slovakia)

Institute of Materials Research, Kosice, SK (**IMRSAS**) is involved, as partner or coordinator, in a series of projects (2010-2012/13) in the EU Structural Fund Programme:

- Advanced materials with nano and submicron sized structure
- Technology of preparation of electrotechnical steels possessing high permeability for high affectivity electromotors
- Research Centrum for Combined and Renewable Sources of Energy.
- New materials for power engineering.
- Advanced implants with stem cells for regeneration and reconstruction of hard tissues.
- Slovak Research-Innovation Platform on Sustainable Mineral Resources

OTHER NATIONAL PROJECTS

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 (MCL).

FOTOCER (Spain) "Development of photocatalytic surfaces using readily scalable techniques for use in industry" (2009-2011) is coordinated by ITC and involving CIDETEC (more details in "NEWS FROM WG2").

COOPERATION

EuMaT ETP

KMM-VIN is one of the key members of the **"European Technology Platform on Advanced Engineering Materials and Technologies"** (EuMaT). The scope of KMM-VIN research is represented across all six Working Groups of EuMaT, one of them (WG4: Knowledge-based Structural and Functional Materials) being coordinated by the KMM-VIN CEO. Besides KMM-VIN, the core group of EuMaT WG4 includes six KMM-VIN members: FHG-IFAM (Bremen and Dresden), INASMET, TUV, ITME, UH and CIDETEC.

Recently, KMM-VIN has become a bridge between the Polish Presidency Conference on Materials (FUMAT 2011) and EuMaT ETP (cf. KMM Projects for more details).

KMM-VIN is also providing secretariat services for EuMaT and hosting many of EuMaT Steering Committee meetings in its office in Brussels.

Website: www.eumat.org

EU-VRi

KMM-VIN is an associate member of the European Virtual Institute for Integrated Risk Management (EEIG) and EU-VRi is an associate member of KMM-VIN. Cooperation between KMM-VIN and EU-VRi has been so far carried out within the iNTeg-Risk project which is coordinated by the EU-VRi. More details on http://www.eu-vri.eu.

KMM-VIN RESEARCH FELLOWSHIPS and TRAINING

The KMM Mobility Programme includes Research Fellowships intended for PhD-students and early stage researchers from the KMM-VIN member institutions (more at: www.kmm-vin.eu/LatestNews)

The 2nd call for Research Fellowships was closed on March 31, 2010. The submitted applications were reviewed by the Research Fellowship Committee consisting of the Chair of the KMM-VIN Mobility Programme (Josef Eberhardsteiner) and of the Coordinators of the KMM-VIN Working Groups (Andreas Chrysanthou, Aldo Boccaccini, Christian Hellmich and Thomas Weissgärber. As in 2009, six person-months could be granted according to the regular KMM-VIN budget. In addition, two person-months were made available financed by POLITO. This additional grant is dedicated to Professors Margherita and Pietro Appendino.

Results of the second call (March 2010**)**

Applicant (Institution)	Host (Institution)	Stay in months	Start date
A. Hoppe* (UEN)	E. Verne (POLITO)	2	01.10.10
L. Hegedusova (IMRSAS)	A. Moreno (ITC)	1	10.07.10
M. Zietara (AGH)	F. Rustichelli (UNIVPM)	1	01.09.10
A. Krawczynska (WUT)	R. Pippan (MCL)	2	01.09.10
M. Kasiarova (IMRSAS)	G. Cempura (AGH)	1	01.10.10
G. Cempura (AGH)	J. Dusza (IMRSAS)	1	01.08.10

** Margherita and Pietro Appendino Grant" funded by POLITO*

KMM Summer Schools will be Reactivated

A one-week KMM-VIN course on "Tissue Engineering Scaffolds: Fabrication, Properties and Modelling" will be hosted – similarly as KMM-NoE Summer Schools were – at CISM (Udine, IT) and will probably be held in September 2011. Its organizers are A. R. Boccaccini (Erlangen, DE) and Ch. Hellmich (Vienna AT).

Next course on advanced composites is planned for 2012

PERSONALIA

Prof. Aldo R. Boccaccini (UER)

– became Editor-in-Chief for *Materials Letters* an interdisciplinary Elsevier journal devoted to rapid communications on the science, applications, and processing of materials;

– has been awarded the Ivor Jenkins Medal 2010 from the UK Institute of Materials, Minerals and Mining (IOM3) "in recognition of significant contribution which has enhanced the scientific, industrial or technological understanding of materials processing or component production using particulate materials".

Prof. Jean-Louis Chaboche (ONERA) co-authored recently two books:

– "Mécanique des Matériaux Solides"

J. Lemaitre, J-L. Chaboche, A. Benallal and R. Desmorat, Dunod, Paris 2009: the 3rd edition, after the 1985 (French) and 1990 (English) versions – a completely renewed and extended presentation.

– "Non-Linear Mechanics of Materials"

J. Besson, G. Cailletaud, J.-L. Chaboche, S. Forest, M. Blétry, Springer 2010 (English edition of "Mécanique Non-Linéaire des Matériaux", 2001).

Prof. Christian Hellmich (TUV) has been awarded by the European Research Council with the prestigious **"ERC Starting Grant"** for consolidation of the career development. "Internationally active engineering scientist recognized for his cutting-edge research in applied multiscale mechanics, has worked predominantly on the quantitative description of mechanical systems, from their chemical composition, as well as from their nano, micro, and macrostructures. The 1.5 million Euro endowment of the ERC Grant is allotted for exploration of the 'Poro-Micromechanics of Bone Materials, with Links to Biology and Medicine', aiming at breakthroughs in experimentally validated, theoretical and computational strength predictions from micro and nanomechanical building principles of bones".

Prof. Bernhard Schrefler (UNIPAD)

– has been awarded in April 2010, with the doctorate honoris causa at Ecole Normale Superieure de Cachan, France.

– received at ECCM-2010 in Paris, in May 2010, the Euler Medal from ECCOMAS (European Council of Computational Methods in Applied Sciences).

Members (Institutions)

CORE

AGH University of Science and Technology, Cracow, Poland
AITEX Textile Research Institute, Alcoy-Alicante, Spain
BioIRC Bioengineering Research and Developing Centre, Kragujevac**,** Serbia
CIDETEC Fundacion CIDETEC (Centre for Electrochemical Technologies), Donostia/San Sebastián, Spain
CISM Lab Centro Internazionale di Scienze Meccaniche Spin-off *(new Member)*
CUT Cracow University of Technology, Cracow, Poland
CUTL Cyprus University of Technology, Limassol, Cyprus
EMINATE eminate Ltd, Nottingham, UK
FGH Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V:
- **FGH-IFAM** Fraunhofer Institute for Manufacturing and Advanced Materials, Bremen, Germany
- **FGH-IFAM-DD** Fraunhofer Institute for Manufacturing and Advanced Materials, Dresden, Germany

IOD Foundry Research Institute, Caracow, Poland
IMBAS Institute of Mechanics, Bulgarian Academy of Sciences, Sophia, Bulgaria
IMIM Institute of Metallurgy and Materials Science, Polish Academy of Sciences, Cracow, Poland
IMRSAS Institute of Materials Research, Slovak Academy of Sciences, Kosice, Slovakia
IMZ Institute for Ferrous Metallurgy, Gliwice**,** Poland
INASMET Fundación Inasmet, Donostia-San Sebastian, Spain
IPPT Institute of Fundamental Technological Research, Polish Academy of Sciences, Poland
IPSUA Institute for Problems of Strength, National Academy of Sciences, Kiev, Ukraine
ITC Instituto de Tecnología Cerámica - AICE, Castellón, Spain
IPM Institute of Physics of Materials, Brno, Czech Republic
ITME Institute of Electronic Materials Technology, Warsaw, Poland
MCL Werkstoff-Kompetenzzentrum-Leoben Forschungsgesellschaft m.b.H. (Materials Centre Leoben), Austria
MERL Materials Engineering Research Laboratory Ltd, Hitchin, Hertfordshire, UK
ONERA Office National d'Etudes et de Recherches Aérospatiales, Chatillon, France
POLIMI Politecnico di Milano, Milan, Italy
POLITO Politecnico di Torino, Italy
R-TECH Steinbeis Advanced Risk Technologies GmbH, Stuttgart, Germany
TUD Technische Universität Darmstadt, Germany
TUV Vienna University of Technology, Vienna, Austria
UH University of Hertfordshire, Hatfield, Herts, UK
UNIPAD Università degli Studi di Padova, Italy
UNIVPM Università Politecnica delle Marche, Ancona, Italy
WUT Warsaw University of Technology, Warsaw, Poland

ASSOCIATE

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

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