

PROJECT PERIODIC REPORT

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Project title: **Reinforcement of Research Potential of the Department of Materials Engineering in the Field of Processing and Characterization of Nanostructured Materials**

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Period covered: **from 01/05/2010 to 30/04/2011**

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¹ Usually the contact person of the coordinator as specified in Art. 8.1. of the grant agreement

² The home page of the website should contain the generic European flag and the FP7 logo which are available in electronic format at the Europa website (logo of the European flag: http://europa.eu/abc/symbols/emblem/index_en.htm ; logo of the 7th FP: http://ec.europa.eu/research/fp7/index_en.cfm?pg=logos). The area of activity of the project should also be mentioned.

Declaration by the scientific representative of the project coordinator¹

I, as scientific representative of the coordinator¹ of this project and in line with the obligations as stated in Article II.2.3 of the Grant Agreement declare that:

- The attached periodic report represents an accurate description of the work carried out in this project for this reporting period;
- The project (tick as appropriate):
 - ☐ has fully achieved its objectives and technical goals for the period;
 - ☒ has achieved most of its objectives and technical goals for the period with relatively minor deviations³;
 - ☐ has failed to achieve critical objectives and/or is not at all on schedule⁴.
- The public website is up to date, if applicable.
- To my best knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project (section 3.6) and if applicable with the certificate on financial statement.
- All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 5 (Project Management) in accordance with Article II.3.f of the Grant Agreement.

Name of scientific representative of the Coordinator¹: Prof. Dr. Vladimir V. Srdić

Date:31/ 07/ 2011

Signature of scientific representative of the Coordinator¹: 

³ If either of these boxes is ticked, the report should reflect these and any remedial actions taken.

⁴ If either of these boxes is ticked, the report should reflect these and any remedial actions taken.

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1. Publishable summary



RP-DEMATEN – third year report **Reporting period: 01. 05. 2010. – 30. 04. 2011.**

Contractor:

FTUNS – Faculty of Technology, University of Novi Sad, Novi Sad, Serbia

Project coordinator:

Prof. Vladimir V. Srdić, Ph.D. - srdicvv@uns.ac.rs

RP-DEMATEN is an acronym for the project titled: “Reinforcement of Research Potential of the Department of Materials Engineering in the Field of Processing and Characterization of Nanostructured Materials”. The objectives of the proposed Project are reinforcement of research potential of the DEMATEN at FTUNS and strengthening partnerships among centers of excellence established in the EU’s convergence region, the Member States and the Western Balkan Countries (WBC).

The major RP-DEMATEN objectives are to:

- Hire new young and experienced researchers;
- Improve networking and exchanging of know-how and experience by exchange of senior researchers;
- Provide training for our young researchers;
- Develop, launch and support information system through web site offering access to thematic and general information in the field of nanomaterials and nanotechnology;
- Disseminate written information in form of flyers, pamphlets etc.
- Upgrade and renew equipment necessary for successful development of nanomaterials and nanotechnology;
- Organize Conference, Workshops, and Training schools.

During the third year of the RP-DEMATEN project, according to **WP1 Mobility and Training** Work Plan, the following trainings were organised:

- 2 six-month trainings:
 - I. Stijepović from FTUNS visited UDE (the third visit)
 - S. Ognjanović / B.Mojić / E.Csehova / M.Kachlik visited UDE
- 2 two-month trainings:
 - B. Mojić / V. Simendić / N. Vukić from FTUNS visited IMRSAS
 - M. Kachlik from DCPBUT visited UDE
- 8 one-month trainings:
 - M. Kachlik from DCPBUT visited IMSNCSR (the second visit)
 - V. Puchy from IMRSAS visited DCPBUT
 - S. Ognjanović from FTUNS visited UDE
 - I. Ristić from FTUNS visited IMCASC
 - D. Drdlik from DCPBUT visited IMRSAS

- A. Duszová from IMRSAS visited UDE
- B. Mojić from FTUNS visited IMSNCSR
- V. Simendić / N. Vukić from FTUNS visited IMRSAS

In addition, 19 visits were organised in the third project year:

- 2 one-month visits
 - Dr. M. Špírková from IMCASCRC visited FTUNS (the second visit)
 - P. Tatarko from IMRSAS visited FTUNS
- 2 two-week visits
 - Dr. K. Častkova / Prof. K. Maca / Prof. M. Trunec from DCPBUT visited FTUNS
 - E. Csehova from IMRSAS visited FTUNS
- 15 one-week visits:
 - Prof. J. Budinski Simendić from FTUNS visited IMCASCRC
 - Prof. V. Srdić from FTUNS visited IMSNCSR
 - Prof. J. Budinski Simendić from FTUNS visited IMRSAS
 - Dr. F. Lofaj from IMRSAS visited IMSNCSR (the second visit)
 - Dr. M. Čubová Urbanova from IMCASCRC visited FTUNS
 - Dr. J. Dusza from IMRSAS visited UDE
 - Dr. P. Hvizdos from IMRSAS visited FTUNS
 - Dr. K. Giannakopoulos from IMSNCSR visited UDE
 - Dr. K. Giannakopoulos from IMSNCSR visited DCPBUT
 - Dr. M. Špírková from IMCASCRC visited IMSNCSR
 - Dr. J. Dusza from IMRSAS visited DCPBUT
 - Dr. M. Kašiarova from IMRSAS visited FTUNS
 - A. Duszova from IMRSAS visited IMCASCRC
 - Prof. K. Maca from DCPBUT visited IMSNCSR
 - Prof. K. Maca/ Prof. M. Trunec from DCPBUT visited UDE

The most important activities of **WP 2 Dissemination of information**, in the third Project year, were constantly updating and improving of the web site, preparation of a brochure and dissemination of information about the RP-DEMATEN project on TV programme, newspapers, international conferences, meetings etc.

In the third year of the RP-DEMATEN Project, according to **WP 3 Strengthening the human potential** two experienced senior researchers (Dr. Milena Špírková and Dr. Jiří Brus) were employed at the FTUNS.

Young researcher: I. Stijepović continued his work at the Project during the whole 12 months, considerably improved himself through trainings in the EU centres and trainings at DEMATEN supervised by professors from the FTUNS, hired experienced senior scientists and visitors. However, J. Pavličević was working only up to 4th November 2010 and then left the Project due to attending UNESCO postgraduate course in Polymer Science, organised at the Institute of Macromolecular Science of Czech Academy of Science in Prague. Thus, the position was filled by a young researcher, Oskar Bera, from 1st November 2010.

Incoming experienced researchers employed at the FTUNS M. Nikolić continued his work at the Project during the whole 12 months and Dr. K. Giannakopoulos was employed for additional two months in the third Project year.

In the third Project year in **WP 4 Upgrading research capacities** regular service of Waters Gel Permeation Chromatograph (GPC) was done by “Hemtek” D.O.O. Belgrade and some parts of the injector were replaced. In addition, the official representative of the company Malvern Instruments

Ltd., from United Kingdom, Stuart Macaulay, gave the special training for young researchers from DEMATEN, FTUNS in Novi Sad on 23rd May 2010.

In the third project year, the Waters Gel Permeation Chromatograph (GPC) (based on HPLC system) was additionally equipped with compatible BioSuite Phenyl, 1000, 13 μ m HIC preparative column and 5 mL sample loop. In this way HPLC system was enabled to be used for preparative purposes – for isolation and purification of various biomolecules by hydrophobic interaction chromatography. This preparative chromatographic system has been applied for isolation and purification of fungal cellulase by their fractionation according to a modified method described by Tomaz and Queiroz.

In the third Project year, according to **WP 5 Workshops and training schools**, two workshops were organised: i) the second Workshop, held from 3rd to 5th of June 2010 in Ourinopoulo, Chalkidiki, Greece and ii) the third Workshop, held from 3rd till 5th March 2011 at the Faculty of Mechanical Engineering, Brno University of Technology, Brno, Czech Republic.

The second RP-DEMATEN Workshop “*Structural and Functional Characterisation of Complex Materials*” was held in Hotel “Aristoteles”, Ourinopoulo, Chalkidiki, Greece from 3rd to 5th of June 2010. The Workshop gathered 44 participants from Europe and United States, 25 of them were young scientists carrying out their Ph.D. thesis or their postdoctoral training mainly at the FTUNS, but also at other European universities and institutes (DCPBUT, IMRSAS, IMCASCR, ESRF etc.). The Workshop was focused on modern characterisation techniques of complex materials. Accurate structural and functional characterisation of materials, have invaluable importance in understanding the properties of materials, in tailoring their functionalities and in guiding the design of novel materials. The second Workshop was opened by Dr. E. Moshopoulou. Eight invited speakers, coming from United States and Europe, presented exciting recent developments and cutting edge challenges of these techniques. In addition, 18 participants gave contributed talks and 13 participants presented posters. The extended abstracts of all presentations were published in the booklet “Programme and Book of Abstracts”, edited by E.G. Moshopoulou, K. Giannakopoulos, D. Kechrakos. Apart from gaining theoretical knowledge, young scientists had opportunity to meet and exchange their experiences in more casual manner, since a few social events were organized after the official program.

The third RP-DEMATEN Workshop “*Processing of Nanostructured Ceramics and Nanocomposites*” was held from 3rd till 5th March 2011 at the Faculty of Mechanical Engineering, Brno University of Technology. The third Workshop was opened by the Dean of the Faculty of Mechanical Engineering, Prof. Miroslav Doupovec. The key objective of this final workshop was to learn how to tailor, at the nanoscale, novel material systems with new or improved properties and performance based upon better understanding of material nanostructure. Thus the three main topics of the workshop were: Synthesis of nanopowders, ii) Processing of advanced ceramics and polymers and iii) Properties and application of advanced ceramics and nanocomposites. The programme was dedicated for the young researchers and strengthening of the partnerships between the European centres of Excellence. To extend the knowledge of young researchers, six invited lectures (45 min. each, together with discussion) had the presentation of their work. In addition to the invited lectures, 19 oral presentations (15 min. each) and 19 posters (in two 90 min. sessions) were presented. The workshop had about 60 participants from DEMATEN project and was also open for scientists and students outside of the project. The abstracts of all presentations were published in the booklet “Programme and Book of Abstracts”, edited by Prof. K. Maca and Prof. M. Trunec, and printed in Novi Sad. In addition to scientific presentations and lectures, a social evening was organized where young and experienced researchers alike had the opportunity to strengthen their relationships.

2. Project objectives for the period

The Department of Materials Engineering (DEMATEN) at the Faculty of Technology, University of Novi Sad (FTUNS) represents the strongest research and education centre in the province Vojvodina in the field of ceramics and polymer materials and one of the first research centres in Serbia in which investigation of nanostructured materials has begun in early 1990's. Since then the research activities at the DEMATEN are focused on processing and characterization of nanostructured materials - nanopowders, nanotubes, nanofilms and nanocomposites. The research team at the DEMATEN consists of relatively young and qualified researchers, having considerable international experiences. Thus, the RP-DEMATEN project will continue already initiated bilateral collaboration between researchers from the FTUNS (DEMATEN) and five centres of excellence from Europe: Nanoparticle Process Technology, Duisburg (UDE); Institute of Macromolecular Chemistry AS CR, v.v.i., Prague, (IMCASCAR); Institute of Materials Science, Athens (IMSNCSR); Institute of Materials Research, Košice (IMRSAS) and Department of Ceramics and Polymers, Brno (DCPBUT)). The collaboration had been based on cooperative research activities, exchange of scientists, joint publications of the obtained results and the European project - COST 539, COST MP0701 and COST MP0904. During the RP-DEMATEN project this collaboration considerably strengthened and offered an excellent basis for sustainable partnership among the centres of excellence concerned and in the same time promotes closer S&T cooperation between Europe and the Western Balkan Countries (WBC). In addition, it was obvious that some centres from the Balkan region (such as the Faculty of Technology, University of East Sarajevo, Zvornik, Republic of Srpska, Bosnia and Herzegovina and the Faculty of Technology and Metallurgy, University of St. Cyril & Methodius, Skopje, FYRO Macedonia) recognised the established partnership and connected their self to the created network, giving perspective of further integration of the Balkan region into the European Research Area and therefore the European RTD activities.

The major RP-DEMATEN objectives for the third Project year were to:

- Hire one experienced incoming researcher at FTUNS
- Hire experienced senior researcher from IMCASCAR at FTUNS;
- Improve networking and exchanging of know-how and experience by exchange of senior researchers through several one-week, two-week and one-month visits;
- Provide training for young researchers from FTUNS, IMRSAS and DCPBUT through several one-month, two-month and six-month training visits;
- Develop and support information system through web site and printing a brochure offering access to thematic and general information in the field of nanostructured materials and nanotechnology;
- Learn more about the purchased equipment (Zetasizer Nano and GPC) through organized trainings and use them for current research activities at the FTUNS;
- Organize the two Workshops: “*Structural and Functional Characterisation of Complex Materials*”, in June 2010 in Greece and “*Processing of Nanostructured Ceramics and Nanocomposites*” in March 2011 in Czech Republic.

3. Work progress and achievements during the period

3.1 WP 1 - Mobility and training

3.1.1 Summary

Within the frame of the RP-DEMATEN few types of trainings/visits were organized:

- six-month trainings in EU institution for young researches;
- two-month trainings in EU institutions for young researchers;
- one-month trainings in EU institutions for young researches;
- one-month study visits for experienced researchers;
- two-week study visits for experienced researchers;
- one-week study visits for experienced researchers.

On the Kick-off Meeting, held on September 23, 2008 at Faculty of Technology, University of Novi Sad, members of the Project Management Board agreed to follow the proposed plan for mobility and training of researchers (*please see Table 1*).

Table 1. Timetable for Mobility & Training

Time-table	FTUNS Novi Sad	UDE Duisburg	IMCASC Prague	IMSNC Athens	IMRSAS Kosice	DCPBUT Brno
M 1-6	IMCASC-v* IMSNC-v		FTUNS-v FTUNS-2		DCPBUT-v DCPBUT-1	FTUNS-v FTUNS-2
M 7-12	UDE-v <u>DCPBUT-1</u>	DCPBUT-v DCPBUT-2	DCPBUT-v	FTUNS-2 IMRSAS-v IMRSAS-2	FTUNS-v FTUNS-2	<u>UDE-v</u>
M 13-18	IMCASC-1 IMSNC-v DCPBUT-w	FTUNS-6	FTUNS-2 IMRSAS-v IMRSAS-1	FTUNS-v	IMCASC-v	IMRSAS-v IMRSAS-1
M 19-24	<u>UDE-1</u> IMRSAS-v DCPBUT-w	IMSNC-v FTUNS-1		DCPBUT-v DCPBUT-1	<u>UDE-v</u>	IMSNC-v
M 25-30	DCPBUT-v IMRSAS-1 <u>IMSNC-w</u>	FTUNS-v FTUNS-6		FTUNS-1 IMCASC-v	DCPBUT-1	FTUNS-1
M 31-36	<u>IMSNC-1</u> IMCASC-v IMRSAS-w	IMRSAS-v IMRSAS-1	FTUNS-1		FTUNS-1	

* acronym of the participant and type of visit (v – one-week visit, w-two-week visit, 1 – one-month visit, 2 – two-month visit, 6 – six-month visit)

The plan for **the first year of the RP-DEMATEN Project** was not completely realized, but most of planned activities were actually achieved.

The plan for **the second year of the RP-DEMATEN Project** was not completely realized, even all the beneficiaries were very active and tried to achieve the proposed goals. The only problem was a delay in realization of some visits/trainings which was caused by delay from the first project year.

In **the third year of the RP-DEMATEN Project** all the beneficiaries were very active and finalised most of the planned trainings/visits. Thus, in comparison to the proposed mobilities, only a

few (*underlined and indicated in red in Table 1*) were not realised. However, it has to be mentioned that a few additional training/visits were also done.

The following trainings were organised in the third project year:

- 2 six-month trainings:
 - I. Stijepović from FTUNS visited UDE (the third visit)
 - S. Ognjanović / B.Mojić / E.Csehova / M.Kachlik visited UDE
- 2 two-month trainings:
 - B. Mojić / V. Simendić / N. Vukić from FTUNS visited IMRSAS
 - M. Kachlik from DCPBUT visited UDE
- 8 one-month trainings:
 - M. Kachlik from DCPBUT visited IMSNCSR (the second visit)
 - V. Puchy from IMRSAS visited DCPBUT
 - S. Ognjanović from FTUNS visited UDE
 - I. Ristić from FTUNS visited IMCASC
 - D. Drdlik from DCPBUT visited IMRSAS
 - A. Duszová from IMRSAS visited UDE
 - B. Mojić from FTUNS visited IMSNCSR
 - V. Simendić / N. Vukić from FTUNS visited IMRSAS

In addition, 19 visits were organised in the third project year:

- 2 one-month visits
 - Dr. M.Špírková from IMCASC visited FTUNS (the second visit)
 - P. Tatarko from IMRSAS visited FTUNS
- 2 two-week visits
 - Dr. K. Častkova / Prof. K. Maca / Prof. M. Trunec from DCPBUT visited FTUNS
 - E. Csehova from IMRSAS visited FTUNS
- 15 one-week visits:
 - Prof. J. Budinski Simendić from FTUNS visited IMCASC
 - Prof. V. Srdić from FTUNS visited IMSNCSR
 - Prof. J. Budinski Simendić from FTUNS visited IMRSAS
 - Dr. F. Lofaj from IMRSAS visited IMSNCSR (the second visit)
 - Dr. M. Čubová Urbanova from IMCASC visited FTUNS
 - Dr. J. Dusza from IMRSAS visited UDE
 - Dr. P. Hvizdos from IMRSAS visited FTUNS
 - Dr. K. Giannakopoulos from IMSNCSR visited UDE
 - Dr. K. Giannakopoulos from IMSNCSR visited DCPBUT
 - Dr. M. Špírková from IMCASC visited IMSNCSR
 - Dr. J. Dusza from IMRSAS visited DCPBUT
 - Dr. M. Kašiarova from IMRSAS visited FTUNS
 - A. Duszova from IMRSAS visited IMCASC
 - Prof. K. Maca from DCPBUT visited IMSNCSR
 - Prof. K. Maca/ Prof. M. Trunec from DCPBUT visited UDE

3.1.2 Six-month trainings

I. Stijepović at UDE

One training of six-months for young researcher from the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, Serbia (FTUNS) at the University Duisburg-

Essen, Duisburg, Germany (UDE) was divided into three trainings (two months each). The reason was to seize the opportunity for continuous and combined training of the young scientist. I. Stijepović did the first two months of training from 2nd September to 31st October 2009, and the second part from 1st March to 30th April 2010. The third two-month training was done in the third Project year. It is important to underline that the same amount of money, allocated for the six-month training was used to cover all costs for these three trainings of two months each.

The third two months – I. Stijepović at UDE

Ivan Stijepović (Ph.D. student) from the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, Serbia (FTUNS) visited the University Duisburg-Essen, Duisburg, Germany (UDE), for two-month training and education (from September 1st to October 30th, 2010) within the Mobility and training activity (WP 1).

This was his third two-month visit to the University and during this stay he continued his training in the laboratory for Nanoparticle Process Technology (NPPT) under Prof. Markus Winterer as his supervisor. Once again, he had the opportunity to work with the modular system for chemical vapour synthesis (CVS) from solid acetylacetonate precursors which is available at the NPPT. Being able to work independently, Ivan Stijepović conducted several different types of experiments in order to obtain lanthanum-gallate (LaGaO₃) nanopowders. He changed the CVS system in the laboratory in order to get the “up-down” and “down-up” reactor profiles. Also, he had the unique opportunity to use a microwave generator to produce low-temperature plasma and combine it with classical hot-wall furnace to increase crystallinity and achieve more precise stoichiometry of the powders. It should be emphasised that Ivan Stijepović constructed and assembled the laboratory table and configured other necessary adaptations in order to connect the microwave furnace to the existing CVS system. In this way, he enabled also other colleagues from the laboratory to use plasma furnace more easily in their experiments. Therefore, he was involved in Alexander Kompch's (young researcher at the UDE) experiments in which they used the new reactor configuration to synthesise copper-aluminate nanopowders. Accordingly, with his experience I. Stijepović was able to help Stevan Ognjanović, another student from the FTUNS, in his experiments and synthesis of titania nanopowders from liquid precursors.

At the end of his visit in October, Prof. Winterer offered Ivan Stijepović an opportunity to go to Hamburg synchrotron radiation facility (HASYLAB). There he was introduced with the extended X-ray absorption fine structure method (EXAFS). Together with colleagues from UDE he conducted measurements in this well known scientific institute. Since this is one of the most advanced methods for the characterisation of the local structure of nanopowders, this experience will surely upgrade scientific potential of Ivan Stijepović and his knowledge in the field of nanomaterials and nanostructure.

S. Ognjanović/B. Mojić/E. Csehova/M. Kachlik at UDE

One training of six-months for young researcher from the Faculty of Technology, University of Novi Sad, Serbia (FTUNS) at the University Duisburg-Essen, Duisburg, Germany (UDE) was divided into four trainings. The reason was to seize the opportunity to train more young scientists at the UDE. Thus, the first month was used by B. Mojić, E. Csehova, M. Kachlik and S. Ognjanović in period from December 6th to December 11th 2010 with the main idea to attend the Winter school on Semiconducting Nanoparticles: Optoelectronics and Photovoltaics. S. Ognjanović did the three-month training from 2nd February to 27th April 2011, and B. Mojić was trained two times at the UDE - January 28th to March 2nd 2011 and April 2nd to April 27th 2011. It is important to

underline that the same amount of money, allocated for the six-month training was used to cover all costs for these three two-month trainings.

The first visit – B. Mojić, E. Csehova, M. Kachlik, S. Ognjanović one-month at UDE

Ph.D. students Bojana Mojić, Stevan Ognjanović (from the Faculty of Technology, University of Novi Sad, Serbia - FTUNS)), Erika Csehova (from the Institute of Materials Research, Slovak Academy of Sciences, Košice - IMRSAS) and Martin Kachlik (from the Department of Ceramics and Polymers, Brno University of Technology, Brno - DCPBUT) attended the Winterschool 2010 organized by Prof. Markus Winterer at Nanoparticle Process Technology, University of Duisburg-Essen, Duisburg, Germany (UDE), from December 6th to December 11th 2010 within the Mobility and training activity (WP 1).

They learned a lot from the well organized and interesting lectures that covered a wide range of topics in the field of optoelectronics and photovoltaics from some novel synthesis and processing routes via safety aspects of handling nanoparticles to their applications. Talks were given by prominent scientists from Europe and the United States of America and heads of research departments of industry leading companies and the knowledge gained during these talks will be of great use to B. Mojić, S. Ognjanović, E. Csehova and M. Kachlik in their future scientific research.

Furthermore, B. Mojić and S. Ognjanović had the opportunity to visit the laboratory for sintering where Dr. Devendraprakash Gautam showed them the system for spark plasma sintering and explained in detail the principles and inherent advantages/disadvantages of this novel method for densification of ceramics.

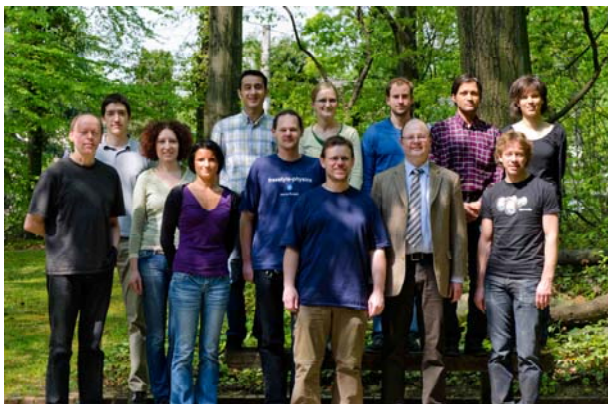
The second visit – S. Ognjanović three-months at UDE

Stevan Ognjanović (Ph.D. student) from the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, Serbia (FTUNS) visited the laboratory for Nanoparticle Process Technology at the University Duisburg-Essen, Duisburg, Germany (UDE), for three-month training and education (from February 2nd to April 27th 2011) within the Mobility and training activity (WP 1).

During his stay at the University, he worked in the laboratory for Nanoparticle Process Technology under Prof. Markus Winterer as his supervisor. The training included synthesis and characterisation of zinc-aluminium (ZnAl_2O_4) and zinc-ferrite (ZnFe_2O_4) spinel nanoparticles. The method used for the synthesis was chemical vapour synthesis (CVS) from liquid (diethylzinc and triethylaluminium, for ZnAl_2O_4) and solid (tetramethyl-heptanedionates and acetylacetonates, for ZnFe_2O_4) precursors. ZnAl_2O_4 nanoparticle synthesis was carried out with varying precursor concentrations (achieved by changing the carrier gas flow through the bubbler as well as changing the bubbler temperature) while for the synthesis of ZnFe_2O_4 nanoparticles stoichiometric precursor ratio was used.

Given method consists of three major stages: precursor evaporation, reactions in the gas phase and particle collection. In the first step, precursors were evaporated by two bubblers (for the liquid precursors) and flash evaporator with a CO_2 laser (for the solid precursors) and carried to the reactor by a helium flow. As this was his second visit to the UDE, his knowledge was improved for the simultaneous use of multiple bubblers for the production of chemically complex nanoparticles. He was trained to use the solid precursor delivery system, which has high efficiency compared to classical heat induced sublimation. The specific feature of this setup is the use of a CO_2 laser with the wavelength of 10.6 μm which is in the infrared region and coincides with the region where the majority of organometallic compounds have wide absorption bands. Being able to absorb high energy irradiation from the laser, solid organometallic precursors evaporate at higher rate and efficiency. He adopted all necessary skills for the use of this complicated system very successfully.

S. Ognjanović also learned a lot about the reactions in the gas phase during the CVS process, mostly reactions between organometallic compounds and oxygen in the hot wall reactor at low pressure in order to produce nanoparticles.



Heating of the reactor to various temperatures was accomplished by the use of tube furnaces. For the synthesis of ZnAl_2O_4 nanoparticles one tube furnace was heated to 900 and 1000°C, while ZnFe_2O_4 nanopowder synthesis was carried out with the use of two tube furnaces heated to 1050°C. After the reactions, nanoparticles were collected in a thermophoretic collector. Thermal gradient was maintained constant between the quartz lamps positioned in the middle of collector and the water cooled mantle. Properties of the powders, e.g. crystallinity, stoichiometry and yield, were controlled by changing reactor temperature and precursor ratio. Stevan Ognjanović also gained advanced knowledge about characterising nanopowders using X-ray diffractometer (Pananalytical X'pert Pro) and Rietveld refinement of XRD data (MAUD software package). The emphasis was on structural characterisation and phase composition of as-obtained powders. Prof. Winterer and Mr. Ružica Đenadić taught Stevan Ognjanović how to use advanced features of MAUD software package and trained him in applying Rietveld refinement method to nanocrystalline materials. Also, he had the opportunity to visit DESY labs near Hamburg for 6 days where he learned about EXAFS technique for structural characterisation of materials using synchrotron radiation. On his return to Duisburg, Prof. Winterer demonstrated the use of EXAFS data analysis software that he developed by himself.

The third visit – B. Mojić one-month at UDE

Bojana Mojić (Ph.D. student) from the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, Serbia (FTUNS) visited the laboratory for Nanoparticle Process Technology at the University Duisburg-Essen, Duisburg, Germany (UDE), for one-month training and education (from January 28th to March 2nd 2011) within the Mobility and training activity (WP 1).

During her stay at the University, she worked in the laboratory for Nanoparticle Process Technology under Prof. Markus Winterer as her supervisor. The training included preparation of stable dispersions of ZnO nanoparticles and their deposition on different substrates. The method used for deposition was ink-jet printing.

Given method consists of the preparation of stable dispersion of nanoparticles, preparation of the print cartridge, designing the print pattern and the printing itself. All of these techniques B. Mojić adopted very successfully with the help of Dipl. Chem. Alice Sandman. ZnO nanoparticles were first dispersed in ethanol with the use of ultrasound. Different solid:liquid ratios were used ranging from 0.1 to 5 wt% of ZnO until it was determined that 0.5 wt.% was the optimal ratio for printing. Dispersions were printed on glass substrates and etched silicon wafers.



Ms. Mojić improved on her knowledge of dispersion characterisation using Malvern Zetasizer Nano ZS instrument in order to determine particle size, particle size distribution and the zeta potential of the dispersion. She also gained knowledge on rheology measurements - viscosity in particular. Printed layers were characterised by optical and scanning electron microscopy and this experience allowed her to gain more confidence when analyzing optical and SEM micrographs.

The fourth visit – B. Mojić one-month at UDE

Bojana Mojić (Ph.D. student) from the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, Serbia (FTUNS) visited the laboratory for Nanoparticle Process Technology at the University Duisburg-Essen, Duisburg, Germany (UDE), for one-month training and education (from April 2nd to April 27th 2011) within the Mobility and training activity (WP 1).

During her stay at the University, she worked in the laboratory for Nanoparticle Process Technology under Prof. Markus Winterer as her supervisor. The training included preparation of bulk $\text{SrTiO}_3/\text{NiFe}_2\text{O}_4$ ceramics. The aforementioned ceramics were obtained by spark plasma sintering (SPS) of SrTiO_3 core/ NiFe_2O_4 shell nanoparticles synthesized in the laboratories of the DEMATEN.

Spark plasma sintering is a novel method for densification of bulk ceramics which, by combining pressing of the sample with heating it by passing a current through it, ensures the obtaining of fully dense ceramic bodies in short amounts of time. By shortening the time the sample is exposed to high temperatures it suppresses grain growth enabling production of truly nanocrystalline bulk ceramics. Temperatures up to 1200°C and heating rates of 100 K/min with different temperature profiles were used during the experiments. Prior to sintering, the core/shell powders were calcined in tube furnaces in order to increase their crystallinity and remove any residual organic compounds. With the help of Dr. Devendraprakash Gautam, Ms. Mojić gained both theoretical and practical knowledge on this advanced sintering method.

Bojana Mojić also gained knowledge on characterisation of nanopowders and bulk ceramics using X-ray diffractometer (Pananalytical X'pert Pro) and Rietveld refinement of XRD data (MAUD software). The emphasis was on structural characterisation and phase composition of as-obtained powders and bulk ceramics. Prof. Winterer and Mr. Ružica Đenadić taught B. Mojić how to use advanced features of MAUD software package and trained her in applying Rietveld refinement method to nanocrystalline materials. Furthermore, she was taught to use Quantachrome Autosorb 3B instrument for low temperature nitrogen adsorption for determining specific surface of powders and estimating particle size, pore size and pore size distribution.



3.1.3 Two-month trainings

B. Mojić/V. Simendić/N. Vukić at IMRSAS

One training of two-months for young researcher from the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, Serbia (FTUNS) at the Institute of Materials Research of Slovak Academy of Science, Košice, Slovakia (IMRSAS) was divided into three trainings (three weeks each). The reason was seize the opportunity to train not only one, but three young researchers. It is important to add that all three researchers were at the IMRSAS at the same time, which additionally made the training easier for organizers and Ph.D. students. It is also important to underline that the same amount of money, allocated for the two-months training for one researcher, was used to cover all costs for three researchers (V. Simendić, N. Vukić and B. Mojić).

The first three weeks – V. Simendić at IMRSAS

Vesna Simendić (Ph.D. student) from the FTUNS visited the IMRSAS, for three-week training and education (from 12th September to 2nd October, 2010) within the Mobility and training activity (WP 1).

During her stay at the Institute, she worked at the Department of Nano Structured Materials. Dr. Pavol Hvizdoš was her supervisor, and in cooperation with other researchers at the Institute organized all her activities and training at the Institute. The main topic of the training was characterisation of materials, using the equipment available at the Institute. Short courses on each instrument for material characterisation were given by the researches of the Institute, and in the same time, V. Simendić had the opportunity to characterise the samples brought from the laboratory of the FTUNS. The training included general introduction on microhardness measuring, atomic

force microscopy (AFM), scanning electron microscopy (SEM), scratch testing, tribology and profilometry, as well as a course on the sample preparation for the characterisation. V. Simendić used the opportunity to characterise biobased polyurethane sheets, made from castor oil and toluenediisocyanates, and nanocomposites of those polyurethanes made with the addition of TiO₂ nanoparticles, prepared at the FTUNS.

The second three weeks – N. Vukić at IMRSAS

Nevena Vukić (Ph.D. student) from the FTUNS visited the IMRSAS, for three-week training (from 12th September to 2nd October, 2010) within the Mobility and training activity (WP 1).

Together with Bojana Mojić and Vesna Simendić, Nevena Vukić was given the training on the materials characterisation. During her stay at the Institute, Dr. Pavol Hvizdoš was coordinating all the activities and the training. The training included general overview of the characterisation techniques available at the Institute- i.e. nanoindenter, atomic force microscopy (AFM), scanning electron microscopy (SEM), tribology and profilometry, and N. Vukić had a chance to characterise polyurethane films and nanocomposites made with addition of SiO₂ nanoparticles, prepared at the FTUNS. Training also included one-day course on the sample preparation techniques in the ceramography lab, given by Dr. Monika Kašiarova.



The third three weeks – B. Mojić at IMRSAS

Bojana Mojić (Ph.D. student) from the FTUNS visited the IMRSAS, for three-week training and education (from 12th September to 2nd October, 2010) within the Mobility and training activity (WP 1).

During her stay at the Institute, she worked at the Department of Nano Structured Materials. Dr. Pavol Hvizdoš coordinated the training. The topic of the training was characterisation of ceramics in general, by different means, with the accent on mechanical properties. The training included general overview of the equipment, measuring procedures, and in specific cases even work on the instrument. Analysis techniques included were X-ray diffractometer (XRD), Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM), tribology testing, creep testing, scratch testing and profilometry, as well as sample preparation in ceramography lab. During the training, B. Mojić had a chance to examine her own samples of core-shell nanopowder she prepared in the laboratory at the home Faculty.

M. Kachlik at UDE

Martin Kachlik (Ph.D. student) from the Department of Ceramics and Polymers, Faculty of Mechanical Engineering, Brno University of Technology (DCPBUT) visited the University of Duisburg-Essen (group of Prof. Dr. Winterer) for two-month training (from 1st November till 17th December, 2010) within WP-1 - Mobility and training activity.

His stay started with a meeting with team of Prof. Winterer, a tour of all the laboratories of the Nanoparticle Process Technology Division and demonstration of capabilities of different equipment. During the stay Mr. Kachlik had practical training on some of the equipment. The main goals of the training were preparation of powder mixtures for sintering in Spark Plasma Sintering machine, analyses of phase purity by X-ray diffraction and measuring of characteristic of powder materials by BET (nitrogen adsorption).



During his stay Martin Kachlik took part in three-day conference - Winter School (Semiconducting Nanoparticles: Optoelectronics and Photovoltaics) organized by Prof. M. Winterer and his team from the Nanoparticle Process Technology division/group, University of Duisburg-Essen.

Experimental results concerning mechanochemical synthesis, Spark Plasma Sintering and characterisation of EuTiO_3 magnetoelectric ceramics were promising. Thus, further bilateral cooperation between the UDE (Prof. Winterer, Dr. Gautam) and the DCPBUT (Prof. Maca, Ing. Kachlik) was discussed and arranged.

3.1.4 One-month trainings

M. Kachlik/E. Bartoničková at IMSNCSR

The training for young researcher from the Department of Ceramics and Polymers, Faculty of Mechanical Engineering, Brno University of Technology (DCPBUT) at the Institute of Materials Science, National Center for Scientific Research “Demokritos” Athens, Greece (IMSNCSR) was divided into two trainings: Eva Bartoničková visited the IMSNCSR in the second project year (from 6th to 20th April 2010) and Martin Kachlik from 13th to 17th April 2011.

Martin Kachlik (Ph.D. student) from the Department of Ceramics and Polymers, Faculty of Mechanical Engineering, Brno University of Technology (DCPBUT) visited the Institute of Materials Science, National Center for Scientific Research “Demokritos” Athens, Greece (IMSNCSR), from 13th to 17th April 2011, within WP-1 - Mobility and training activity.

Martin Kachlik started his stay with a lab-tour and a meeting with the department leaders. Tour went through the Institute of Materials Science (leader: Dr. Evagelia Moshopoulou) and the Institute of Microelectronics (leader: Prof. Dimitris Tsoukalas). From the perspective of future collaboration, the visit to the laboratories for the preparation of advanced bulk ceramics (leader: Dr. George Vekinis) was also beneficial. During this stay Martin Kachlik also met the DEMATEN project coordinator Prof. Vladimir Srdic from the FTUNS.

Future collaboration in the field of ceramics for electric and magnetic application was discussed with Dr. Konstantinos Giannakopoulos. A bilateral project of the group from the DCPBUT and the Institute “Demokritos” is going to be established after the end of the DEMATEN project. The main aims will be “Preparation of ceramic materials with required physical properties” (on the side of DCPBUT group) and “Measuring of magnetic and electric properties of these materials” (on the side of the IMSNCSR group).



V. Puchý at DCPBUT

Viktor Puchý (PhD. student) from the Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovakia (IMRSAS) visited the Faculty of Mechanical Engineering, Department of Ceramics and Polymers, Brno, Czech Republic (DCPBUT) for one-month training and education (from September 6th to October 1st, 2010) within the Mobility and training activity (WP 1).

Prof. Karel Maca, coordinated all the activities during the stay. The main part of the training was organized and done by Dr. Maca and Ing. Drdlík. Viktor Puchý was trained for the preparation of ceramic suspensions for electrophoretic deposition (EPD), and ceramic monolithic materials and ceramic nanocomposites with 1 wt.% CNF were made by EPD technique using various conditions (parameters: time, electrical field). Electrophoretic deposition (EPD) is a fairly rapid low cost two-step process. In the first step, particles having acquired an electric charge in the liquid in which they are suspended, are forced to move towards one of the electrodes by applying an electric field to the suspension (electrophoresis). In the second step (deposition), the particles collect at one of the electrodes and form a coherent deposit on it. The EPD has been done at the Laboratory of Ceramics and Polymers. After the synthesis, all materials were sintered with shielding gas. It is planned to further analyze and test all the prepared samples at the IMRSAS in Košice. Moreover, after the samples are tested, further cooperation in terms of interpretation of the results is planned. Previous experience that Viktor had in the field of preparation of ceramic materials by electrophoretic deposition were very useful for the preparation of ceramic nanocomposites with carbon nanofibres

at the Faculty of Mechanical Engineering. However, the training held in Brno, and the cooperation with Dr. Maca and Ing. Drdlík in general, were very useful in the terms of knowledge and new aspects of preparation of ceramics by the EPD technique.

S. Ognjanović at UDE

Stevan Ognjanović (diploma/master student) from the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, Serbia (TFUNS) visited the University Duisburg-Essen, Duisburg, Germany (UDE), for one-month training and education (from September 1st to September 29th, 2010) within the Mobility and training activity (WP 1).

During his stay at the University, he worked in the laboratory for Nanoparticle Process Technology under Prof. M. Winterer as his supervisor. The training included synthesis and characterisation of titanium dioxide (TiO₂) nanoparticles. Method used for synthesis was chemical vapour synthesis (CVS) from liquid (titanium isopropoxide) precursor. Mr. Ognjanović gained knowledge on how to assemble and set up the individual components of the CVS system as well as how to control and adjust the main process parameters (such as system pressure and temperature). The experiments carried out within this timeframe comprised a major part of his diploma/master thesis.

The CVS method consists of three major stages: precursor evaporation, reaction in the gas phase and particle collection. In the first step, the liquid precursor was evaporated inside a bubbler and carried to the reactor by a helium flow. The heating of the reactor to various temperatures was accomplished by the use of a tube furnace. For the synthesis of TiO₂ nanoparticles tube furnace was heated to temperatures of 600, 800, 900 and 1000°C. Varying system pressures were also used ranging from 10 to 30 mbar. After the reactions, nanoparticles were collected in thermophoretic collector. Due to the thermal gradient, which was maintained constant by the use of quartz lamps and water cooled mantle, nanoparticles move towards the colder regions and stick on the surface of the collector walls.



The properties of the powders, e.g. crystallinity, particle size and yield, were controlled by changing reactor temperature and system pressure. S. Ognjanović also gained knowledge about characterising nanopowders using X-ray diffractometer (Pananalytical X'per Pro) and Rietveld refinement of XRD data (MAUD software). The emphasis was on structural characterisation and phase composition of as-obtained powders. Prof. Winterer and M.Sc. R. Đenadić taught him how to use MAUD software package and trained him in applying Rietveld refinement method to nanocrystalline materials. M.Sc. Đenadić also taught him to use Quantachrome Autosorb 3B instrument for low temperature nitrogen adsorption and Malvern Zetasizer Nano-ZS instrument for dynamic light scattering. Both these methods are widely used in characterisation of nanopowders to determine particle size and

particle size distribution, specific surface of the powders, to detect and estimate particle agglomeration, etc.

I. Ristić at IMCASCR

Ing. Ivan Ristić (Ph.D. student) from the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, Serbia (FTUNS), visited the Institute of Macromolecular Chemistry, Academy of Sciences, v.v.i., Prague, Czech Republic (IMCASCR), for one-month training and education (from September 19th to October 18th, 2010) within the Mobility and Training Activity (WP 1).

During his stay at the Institute, he worked at the Department of Polymer Networks and Mechanical Properties. Dr. Milena Špírková was his supervisor (polyurethane nanocomposite synthesis) and organized all his activities and training at the Institute. Ing. Ristić also cooperated with senior researcher Dr. Adam Strachota.

As part of the synthesis training Ivan Ristić took part in the synthesis of poly(lactide) polyols for polyurethane preparation. Poly(lactide) (PLA) is polymer derived from renewable sources (mainly starch and sugar) with lactic acid (2-hydroxy propionic acid) building blocks, which exist in optically active D- or L-enantiomers. Depending on the proportion of the enantiomers poly(lactide), (PLA), with variable properties can be derived. This allows the production of a wide spectrum of PLA polymers to match the performance requirements. Poly(lactide) was synthesized by cationic polymerization technique in solution. The cationic polymerizations were carried out in dichloromethane solution, in an exhaustively nitrogen-purged, flame-sealed three necked flask glass reactor equipped with a magnetic stirrer. Poly(lactide) is excellent renewable source of raw materials for the manufacture of polyurethane (PU) components such as polyols. Furthermore, he was trained for polyols hydroxyl number determination by different methods.

Ivan Ristić has been introduced to the atomic force microscopy (AFM) Multimode Digital Instruments NanoScope Dimension IIIa, equipped with a PPPNCLR tapping-mode probe (Nanosensors Switzerland; spring constant 41 Nm⁻¹, resonant frequency \approx 150 kHz) and the possibilities of its use for structure assignment of solid polymers and in investigation of surface properties of different materials (organic polymers, organic-inorganic nanocomposites and polymer-metal nanocomposites).

In addition, I. Ristić took advantage of the Institute library to improve his knowledge in the field of polymeric and organic synthesis. He had the opportunity to be present at many lectures of eminent scientists at the Institute.

He visited, for one day, the Faculty of Mathematics and Physics, Charles University in Prague and with Doc. Ivan Krakovsky arranged future cooperation. They discussed about modern techniques for preparation and processing polymer materials and polymer nanocomposites.

D. Drdlik at IMRSAS

Daniel Drdlik (Ph.D. student) from the Department of Ceramics and Polymers, Faculty of Mechanical Engineering, Brno University of Technology (DCPBUT) visited the Institute of Materials Research, Slovak Academy of Science, Slovakia (IMRSAS), for one month training (from 1st to 26th November, 2010) within WP-1 - Mobility and training activity.

Mr. Drdlik first had a meeting with team from the IMRSAS leading by Prof. J. Dusza. Laboratory equipments and the focus of scientific activities was presented. During the stay Mr. Drdlik had practical training at different equipment at the Institute: X-ray diffractometer (XRD), Transmission

Electron Microscopy (TEM), scanning electron microscopy (SEM), atomic force microscopy (AFM), tribology testing, creep testing, scratch testing, nanoindenter and profilometry. The one-month training contributed on the knowledge of the preparation and characterisation of ceramic composites based on alumina and zirconia with carbon nanofibres. Special training was made on the determination of mechanical properties of these ceramic samples. The training was carried out by measuring the hardness (HPO 250 and Leco LM 700AT) and bending strength (Tira Test) of various samples, including his own. (alumina and zirconia samples with carbon nanofibres), which were made at an earlier stage of the collaboration. All experimental results were discussed with Prof. Dusza and Viktor Puchy (Ph.D. students from the IMRSAS).



A. Duszová at UDE

Annamária Duszová (Ph.D. student) from the Institute of Materials Research of Slovak Academy of Science, Košice, Slovakia (IMRSAS) visited the Department of Engineering Sciences, University of Duisburg-Essen, Duisburg, Germany (UDE), for one-month training and education (from 2nd November to 1st December 2010) within the Mobility and training activity (WP 1).

Annamária Duszová visited the laboratories of the Nanoparticle Process Technology Division and introduced her self to Prof. Markus Winterer and his colleagues. Her training started with preparation of powder mixtures based on $\text{Eu}_2\text{O}_3 + \text{TiO}_2$ and $\text{Eu}_2\text{O}_3 + \text{Ti}_2\text{O}_3$. The main part of the training was directed to Spark plasma sintering (SPS), as a powerful technique for preparation of dense ceramics. Dr. Devendraprakash Gautam helped her to understand the basic principles of SPS and showed her how the system can be practically used. With those experiences A. Duszová was capable to use Spark plasma sintering for preparation of dense EuTiO_3 samples from $\text{Eu}_2\text{O}_3 + \text{TiO}_2$ and $\text{Eu}_2\text{O}_3 + \text{Ti}_2\text{O}_3$ mixtures. She was also trained to characterise the obtained spark plasma sintered samples by low-temperature nitrogen adsorption (BET) and X-ray diffraction (XRD). She learned how to estimate the degree of powder agglomeration according to XRD and BET data and calculate the grain size from XRD patterns. The obtained SPS samples will be additionally analysed and tested at IMRSAS in Košice and also at IMCASCR in Prague during the next one-month training.

A. Duszová also learned a lot about the novel method for nanopowder synthesis - Chemical vapour synthesis (CVS). Ph.D. students from the UDE explained her that the method consists of three major stages: precursor evaporation, reaction in gas phase and particles collection and gave a

detailed description of each step. In the first step, evaporation of precursors was performed by CO₂ laser, while nanoparticles were formed in hot wall tubular reactor and collected due to thermophoretic force in collecting unit. During the stay she used the library to improve her knowledge and enjoyed the possibility to access to scientific papers via the Institute web server.

B. Mojić at IMSNCSR

Bojana Mojić (Ph.D. student) from the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, Serbia (FTUNS) visited the Institute of Materials Science of the National Center for Scientific Research "Demokritos" in Athens, Greece (IMSNCSR), for training (from January 17th to January 21st 2011) within the Mobility and training activity (WP 1). Due to some limitations the training was condensed to only one week (instead of one month).

During her stay at the Institute, she visited the laboratory for Electron Microscopy, where she gained knowledge on the possibilities of nanopowder characterisation by the means of Transmission Electron Microscopy (TEM). The training was given by Dr. K. Giannakopoulos, Research Associate, and under the supervision of Dr. E. Moshopoulou, Researcher A.

Characterisation of nanoparticles by TEM is sometimes the key analysis for advanced nano-structures such as core/shell structure. Since the duration of the training was very short, B. Mojić didn't have a chance for the hands-on individual use of the TEM during the training session, but the training was an excellent opportunity for observing some of the samples with core/shell structure prepared by B. Mojić at the home University. The training included: i) overview and description of the TEM and its research uses, ii) sample preparation and iii) optimal imaging for user's specific sample requirements.

Furthermore, during her stay, B. Mojić had an opportunity to be trained on the use of other equipment for characterisation of nanopowders i.e. SQUID and X-ray diffractometer, and also, to get a global insight into the functioning of the Institute.

V. Simendić/N. Vukić at IMRSAS

One one-month training for young researcher from the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, Serbia (FTUNS) at the Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovakia (IMRSAS) was divided into two trainings (two weeks each). The reason was to continue with the training that started half a year ago at the IMRSAS, so the organization of this training was similar to the previous one, but this time on advanced level and more specified learning about selected techniques for material characterisation. It is important to underline that the same amount of money, allocated for the one-month training for one researcher, was used to cover all the costs for both researchers (V. Simendić and N. Vukić).

The first two weeks – V. Simendić at IMRSAS

Vesna Simendić (Ph.D. student) from the FTUNS visited the IMRSAS, for two-weeks training from 12th until 26th April, 2011 within the Mobility and training activity (WP 1).

This was her second training at the IMRSAS. During the first training researchers from the Institute gave her short courses on each instrument for material characterisation. However, now she worked with Dr. Pavol Hvizdoš at the Department of Nano Structured Materials and was able to learn about advances in selected techniques for material characterisation. Thus, P. Hvizdoš presented her introduction in atomic force microscopy (AFM) with detailed description of characteristics of AFM Dimension Icon, Veeco Instruments (equipment installed at the Institute), operating conditions and

sample preparation. She was trained in characterisation of polyurethane nanocomposites, prepared in Novi Sad, by AFM using ScanAsyst (TM) mode. V. Simendić was trained by Dr. Monika Kašiarova in characterisation of electro porcelain with and without glaze using scanning electron microscopy. She learned how to prepare samples with glaze for SEM analysis and measure the glaze thickness. Ideal cross-section was obtained after cutting, grounding and polishing. She also recognized the importance of final etching on the quality of the recorded SEM micrographs.

Dr. Pavol Hvizdoš and Dr. Monika Kašiarova organized two group meetings with V. Simendić, N. Vukić and Ph.D. students from the IMRSAS with the open discussion about their experiences in material characterisation by AFM and SEM.



The second two weeks – N. Vukić at IMRSAS

Nevena Vukić (Ph.D. student) from the FTUNS visited the IMRSAS, for two-weeks training from 12th until 26th April, 2011 within the Mobility and training activity (WP 1).

Nevena Vukić was at the training in the IMRSAS together with V. Simendić. Thus, P. Hvizdoš presented her (together with V. Simendić) introduction in atomic force microscopy (AFM) with detailed description of characteristics of AFM Dimension Icon, Veeco Instruments, operating conditions and sample preparation. Dr. Monika Kašiarova gave a short course in scanning electron microscopy. N. Vukić had possibility to work on both instruments (AFM and SEM) and practiced on the samples (polyurethane nanocomposites and electro porcelain with and without glaze) and prepared in Novi Sad. In addition, she actively participated in two group meetings with the open discussion about experiences in material characterisation by AFM and SEM, organized by Dr. Pavol Hvizdoš and Dr. Monika Kašiarova.

3.1.5 One-month visit

M. Špírková at FTUNS

Dr Milena Špírková from the Institute of Macromolecular Chemistry, Academy of Sciences, v.v.i., Prague, Czech Republic (IMCASCAR) visited the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, Serbia (FTUNS) within the Mobility and training activity (WP 1). This one-month visit was divided in two parts. During the first visit she stayed two weeks in Novi Sad, from 28th March to 11th April 2010 (in the second project year). A few months later she visited Novi Sad again for one week, from 30th August to 5th September, 2010.

Dr. Milena Špírková from the IMCASCAR visited the FTUNS for the second time (from 30th August to 5th September, 2010) and this visit had four main topics:

1. The summarization of activities of the FTUNS and the IMCASCAR within the DEMATEN project, and the finalization of joint contributions to the YUCOMAT 2010 conference (from 6th to 10th September) with the topic on the preparation and characterization of nanostructured polyurethane elastomers and their nanocomposites.
2. The official meeting (September 2nd) with the Project Coordinator (Prof. Vladimir Srdić), and with Dr. Konstantinos P. Giannakopoulos from the IMSNCSR with the emphasis on the results and experiences from the second Workshop (held from 3rd to 5th June 2010 at Chalkidiki, Greece), and the preparation of some activities for the PMB meeting held on 8th September in Herceg Novi, Montenegro.
3. The specification of the program for the next one-month training of M.Sc. Ivan Ristić from the FTUNS at the IMCASCAR Prague (20th September to 19th October, 2010).
4. The discussion of other mobility and training opportunities for the RP-DEMATEN participants for the third project year, especially a short visit to the IMCASCAR before or after the third Workshop organized by DCPBUT in Brno in March 2011.



P. Tatarko at FTUNS

Peter Tatarko from the Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovakia (IMRSAS) visited the Faculty of Technology, University of Novi Sad, Novi Sad, Serbia (FTUNS) two times within the Mobility and training activity (WP 1). During the first visit he stayed three weeks in Novi Sad from November 14th to December 5th, 2010. A few months later he visited Novi Sad again together with Dr. M. Kašiarova (from 10th to 17th April, 2011) and was deeply involved in the discussion about the finalization of the activities in FP7 DEMATEN Project.

The first part of the visit

During the first three weeks Peter Tatarko (who will finished his Ph.D. thesis in summer 2011) tried to force two main topics: i) visit of all relevant laboratories for material processing and characterization at University of Novi Sad and discussions with senior and young researchers from Serbia and ii) intensification of collaboration between the FTUNS and the IMRSAS.

Prof. V. Srdić showed him several laboratories at different faculties at the University of Novi Sad: the Center for electron microscopy, the Laboratory for crystallography, the Laboratory for mechanical testing, the Center for microelectronic, the Laboratory for catalysis, the Division for

ceramics and the Division for polymers. Thus, during his stay he met a lot of researchers, but he showed special interest for the group of Prof. L. Šidjanin from the Institute of Mechanical engineering. He had a few valuable discussions with them about problems during hardness measurement. P. Tatarko also took part in numerous discussions and talks with young scientists and Ph.D. students from the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad.

During the stay P. Tatarko was also involved in the activities of another FP7-REGPOT Project (coordinated by Prof. D. Janačković from Belgrade) and established new contacts with researchers from the University of Belgrade. Thus, he participated in the FP7-Workshop “Processing of nanostructured ceramics, polymers and composites”, which was held in Belgrade, Serbia (from 29th to 30th November 2010). At the Workshop he had a poster presentation of his new results in characterization of nanocomposite ceramics.

Peter Tatarko also appreciated the extended discussion with people at the Faculty about his research work. He was also trained mainly on the preparation of ceramic nanopowders (e.g. SrTiO_3 by sol-gel method) and characterization of nanopowders (particle size, size distribution and zeta potential) by Zetasizer Nano, Malvern UK. He also took the opportunity and measured densities of all his samples (Si_3N_4 -SiC nanocomposites with different rare-earth oxide additives), which is the topic of his Ph.D. thesis.



The second part of the visit

Peter Tatarko from the IMRSAS visited the FTUNS for the second time for one week from 10th of April to 17th of April, 2011 within the Mobility and training activity (WP 1). This visit was organized together with Dr. Monika Kašiarova from the IMRSAS.

Since the collaboration between the FTUNS and the IMRSAS was well established, P. Tatarko continued his work with Ivan Stijepović on density measurement and Prof. L. Šidjanin on hardness measurements, but also with Mr. Milan Nikolić on further training on the Malvern Zetasizer Nano. Also, Prof. Vladimir Srdić organized additional meeting with other researchers from the University of Novi Sad, (Prof. Branko Skorić and Miloš Bokorov).

He used the possibility, together with Dr. Monika Kašiarova, to talk with the Project coordinator about a few topics: i) summarization of all activities that the IMRSAS realized during all three project years; ii) discussion about the preliminary financial report prepared for the third year for the IMRSAS and iii) clarification on how the Periodic Report for the third year, the Financial Report (Forms C for all beneficiaries) and the Final Report should be prepared.

In addition, all of the activities and results achieved during the third year of the RP-DEMATEN project, as well as the tasks that still have to be finalized before the end of the project were

discussed on the official meetings with RP-DEMATEN representatives from: the FTUNS, (Prof. V. Srdić, Prof. J. Budinski-Simendić, Assoc. Prof. L. Nikolić and Assis. Prof. B. Pilić), the IMRSAS (Dr. Monika Kašiarová and P. Tatarko) and the IMCASC (Dr. M. Špírková, who was in Novi Sad during this period).

M. Kasiarova and P. Tatarko also had a meeting with young researchers (diploma and Ph.D. students) from the FTUNS on the subject of determining important mechanical properties and talked to them about their experiences in the measurements of tensile, compression and bending strength and hardness.

3.1.6 Two-week visit

K. Častkova/K. Maca/M. Trunec at FTUNS

The first part – K. Maca at FTUNS

Assoc. Professor Karel Maca from the Department of Ceramics and Polymers at the Faculty of Mechanical Engineering, Brno University of Technology (DCPBUT), Czech Republic, visited the Department of Materials Engineering, at the Faculty of Technology, University of Novi Sad (FTUNS) from 30th May to 9th June, 2010 (with an interruption for the participation in the Second DEMATEN Workshop in Chalkidiki, Greece). This visit was a part of two-week visit of Czech senior researchers to the University of Novi Sad. Prof. Maca was accompanied by his colleagues Prof. Trunec and Dr. Častkova.

The main goals of his visit were training of young researchers and dissemination of experience in the field of synthesis and sintering of core/shell particles. Prof. Maca discussed present results of synthesis and sintering of core-shell ceramic particles ($\text{SiO}_2/\text{Ni-ferrite}$) with Prof. Srdić, Mr. Milan Nikolić, Bojana Mojić and Ivan Stijepović. The demand for smaller particles was expressed. The mercury porosimetry experiments were discussed and a plan for performing experiments at the Brno University of Technology with ceramic materials prepared in the research group of Prof. Lj. Nikolić was arranged. The general topic of sintering advanced ceramic materials was discussed with senior and junior researchers at the FTUNS. A part of the visit was used to prepare the report and statement of costs for the previous project period (in cooperation with Prof. Srdić) as well as to prepare the future activities in the RP-DEMATEN project.



The first part – M. Trunec at FTUNS

Assoc. Professor Martin Trunec from the Department of Ceramics and Polymers at the Faculty of Mechanical Engineering, Brno University of Technology (DCPBUT), Czech Republic, visited the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad (FTUNS) from 30th May to 9th June, 2010 (with an interruption for the participation in the Second DEMATEN Workshop in Chalkidiki, Greece). This visit was a part of two-week visit of Czech senior researchers at the University of Novi Sad. Prof. Trunec was accompanied by his colleagues Prof. Maca and Dr. Častkova.

Prof. Trunec used this visit to continue the collaboration with Dr. Branka Pilić and Oskar Bera (Ph.D. student). The recent research results were evaluated and the preparation of a scientific paper on rheology of polymer nanocomposites was discussed. New activities in the frame of COST MP0701 programme were arranged – invited lecture of Prof. Trunec at the COST workshop in Novi Sad (September 2010) and two-month research visit (STMS) of Oskar Bera at the Department of Ceramics and Polymers, Brno University of Technology (July-August 2010). The topic of modern shaping methods of advanced ceramics was discussed with senior and junior researchers at the FTUNS.



The first part – K. Častkova at FTUNS

Dr. Klara Častkova from the Department of Ceramics and Polymers at the Faculty of Mechanical Engineering, Brno University of Technology (DCPBUT), Czech Republic visited the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad (FTUNS) from 30th May to 9th June, 2010 (with an interruption for the participation in the Second DEMATEN Workshop in Chalkidiki, Greece). This visit was a part of two-week visit of Czech senior researchers at the University of Novi Sad. Dr. Častkova was accompanied by her colleagues Prof. Maca and Prof. Trunec.

Dr. Častkova discussed the problems of synthesis of nanoparticles and exchanged the experiences concerning preparation of core-shell particles. She prepared a plan of co-operative experiments on syntheses of core-shell particles with the research group of Prof. Srdić. Also, she took a part in the discussion on the preparation of report and statement of costs for DEMATEN project.



E. Csehová at FTUNS

Erika Csehová from the Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovak Republic (IMRSAS) visited the Faculty of Technology, University of Novi Sad, Serbia (FTUNS), for a two-weeks visit (from 28th of November to 12th of December, 2010) within WP-1 - Mobility and training activity.

The main goals of the visit were: i) organization of all proposed activities within the DEMATEN project and ii) discussion about future plans, as the collaboration between the IMRSAS and the FTUNS is well established and nicely organized. In addition, E. Csehová visited the laboratories at the Faculty of Technology and other faculties at the University of Novi Sad and had the opportunity to meet many researchers and become familiar with various methods for the preparation of polymer powders as well as the methods for their subsequent characterisation.

During the stay, E. Csehová was also involved in the activities of another FP7-REGPOT Project (coordinated by Prof. D. Janačković from Belgrade) and established new contacts with the researchers from the University of Belgrade. Thus, she participated in the FP7-Workshop “Processing of Nanostructured Ceramics, Polymers and Composites”, which was held in Belgrade, Serbia (from 29th to 30th November 2010). At the Workshop she presented a poster with some of her experimental results titled: “Tribological Properties of Hot Pressed Al₂O₃/SiC Nanocomposites”.

During this stay E. Csehová went together with B. Mojić and S. Ognjanović to the University of Duisburg-Essen, Duisburg, Germany (UDE) and participated in the Winter School on “Semiconducting Nanoparticles” from 8th to 10th December, 2010. The program consisted of lectures on experimental methods as well as the theory of mesoscopic transport and density functional theory and was completed by a session on “Nanotechnology meets Society” with a podium discussion that was open to the public. Speakers were international experts in the field of nanoscience and technology. At the Nanoparticle Process Technology Division at University of Duisburg-Essen (UDE), E. Csehová had the opportunity to meet Prof. M. Winterer and his collaborators as well as researchers from other institution from Europe and USA. Also, she was able to be trained to use Spark Plasma Sintering (SPS).

3.1.7 One-week visit (researchers from FTUNS)

J. Budinski-Simendić at IMCASCR

Prof. Jaroslava Budinski-Simendić from the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, Serbia (FTUNS) visited the Institute of Macromolecular

Chemistry v.v.i., Academy of Sciences, Prague, Czech Republic (IMCASC), for one week (from 26th February to 2nd March 2011) within the Mobility and training activity (WP 1).

Prof. Budinski-Simendić had a meeting with Dr. Milena Špírková and used it for: i) detailed review of all the activities done in the RP-DEMATEN project, ii) preparation for the PMB Meeting in Brno, iii) planning future activities of young researchers in the field of synthesis and characterisation of nanocomposites and iv) finalizing of joint publications in scientific journals and international conferences. The meeting with Dr. Jelena Pavličević, postdoctoral student at the IMCASC (from the FTUNS), about her current training and research at the IMCASC was important as well. J. Budinski-Simendić and M. Špírková used the opportunity to discuss the improvements in the preparation of novel polyurethane/clay nanocomposites and help her with the in preparation of her oral presentation for the Third FP7-DEMATEN Workshop in Brno. In addition, she had meetings and discussions with other scientists from the IMCASC: Dr. Adam Strachota, Dr. Jiří Brus and Dr. Zdenka Sedlakova. The visit was very stimulative for future scientific activities and also for future cooperation between the groups at the FTUNS and at the IMCASC. The main part of the discussion was the preparation for future application for the European projects and bilateral cooperation. The discussions and consultations with senior scientists and Ph.D. students from the IMCASC were mainly in the field of incorporation of inorganic nanofillers into organic polymeric matrix and about nanocomposite properties assessment.

V. Srdić at IMSNCSR

Prof. Vladimir V. Srdić from the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, Serbia (FTUNS) visited the Institute of Materials Science, National Center for Scientific Research “Demokritos” Athens, Greece (IMSNCSR), for one week (from 14th to 16th April 2011) within the Mobility and training activity (WP 1).

The purpose of his visit was to meet with Dr. Evagelia Moshopoulou and Dr. Konstantinos Giannakopoulos from the IMSNCSR and Prof. Karel Maca from the DCPBUT, and discuss about realized activities in the third project year and the Periodic and Final reports. This was a very good opportunity for the project coordinator to talk to the leaders of two beneficiaries at the same time about the successful project completion, and their opinions on past and future actions. It was concluded that the RP-DEMATEN was very successful, that a lot of activities were done on a highly professional way and that the money was used very efficiently. V. Srdić pointed out that the Periodic Report and the Financial Report (Forms C for all beneficiaries) for the third project year as well as the Final Report, have to be prepared before 30th June 2011 and asked them for help in order to fulfill all obligations on time. He explained how the reports should be prepared and how the prepared templates should be filled.

This visit was also an excellent opportunity for V. Srdić to gain a better insight in the research potential of the National Center for Scientific Research “Demokritos”. Thus, E. Moshopoulou showed him the laboratories of the Institute of Materials Science and K. Giannakopoulos laboratories of the Institute for Microelectronics. After the lab visits, he talked with E. Moshopoulou and K. Giannakopoulos about publications prepared for submission to scientific journals and presentations at international conferences. Moreover, during his stay in Athens, V. Srdić met Prof. Karel Maca and Martin Kachlik (PhD student) from the Department of Ceramics and Polymers, Brno University of Technology, Czech Republic (DCPBUT) who were staying at the IMSNCSR at the same time and discussed future collaboration with them. They all were at the plenary lecture of Nobel Price winner James Watson for chemistry, which was part of celebration of the NCSR “Demokritos”.

J. Budinski-Simendić at IMRSAS

Prof. Jaroslava Budinski-Simendić from the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, Serbia (FTUNS) visited the Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovakia (IMRSAS), for one week (from 20th to 26th April 2011) within the Mobility and training activity (WP 1).

At the beginning of the stay, Prof. Budinski-Simendić visited the laboratories at the Institute and was introduced to the experimental techniques for the characterisation of morphology of nanocomposites (atomic force microscopy) and characterisation of electro porcelain with and without glaze using scanning electron microscopy, microhardness measurements, tribology and profilometry. During the visit young scientists Nevena Vukić and Vesna Simendić from the FTUNS (who were staying at the IMRSAS at the same time) explained what they learned during the one-month training at the IMRSAS and how the researchers from the Institute helped them. They also discussed with Dr. Jan Dusza and Dr. Pavol Hvizdoš about the possibility to publish some of the obtained results.

J. Budinski-Simendić mentioned that the Periodic Report and the Financial Report (Forms C for all beneficiaries) for the third project year as well as the Final Report have to be prepared before 30th June 2011 and asked Dr. Jan Dusza and Dr. Monika Kasiarova for help in order to fulfill all obligations on time. She explained how the reports should be prepared and how the prepared templates should be filled. They also discussed about all other aspects important for the preparation of reports.

One of the goals of the visit was to plan future activities in the field of synthesis and characterisation of nanocomposites with Dr. Jan Dusza and Dr. Pavol Hvizdoš and prepare a proposal for a bilateral project between Slovakia and Serbia. Discussions were mainly in the field of incorporation of inorganic nanofillers into organic polymeric matrix and about nanocomposite properties assessment. The visit was very stimulative for future bilateral projects and scientific activities in the future cooperation between the groups at both partner-institutions.

3.1.8 One-week visit (researchers from EU Centres)

F. Lofaj at IMSNCSR

Dr. František Lofaj, leading researcher from the Institute of Materials Research of the Slovak Academy of Sciences, Košice, Slovakia visited the Institute of Materials Science, National Center for Scientific Research “Demokritos”, Athens, Greece, for one week within the Mobility and training activity (WP 1). The visit was divided in two parts: i) from 3rd to 6th June 2010 and ii) from 15th to 22nd March 2011. The reason was to seize the opportunity and met researchers from the IMSNCSR at the Workshop in Chalkidiki and finally to visit the Institute “Demokritos”, Athens, i.e. two things with the costs within the allocated budget.

The second visit of Dr. Frantisek Lofaj from the IMRSAS to the IMSNCSR (from 15th to 22nd March 2011) was coordinated by Dr. Evagelia Moshopoulou and organized by Dr. Konstantinos P. Giannakopoulos. The main organizational focus of the stay was oriented toward the exchange of experience and the organization of scientific activities at several institutes of the National Center for Scientific Research “Demokritos”. Scientifically, it was focused on the Raman spectroscopy of the nanocomposite coatings prepared at the IMRSAS. Over 20 measurements on different WC-C nanocomposite coatings were performed under the supervision of Dr. Athanasios Kontos during the stay. The measurements were followed by data treatment, data evaluation and analysis and thorough

discussions. This contributed to considerable widening of the knowledge of Raman spectroscopy, which is not used at the IMRSAS yet. All the discussions led to the conclusion about the preparation of a common project between the IMSNCSR and the IMRSAS in the field of Raman spectroscopy. Additional benefit from the visit was detailed analysis of the parameters of Raman microscopes from different producers, which provided valuable information for the preparation of the tender for the purchase of Raman microscope at the IMRSAS. Furthermore, the stay included a visit to the other research facilities at the Institute and discussions with Dr. G. Vekinis, which identified the possibility to join ESA project on the development of materials for space applications. The stay was successful and fulfilled its objectives.

Dr. F. Lofaj together with Dr. E. Moshopoulou and Dr. K.P. Giannakopoulos also summarized all activities realized in the RP-DEMATEN project between the IMRSAS and the IMSNCSR, with the aim to prepare themselves for the writing of the Financial Report, the Periodic Report and the Final Report.

M. Čubová Urbanova at FTUNS

Dr. Martina Čubová Urbanova from the Institute of Macromolecular Chemistry, Academy of Sciences, v.v.i., Prague, Czech Republic (IMCASC) visited the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, for 11 days (from 13th to 23rd September, 2010) within the one-week visit of the Mobility and training activity (WP 1).

There were five main topics of this visit:

1. Visit of the laboratories of the Department of Materials Engineering at the FTUNS and discussion about further cooperation within the DEMATEN project;
2. Discussion with young researchers about the possible use of solid-state NMR spectroscopy for the characterisation (structural properties, morphology and molecular dynamics) of nanostructured polyurethane elastomers and their nanocomposites.
3. Discussion with Prof. J. Budinski-Simendić about the application for a new research project focused on the characterisation of polymer materials and the preparation of the contract for bilateral cooperation between two institutions - the IMCASC and the FTUNS (which could be signed in 2011).
4. Summarization (with M.Sc. Jelena Pavličević and M.Sc. Ivan Ristić) of the result obtained within the DEMATEN project during student internships at IMCASC.
5. Evaluation of the measured NMR spectra and their correlation with the obtained mechanical properties of samples prepared during the training of Ph.D. students from FTUNS at IMCASC.

J. Dusza at UDE

Dr. Jan Dusza, head of the Structural Ceramics Department of the Institute of Materials Research of Slovak Academy of Science, Košice, Slovakia (IMRSAS), visited the University of Duisburg-Essen, Duisburg, Germany (UDE) for one week (from 2nd to 4th November 2010) within the Mobility and training activity (WP 1).

This was the first official visit within RP-DEMATEN of some scientists from the IMRSAS to the UDE. Thus, during his stay at the University of Duisburg-Essen he visited all the laboratories of the Nanoparticle Process Technology Division and discussed the different methods for processing and characterisation of nanopowders. After the lab tour, Dr. J. Dusza introduced himself, talked about the research potential of the Institute of Materials Research and presented a lecture entitled: "Ceramic Nanocomposites". With Prof. Winterer and his coworkers he discussed the possible future

collaborations between two research teams and also the preparation of possible common project proposals.

K. Maca at IMCASC

Assoc. Prof. Karel Maca from the Department of Ceramics and Polymers, Brno University of Technology, Czech Republic (DCPBUT) visited the Institute of Macromolecular Chemistry, ASCR, v.v.i., Czech Republic (IMCASC) within the Mobility and training activity (WP 1). Since the collaboration among these two institutions is newly established, the visit was divided into few parts (two times in the first project year: from 22nd to 24th July 2008 and from 6th to 7th November 2008). The third visit was organised from 8th to 9th February 2011.

The third visit – K. Maca at IMCASC

Prof. Karel Maca from the Department of Ceramics and Polymers, Faculty of Mechanical Engineering, Brno University of Technology (DCPBUT) visited from 8th to 9th February 2011 the Institute of Macromolecular Chemistry, Academy of Sciences Czech Republic (IMCASC). It was the last part of the one-week visit of IMCASC Prague.

During this last stay in Prague he discussed details of the preparation of the Final DEMATEN Workshop and the sixth PMB meeting in Brno from 3rd to 5th March, 2011 with Dr. Milena Špírková. Very important part of their discussion was the preparation of the Final project report, namely the implementation of Czech rules and laws.

P. Hvizdos at FTUNS

Dr. Pavol Hvizdoš from the Institute of Materials Research of Slovak Academy of Science, Košice, Slovakia (IMRSAS) visited the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad, Serbia (FTUNS) for one week (from 27th February to 4th 2011) within the Mobility and training activity (WP 1).

The main goals of his visit were training and dissemination of experience in the field of measurement of contact properties of materials. Thus, during his stay he took part in numerous discussions and consulted young scientists and Ph.D. students from the Department of Materials Engineering at the FTUNS. Dr. Hvizdoš trained them mostly in the field of his expertise in area of nanoindentation and instrumented indentation, tribology, microstructure studies and AFM techniques. With Prof. V. Srdić he discussed some of the results obtained during the training visit of Ph.D. student Bojana Mojić (from the FTUNS) in Košice and the continuation of the current collaboration and future possibilities. During the visit he also realized a number of meetings with scientists from other Departments of various Faculties. Apart from the host Department he visited the Laboratories of Electron Microscopy and X-ray diffractography at the Faculty of Natural Sciences (where he had constructive discussion with M. Bokorov, Prof. S. Rakić, Dr. Ž. Cvejić), Department of Product Technologies at the Faculty of Technical Sciences (where he had constructive discussion with Prof. D. Kakaš and Prof. B. Škorić), Laboratory of Physical Chemistry and Catalysis at the Faculty of Technology (where he had constructive discussion with Prof. G. Bosković), and newly established Laboratory of Nanoindentation at the Department of Electronics (where he spent two days as a specialist-advisor in the field of nanoindentation techniques during installation of new equipment with Prof. G. Stojanović). In all instances he was informed about the equipment and scientific focus of visited laboratories and with his hosts he discussed the possibilities of future cooperation in research, teaching and project work.



K. Giannakopoulos at UDE

Dr. Konstantinos P. Giannakopoulos (Institute of Microelectronics of National Center for Scientific Research Demokritos, Greece) visited the Department of Engineering Sciences, University of Duisburg-Essen, Germany (UDE), for one week (February 20th to 25th, 2011) within the Mobility and training activity (WP 1).

At the UDE, Dr. Giannakopoulos first had a meeting with Prof. M. Winterer, who informed him about all the research activities in the Nanoparticle Process Technology Division. Initially, his visit was aimed at the full exploitation of the capabilities of the JEOL Scanning Electron Microscope (SEM-FEG) that is used at both Institutes. On 21st February he attended the “Advanced training” by a JEOL (Japanese Electron Optics) Application Engineer, which is the second half of the training on SEM offered by JEOL, aimed at experienced SEM users. The instruments used in both Institutes are similar, so this training had not simply been an excellent opportunity to communicate with an experienced Application Engineer but also to exchange ideas and knowledge on advanced issues of Scanning Electron Microscopy; among these were low voltage imaging, the study of beam sensitive materials (polymers etc) and the study of magnetic materials. The optimum and safe use of the SEM in such cases can be very difficult and is always a subject for intensive research. On 23rd February Dr. Giannakopoulos gave a talk on recent scientific work done in Demokritos in order to improve the communication between the two Institutions. During his stay in Duisburg, he was introduced to the technology and the setup for the Chemical Vapour Synthesis (CVS) and its in situ and ex-situ characterisation facilities (Mass spectrometry etc) and was also consulted on advanced issues of Materials characterisation (especially Electron Microscopy). In the next days he visited also the Electron Microscopy Laboratory and the group of Prof. H. Wende for the nanocharacterisation of materials; there he had the chance to discuss scientific issues and also get valuable information on the capabilities of modern equipment that NCSR Demokritos is intending to purchase. Of particular interest have also been his discussions on the funding and administrative support of Research in the University of Duisburg-Essen.

K. Giannakopoulos at DCPBUT

Dr. Konstantinos P. Giannakopoulos from the Institute of Microelectronics of the National Center for Scientific Research Demokritos, Greece visited the Department of Ceramics and Polymers, Faculty of Mechanical Engineering, Brno University of Technology, Czech Republic (DPCBUT), for one week (from February 28th to March 5th 2011) within the Mobility and training activity (WP 1).

During his stay at the Brno University, Dr. Giannakopoulos had a few discussions with Prof. Karel Maca about further collaboration and also met other colleagues from the DCPBUT: Prof. Jaroslav Cihlar, Prof. Martin Trunec, Dr. Klara Častkova and their Ph.D. students. His stay started with the tour of the Clean Rooms that host the laboratories in Brno that are relevant to his scientific field: ceramic processing (synthesis, sintering etc), growth by physical deposition methods (in vacuum chambers) of nanostructures and their in situ and ex-situ characterisation (TEF SIMS, XPS, AFM, porosimetry etc). As Brno is a world class centre for electron microscopy, in the second day of his stay he exploited the opportunity to visit the neighbouring facilities of two important companies in the field: FEI and TESCAN, where he entered the Clean Rooms of their (SEM/TEM) fabrication facilities and discussed about new advances in the field, such as electron/ion beam assisted growth in the SEM, Critical Dimensions (CD) SEMs etc. The possibility of future scientific collaborations had also been discussed. In the last days of his stay he participated in the Final DEMATEN workshop where he chaired the Session 5 and gave a presentation entitled: “Synthesis, structural characterization and magnetic properties of undoped, In-doped and Y-doped ZnFe_2O_4 nanoparticles” (by M. Milanović, K. Giannakopoulos, E. Devlin, D. Stamopoulos, A. Kontos, V.V. Srdić, E.G. Moshopoulou). Also, he participated in two other presentations: “Structural characterization of sol-gel ZnFe_2O_4 annealed at variable temperatures via Raman spectroscopy” (by A.G. Kontos, M. Milanović, K. Giannakopoulos, D. Stamopoulos, E. Devlin, V.V. Srdić, E.G. Moshopoulou) and “Preparation and characterisation of titanate core/ferrite shell nanoparticles” (by B. Mojić, M. Nikolić, K.P. Giannakopoulos, V.V. Srdić).

M. Špírková at IMSNCSR

Dr. Milena Špírková from the Institute of Macromolecular Chemistry, Academy of Sciences, v.v.i., Prague, Czech Republic (IMCASCR) visited the Institute of Materials Science, National Center for Scientific Research “Demokritos” Athens, Greece (IMSNCSR) for one week (from 19th to 25th March 2011) within the Mobility and training activity (WP 1).

There were four main topics of the visit:

1. The visit of the Institute of Materials Science (organized by Dr. Evagelia G. Moshopoulou) and the Institute of Microelectronics, at National Center of Scientific Research, Demokritos, Athens (organized by Dr. Konstantinos P. Giannakopoulos).
2. Evaluation of all the activities done at the IMSNCSR and the IMCASCR within the FP7 DEMATEN project in the last three years.
3. Discussion at the joint meeting with the representatives from the IMSNCSR (Dr. K.P. Giannakopoulos), IMRSAS (Dr. F. Lofaj) and IMCASCR (Dr. M. Špírková), organized at Institute “Demokritos”, about the important aspects closely related to the FP7-DEMATEN project. The discussion about the finances was especially interesting because all the participants wanted to know how to finalize their activities in the frame of the proposed budget and strict rules.
4. Discussion of other mutual interests in the development of polymer based nanocomposites at the two Institutes. She also talked about the future collaboration with scientists from the Institute of Microelectronics: Dr. Evangelos Gogolides, Dr. Panagiotis Argitis and Dr. Vassilios Constantoudis.

J. Dusza at DCPBUT

Dr. Jan Dusza, head of the Structural Ceramics Department of the Institute of Materials Research of Slovak Academy of Science, Košice, Slovakia (IMRSAS), visited the Department of Ceramics and Polymers, Brno University of Technology, Czech Republic (DCPBUT) for one week (from 28th March to 2nd April 2011) within the Mobility and training activity (WP 1).

During his stay Dr. J. Dusza talked with Prof. Karel Maca about all realized activities within the PR-DEMATEN project done by researchers from IMRSAS and DCPBUT, preparation of the Financial Report and the Final Report. He visited all laboratories of the Department for Ceramics and Polymers and discussed about the different methods for processing, characterisation and testing advanced ceramics with Prof. Maca.

With K. Maca and his coworkers J. Dusza also discussed the possible future collaborations between two research teams and the preparation of possible common project proposals. Thus, they started to prepare a project proposal for bilateral collaboration between the two teams in the frame of Slovak – Czech Republic with the title: “Czech – Slovak scientific collaboration in preparation and properties of nanostructured and composite ceramics”. With the agreements of both sides the proposal was applied.

M. Kašiarova at FTUNS

Dr. Monika Kašiarová from the Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovak Republic (IMRSAS) visited the Department of Materials Engineering at the Faculty of Technology, University of Novi Sad (FTUNS) for one week (from 10th to 17th April, 2011) within the Mobility and training activity (WP 1).



The visit can be divided into four parts: i) preparation of final report for the IMRSAS, ii) official meeting of the representatives from IMCASCAR, IMRSAS and FTUNS, iii) work with students from the FTUNS and iv) activities related to experimental work on Zetasizer Nano.

- i) During her stay the discussion and summarization of all the activities of the IMRSAS were realized with the aim to coordinate last activities to fulfil the tasks of the project. Preliminary financial report was prepared and discussed. Clarification how the Periodic Report for the third year, the Financial Report (Forms C for all beneficiaries) and the Final Report should be prepared was elaborated.
- ii) The official meetings with RP-DEMATEN representatives from: FTUNS, (Prof. V. Srdić, Prof. J. Budinski-Simendić, Assoc. Prof. L. Nikolić and Assis. Prof. B. Pilić), IMRSAS (Dr. Monika Kašiarová and P. Tatarko) and IMCASCAR (Dr. M. Špírková, who was in Novi Sad during this period) was used to elaborate all the activities and results achieved during the third year of the whole RP-DEMATEN project, as well as the required tasks which have to be finalized before the end of the project.
- iii) M. Kašiarová visited several laboratories at the Faculty of Technology and also important laboratories at other faculties of the University of Novi Sad. Thus, she had a global view of the research activities at the Department of Materials Engineering. During her stay she took part in numerous discussions and consulted especially with young scientists and Ph.D. from the

DEMATEN and trained them mostly for sample preparation for electron microscopy and mechanical testing. She, together with P. Tatarko, had also a meeting with young researchers (diploma and Ph.D. students) from the FTUNS on the subject of how to determine important mechanical properties and talked with them about their experiences in measurement of tensile strength, compression strength, bending strength and hardness.

- iv) Main research interest of M. Kašiarová was to learn more about the measurement of the average particle size, particle size distribution and zeta potential on Zetasizer Nano ZS – Malvern, UK. Thus, the general concept how to measure size and distribution of nanoparticles dispersed in a liquid and zeta-potential of dispersed particles and molecules as the function of pH was explained in details. She measured some of her samples to compare the obtained results with ones obtained with other characterisation techniques.

A. Duszova at IMCASCR

Annamária Duszová (Ph.D. student) from the Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovak Republic (IMRSAS) visited the Institute for Macromolecular Chemistry, Academy of Sciences, v.v.i., Prague, Czech Republic (IMCASCR) for one week (from 11th to 21st April, 2011) within the Mobility and training activity (WP 1).

At the Department of Polymer Networks and Mechanical Properties Annamária Duszová was supervised by Dr. Milena Špírková. This was her second visit to the Institute during which she continued her work on characterisation of polymer samples and nanocomposites, i.e. polymer with different volume fraction of carbon nanofilers (CNF). During the stay she tested all the samples with the so called Instron apparatus and measured stress (MPa) versus strain (%) and energy to break (mJ/mm³). She also used TA, Ares-G2 for measuring extensional viscosity of polymers and nanocomposites. The obtained results will be analysed at the IMRSAS in Košice and, based on the experimental results, common publications will be prepared and published in scientific meetings. Thus, during the stay A. Duszová learned a lot about different processing and characterisation methods used in polymer science. She used the Institute library and enjoyed the possibility to access scientific papers via the Institute's web-server,

A. Duszová also talked with M. Špírková about the realized activities in the RP-DEMATEN project, future collaboration, the Financial Report (Form C) for the third project year and preparation of necessary data for the Final Report.

K. Maca at IMSNCSR

Assoc. Prof. Karel Maca from the Department of Ceramics and Polymers, Faculty of Mechanical Engineering, Brno University of Technology (DCPBUT) visited the Institute of Materials Science, National Center for Scientific Research “Demokritos” Athens, Greece (IMSNCSR) from 13th to 17th April 2011, within the WP 1 - Mobility and training activity.

During his stay he had a meeting with the team of Dr. Evagelia Moshopoulou, followed by the demonstration of the laboratory equipment, discussions with Dr. Konstantinos Giannakopoulos about future collaboration in the field of ferroic and multiferroic materials, meeting with Prof. Dimitris Tsoukalas (Director of IMEL), meeting with Dr. George Vekinis (leader of the ceramic group and Senior Consultant to the European Commission), meeting with Dr. Galina Xanthopoulou (Professor, Consultant to the European Commission) and a meeting with Prof. Vladimir Srdić (the coordinator of the DEMATEN project).

**K. Maca/M. Trunec at UDE**

Assoc. Prof. Karel Maca and Assoc. Prof. Martin Trunec from the Department of Ceramics and Polymers, Faculty of Mechanical Engineering, Brno University of Technology (DCPBUT) visited the University of Duisburg-Essen (group of Prof. Dr. Winterer) for one week (from 18th to 20th April, 2011) within the WP 1 - Mobility and training activity.

They started this study visit with the demonstration of the laboratory equipment (Chemical Vapor Synthesis, X-ray, BET and 3D-printing with Mr. Ružica Djenadić; Spark Plasma Sintering with Dr. Devendraprakash Gautam). The main part of their stay was the discussion with Prof. Winterer about the collaboration after the end of the project. They decided to apply for Czech-German research project funded by the Grant Agency of Czech Republic and German Research Foundation concerning processing of advanced ceramics made from nanoparticles.

3.2 WP 2 - Dissemination of information

3.2.1 Summary

The objective of this Work Package is dissemination of information during the lifetime of the project and afterwards, important for a successful realization of all established tasks. In addition to web site, different written dissemination materials, such as pamphlets, flyers etc., are very important for the successful realization of the Project with main goals to inform, mainly general public, about activities within the RP-DEMATEN, the capacities of our laboratories and researchers, their involvement in national, regional and international projects.

The plan for **the first year of the RP-DEMATEN Project** was completely realized – i) web site was installed, constantly updated and improved, ii) flyer about the RP-DEMATEN was printed and distributed at different meetings together with explanation about results and benefit of the Project, iii) information about the RP-DEMATEN was broadcasted by TV stations in Serbia as well as newspapers.

The plan for **the second year of the RP-DEMATEN Project** was completely realized: i) web site was constantly updated and improved, ii) flyer about the main Conference and the Training school was printed and distributed at different European conferences together with more important data about the Project, iii) information about the RP-DEMATEN was broadcasted by TV stations in Serbia, newspapers, as well as at different meetings.

The plan for **the third year of the RP-DEMATEN Project** was completely realized: i) web site was constantly updated and improved, ii) brochure (instead of pamphlet) in the form of final publication, containing important information about all important activities in the Project, was published and iii) information about the RP-DEMATEN was broadcasted by TV stations in Serbia, newspapers, as well as at different meetings.

3.2.2 Web site

The website was officially launched on October 31, 2008 on the server of Faculty of Technology, University of Novi Sad, Novi Sad, Serbia.

The web site address is <http://tehnol.ns.ac.yu/dematen>

Due to the necessary change from *YU*-domen to *RS*-domen on the territory of Serbia, our web site address on the server of Faculty of Technology, University of Novi Sad, Serbia was changed in March 2009 to <http://www.tf.uns.ac.rs/dematen>.

New features of the web site and its constant maintenance, updating and improving gave new dimension to the dissemination of information considering the RP-DEMATEN project. It had high impact even on wider audience outside the Project and enabled for general public to recognise the importance of realised activities within the project, the capacities of the laboratories and researchers, their involvement in national, regional and international projects

3.2.3 Pamphlet/Brochure

Already on the fourth PMB Meeting held on 3rd June 2010, in Chalkidiki, Greece it was concluded that it would be good if, instead of pamphlet, we could publish a brochure in the form of final publication, containing important information about all important activities in the Project. The idea was also well accepted on other two PMB meetings in Herceg Novi (September 2010) and Brno (March 2011). Thus, the brochure was prepared (designed and printed in 120 copies) by young

researchers from FTUNS (*the front page is given in figure above*). It contains three chapters: i) DEMATEN-FTUNS before RP-DEMATEN Project, ii) RP-DEMATEN Project and iii) DEMATEN-FTUNS beyond RP-DEMATEN Project, in which basic information about RP-DEMATEN Project (consortium, goals, impact, description of all work packages and progress during whole three years) were shortly described. The first of all, the brochure will be distributed to all participants in the Project. However, it will be used in the future to disseminate information at conferences, meetings, visits etc, which will enable considerably extension of the lifetime of the Project in the future.



3.3 WP 3 - Strengthening the human potential

3.3.1 Summary

Hiring of young researchers within DEMATEN at the Faculty of Technology, University of Novi Sad (FTUNS) was very important for the reinforcement of the human potential and provided a stimulative climate for creative scientific activities, in the field of nanostructured materials and nanotechnology. To strengthen the human potential, improve the quality of research activities and enable good training of young scientists at DEMATEN it was also planned to hire an experienced senior scientist and an experienced researcher coming back to the FTUNS. All of this enabled the research group of DEMATEN to become expert and competent in the challenging field of nanomaterials and nanotechnology and generally reinforce the WBC research potential.

The plan for **the first year of the RP-DEMATEN Project** was completely realized - two young scientists (J. Pavličević and I. Stijepović) were employed within DEMATEN at the FTUNS. Unfortunately, as the Grant Agreement was finally signed just on August 5th, 2008 (by the European Commission) and the starting date of the Project was May 1st, 2008, we were late with the beginning of our activities. Thus, instead of hiring two young scientists on the beginning of the first month we had to postpone it to the beginning of the fifth month of the Project.

The plan for **the second year of the RP-DEMATEN Project** was realized with some changes. Young researchers, J. Pavličević and I. Stijepović, continued their work at the Project during the whole 12 months, considerably improved themselves through trainings in the EU centers and trainings at DEMATEN supervised by professors from the FTUNS, hired experienced senior scientists and visitors. It is important to underline that J. Pavličević finalized her Ph.D. thesis and defended it on 25th June 2010. The position for experienced senior scientist from IMCASCR at the FTUNS was filled in the second Project year. More precisely, we have had the opportunity to employ two senior researchers from the IMCASC R on this position: Dr. Milena Špírková and Dr. Adam Strachota. Unfortunately, regarding the hiring of an experienced researcher coming back to the FTUNS, we had a problem. Our candidate Mr. Ružica Djenadić, selected already in the proposal for the position “Incoming Experienced Researcher” at the FTUNS, decided to stay longer at the University Duisburg-Essen, Germany. The problem was solved with the help of Project Officer Dr. Salvatore La Rosa, who gave us support to employ two researchers Mr. Milan Nikolić (with Serbian citizenship) and Dr. Konstantinos Giannakopoulos (with Greek citizenship), with payments within the allocated amount in the proposed budget. M. Nikolić (scientist with five years of research experience) was employed from 1st February 2010 until the end of the project. K. Giannakopoulos (well recognized scientist with a lot of experience in the field of nanostructured materials) was employed for 1½ months in the second and for two months in the third Project year.

The plan for **the third year of the RP-DEMATEN Project** was realized with some changes. Young researcher: I. Stijepović continued his work at the Project during the whole 12 months, considerably improved himself through trainings in the EU centres and trainings at DEMATEN supervised by professors from the FTUNS, hired experienced senior scientists and visitors. However, J. Pavličević was working only up to 4th November 2010 and then left the Project due to attending UNESCO postgraduate course in Polymer Science, organised at the Institute of Macromolecular Science of Czech Academy of Science in Prague. Thus, the position was filled by a young researcher, Oskar Bera, from 1st November 2010. The position for experienced senior scientist from the IMCASCR at the FTUNS was filled in the third Project year with two senior researchers from the IMCASC R: Dr. Milena Špírková and Dr. Jiří Brus. Incoming experienced researchers employed at the FTUNS: M. Nikolić continued his work at the Project during the whole 12 months and Dr. K. Giannakopoulos was employed for additional two months in the third Project year.

3.3.2 Hiring of young researcher

Jelena Pavličević

According to the plan of the WP3 RP-DEMATEN “Strengthening the human potential of the Department of Materials Engineering FTUNS”, Dr. Jelena Pavličević was employed in the first Project year, continued her scientific improvement during the whole second Project year and was working up to November 4th, of the third Project year. She had to leave the project due to attending UNESCO postgraduate course in Polymer Science, organised by the Institute of Macromolecular Science of Czech Academy of Science in Prague.



Dr. Jelena Pavličević took part in the successful organization of COST-MP701 Workshop “Nanoparticles surface (modified/unmodified) as a base for the interaction with polymer matrix”, held on 23rd and 24th September at Faculty of Technology, University of Novi Sad. During the COST Workshop, she had a good possibility to meet young researchers and respected scientists from European institutions, exchange experience, listen to their lectures covering different nanocomposite systems, and, in this way, have more ideas about future topic of her scientific work. At the Workshop she presented two posters, entitled: “Thermal properties of novel polyurethane/montmorillonite nanocomposites synthesized by prepolymerization technique” and “Synthesis and thermal characterisation of polystyrene filled with hydrophobic fumed nanosilica”. The first one was done under supervision of Dr. Milena Špírková from the IMCASC, Prague and the second one showed some preliminary results of polystyrene/silica nanocomposites obtained at the FTUNS, Novi Sad.

Dr. Jelena Pavličević collaborated with researchers from the Institute of Macromolecular Chemistry of Czech Academy of Sciences in Prague, Faculty of Science, University of Novi Sad and Institute of General and Physical Chemistry in Belgrade and learned a lot about novel polyurethane/clay nanocomposites. The obtained results were presented at The Twelfth Annual Conference “YUCOMAT 2010”, held from 6th to 10th September, in Herceg Novi, Montenegro in the form of poster entitled “Synthesis and thermal properties of novel polyurethane/clay nanocomposites”. She participated in the same conference as the coauthor of two additional posters with similar topics (synthesis and characterisation of advanced polyurethane materials and their nanocomposites), and one investigation of mechanical and swelling properties of polyurethane networks with controlled topology of network chains.

Trainings at IMCASC and FTUNS enabled considerable improvement of Dr. Jelena Pavličević, and she was able to participate in some other conferences. At the 10th International Conference on Fundamental and Applied Aspects of Physical Chemistry “*Physical Chemistry 2010*”, Belgrade, held in Belgrade from 21st to 24th September, she was the author of one short scientific contribution with title “Characterisation of novel polycarbonate-based polyurethanes using FTIR method”, and the coauthor of two other short papers: “Modelling of free radical bulk polymerization of styrene” and “Cure kinetics of alkyd/melamine resins studied by isoconversional methods”. As the coauthor of the poster contribution with the title “Cure kinetics of alkyd/hexamethoxymethylmelamine resin studied by isoconversional methods”, she was a participant in the 11th International Symposium Interdisciplinary Regional Research “ISIRP 2010”, Szeged, Hungary, October 13-15. She was the coauthor of two scientific papers published in the European Polymer Journal and *Thermochimica Acta*.

Ivan Stijepović

According to the plan of the WP3 RP-DEMATEN “Strengthening the human potential of the Department of Materials Engineering FTUNS”, Ivan Stijepović was employed in the first Project year, continued her scientific improvement during the whole second and third Project years. In the period from May 1st 2010 till April 30th 2011 his efforts were mainly focused on the synthesis and characterisation of nanomaterials. In addition, he attended the Second Workshop of the RP-DEMATEN Project held in Chalkidiki, Greece, the Final Workshop of the project in Brno, Czech Republic and 1st Conference on Materials for Energy, Karlsruhe, Germany. Also, he had visited the University of Duisburg for the third time as a part of the WP1 – Mobility and training.



Ivan Stijepović has been performing a number of experiments on the synthesis and characterisation of nanomaterials in the course of his training at the FTUNS. His main area of interest has been citrate method for obtaining doped lanthanum-gallates but also several other sol-gel techniques for the synthesis of ceramics. Since he has been introduced with various methods for characterisation of these materials, Ivan Stijepović regularly used different advanced testing equipment such as scanning electron microscope (SEM), X-ray diffractometer (XRD), infrared spectroscope (FT-IR), thermal analysis (DTA/TG) and impedance spectroscopy devices (IS).

Ivan Stijepović visited the University of Duisburg, Germany for the third time in the frame of the RP-DEMATEN Project (WP1 – Mobility and training). During these two months (September and October 2010) he continued with the CVS synthesis of lanthanum-gallate nanopowders and extended his knowledge about the method. Also, he was involved in several other experiments with his colleagues on the synthesis of copper-aluminate and titania nanopowders. He had the unique opportunity to work with microwave plasma reactor and successfully applied it in his own experimental set-up. At the end of his visit, he went to Hamburg synchrotron radiation facility (HASYLAB) and worked on measurements of extended X-ray absorption fine structure (EXAFS) of several nanopowders. This technique is one of the most advanced in the field of nanosciences and it is widely used to probe local atomic structure of nanomaterials.

One part of his activities was collaboration with Mr. Radislav Filipović and Mr. Zoran Obrenović, researchers from Faculty of Technology, University of East Sarajevo, Zvornik, Republic of Srpska, Bosnia and Herzegovina. Thus, two papers were published in international journals (Z. Obrenović, M. Milanović, I. Stijepović, Lj. Nikolić, *Ceram. Int.*, **37** (2011) and R. Filipović, D. Lazić, M. Perušić, I. Stijepović, *Process. Applic. Ceram.*, **4** [4] (2010) 265–269) and some of the obtained results were presented at international conferences (12th YUCOMAT, Herceg Novi, Montenegro, September 2010, 1st Conference of the Serbian Ceramic Society, Belgrade, Serbia, March 2011, 2nd International Congress - Engineering, Ecology and Materials in Processing Industry, Jahorina, Republic of Srpska, Bosnia and Herzegovina, March 2011).

On June 3-5, 2010 Ivan Stijepović attended the Second Workshop of the RP-DEMATEN Project held in Chalkidiki, Greece and orally presented his work entitled “*Electrical characterization of Co and Ni doped LSGM ceramics*”. In the frame of the same project he had the chance to participate in the Final Workshop in Brno, Czech Republic (3-5 March 2011) where he also had an oral presentation with the title “*Synthesis and sinterability of lanthanum-gallate nanopowder obtained by CVS method*” and presented the results of the work done during his three visits to Duisburg and in the laboratories in Novi Sad. Besides participating in these two workshops, Mr. Stijepović attended 1st International Conference on Materials for Energy, Karlsruhe, Germany in July 2010 where he had an oral presentation.

Oskar Bera

Oskar Bera (*please find his CV below*) has been employed at the RP-DEMATEN project from 1st November 2010, according to the WP3 – Strengthening the human potential of the Department of Materials Engineering, FTUNS. He came on the position of J. Pavličević, as she moved to the IMCASCR, Prague on UNESCO postgraduate course in Polymer Science. His efforts were mainly focused on synthesis and characterisation of polymer based nanocomposites.



Oskar Bera performed number of experiments on the synthesis and characterisation of nanomaterials in the course of his training at the FTUNS. His main area of interest was nanoparticles dispersion. Also, the trainings were focused on polystyrene/silica nanocomposites, autoacceleration of styrene polymerization in the presence of nanoparticles and gelcasting of highly concentrated fine alumina suspensions. Since he was introduced with various methods for characterisation of these materials, Oskar Bera regularly uses different advance testing equipment such as thermal analysis (DSC, DTA/TG), rheological analysis, particle sizer, infrared spectroscopy (FT-IR) and scanning electron microscope (SEM).

In the frame of the RP-DEMATEN project he had chance to participate in the Final Workshop in Brno, Czech Republic (3-5 March 2011) where he had oral presentation with the title “*The gelation process in alumina suspensions with dissolved monomers*” and presented his results of the work done during his visits to Brno (within RP-DEMATEN project) and in the laboratories at the FTUNS. He was co-author of another two presentations at Final Workshop in Brno: “*The characterization of novel polycarbonate-based polyurethane hybrid materials*” and “*Modification of silica rubber by amorphous silica nanoparticles*”.

After two training visits the DCPBUT (two-month training in March/April 2009 and one-month training in September 2009) he continued to strengthen the collaboration among two groups (from the DCPBUT leaded by Prof. M. Trunec and from FTUNS leaded by Doc. B. Pilić), and was involved in an another European project - COST MP0701.

He published two papers in this period:

1. O. Bera, B. Pilić, J. Pavličević, M. Jovičić, B. Holló, K. Mészáros Szécsényi, M. Špírková, “Preparation and thermal properties of polystyrene/silica nanocomposites”, *Thermochimica Acta*, **515** (2011) 1–5.
2. M. Špírková, J. Pavličević, A. Strachota, R. Poreba, O. Bera, L. Kapralkova, J. Baldrian, M. Šlouf, N. Lazić, J. Budinski-Simendić, “Novel polycarbonate-based polyurethane elastomers: Composition-property relationship”, *European Polymer Journal*, **47**, Issue 5 (2011) 959–972.

3.3.3 Hiring of experienced senior researcher from IMCASCR

Dr. Milena Špírková

Dr. Milena Špírková from the Institute of Macromolecular Chemistry, Academy of Sciences, v.v.i. Prague, Czech Republic (IMCASCR) was at the Department of Materials Engineering, Faculty of Technology, University of Novi Sad, Serbia (FTUNS) for **one-month hiring** (from 1st to 27th April 2011) within the Strengthening of research potential (WP3) of DEMATEN project. Hiring of Dr. Milena Špírková at the FTUNS (similar to her previous hiring in autumn 2009) reinforced human

potential in WBC centre and provided stimulative climate for creative scientific activities by training of young scientists at the FTUNS in the field of nanostructured materials.



There were six main goals of her visit:

1. Two lectures (60 min each, discussion included) realized at the Faculty of Technology on 20th April: “*Polyurethane foam preparation and characterization*” and “*Polyurethane elastomer preparation and characterization*”. Both lectures were aimed at nanostructured polyurethane (PU) materials. The topic of lecture about foams was more practical, while the main purpose of second lecture was short introduction to the preparation techniques, common for PU elastomer preparation and mainly to multidisciplinary methods of PU characterisation, nanoscale dimension included.
2. The evaluation and summarization of all activities of Dr. Jelena Pavličević and M.Sc. Ivan Ristić during their trainings at the IMCASCR Prague on nanostructure polymeric material preparation and characterisation. Discussion and consultation with other PhD. students of the Department of Materials Engineering, mainly in the field of incorporation of inorganic nanofillers into organic polymeric matrix, and about practical possibilities of segmented nanostructured polyurethane elastomers.
3. The discussion of all activities and results achieved during the third year of RP-DEMATEN project, as well as required tasks which have to be finalized before the end of the project. In this way, several official meetings with RP-DEMATEN representatives from the FTUNS, (especially with the Project coordinator, Prof. Vladimir Srdić, but also with Prof. J. Budinski-Simendić, Assoc. Prof. L. Nikolić and Assis. Prof. B. Pilić) and from the IMRSAS, present in Novi Sad (Dr. Monika Kašiarová and Peter Tatarko) were organized.
4. The discussion of the role of IMCASCR in the whole RP-DEMATEN project and preparation of bilateral cooperation between the IMCASCR and the FTUNS after the finalization of the DEMATEN project.
5. Active participation in XIII YuCorr International Conference (co-author of the joint Czech – Serbian poster: N. Vukić, J. Pavličević, M. Špírková, I. Krakovský, J. Šomvársky and J. Budinski-Simendić, „Swelling and dynamic-mechanical properties of polyurethane networks prepared by catalytic cyclotrimerization crosslinking reaction“) held in hotel Omorika, Tara Mountain from 5th 8th April. The participation was not only useful due to the presentation of the joint results, but also as it was a good opportunity to meet colleagues (mainly from Serbia, but also from other Balkan countries).
6. Visit of the Faculty of Technology in Leskovac on 15th April, where she presented a lecture: “Polycarbonate-based polyurethane elastomers”, had a meeting and discussion with representatives of the Faculty and short interview for the local TV station (about the Czech – Serbian cooperation, which was enabled via RP-DEMATEN project).

Dr. Jiří Brus

Dr. Jiří Brus (*please find his CV below*) from the Institute of Macromolecular Chemistry, Academy of Sciences, v.v.i. Prague, Czech Republic (IMCASCRC) was at the Department of Materials Engineering, Faculty of Technology, University of Novi Sad, Serbia (FTUNS) for **two-week hiring** (from 19th March to 1st April 2011) within the Strengthening of research potential (WP3) of DEMATEN project. Hiring of Dr. Jiří Brus at the FTUNS reinforced human potential in WBC centre especially by training of young scientists at the FTUNS in the field of solid-state NMR spectroscopy.



There were five main topics of his activities:

- (i) He presented four lectures (each 60 min, discussion included) at the FTUNS:
 1. “*NMR spectroscopy in characterization of organic solids – overview*” on 25th March,
 2. “*Dynamics of multicomponent polymer systems: $1H$ - $13C$ wide-line separation experiments and spin diffusion*”, on 25th March,
 3. “*Structure of multicomponent polymer systems: $1H$ - $1H$ correlation experiments and spin diffusion*” on 30th March,
 4. “*Structural characterization of inorganic aluminosilicate systems: role of water*”, on 30th March;
- (ii) Consultation of joint activities realized in the FTUNS and the IMCASCRC, preferably on characterisation of nanostructured materials via solid-state NMR spectroscopy;
- (iii) Discussion and consultation with Ph.D. students from the Department of Materials Engineering, FTUNS, mainly in the field of possibilities for utilization of solid-state NMR spectroscopy in the FTUNS for characterisation of new materials. He also had two-hour meetings (twice per week) with young scientists from the FTUNS (I. Ristić, O. Bera, M. Jovičić and I. Stijepović) about their research on Ph.D. thesis;
- (iv) Evaluation of activities between the FTUNS and the IMCASCRC before the end of RP-DEMATEN project. Meetings with the Project coordinator, Prof. Vladimir Srdić, and with other representatives and members of the RP-DEMATEN project (Prof. Jaroslava Budinski-Simendić, Dr. Ljubica Nikolić, Dr. Branka Pilić) were realized. Preparation of bilateral agreement of scientific collaboration between the FTUNS and the IMCASCRC, and other mutual activities for the future were discussed.
- (v) Dr. Jiří Brus was also officially invited by the dean of the Faculty of technology, University of Novi Sad, Prof. Zoltan Zavargo and discussed about bilateral cooperation.

3.3.4 Hiring of experienced researcher to FTUNS

Mr. Milan Nikolić

According to the plan of the WP3 RP-DEMATEN, Mr. Milan Nikolić, employed in the second Project year, continued his activities during the whole third Project year.

M. Nikolić, the person responsible for Malvern Zetasizer Nano, was strongly involved in training of young scientists from the University of Novi Sad and visitors. He established standard and developed some specific procedures (for the measurement of the particle size distribution) which are used at the FTUNS. Together with Prof. Mirjana Antov from the Department of Biotechnology, Faculty of Technology, University of Novi Sad, he upgraded Waters Gel Permeation Chromatograph (GPC) (based on HPLC system) with compatible BioSuite Phenyl, 1000, 13 μm HIC preparative column and 5 mL sample loop. In this way HPLC system was enabled to be used for preparative purposes - for isolation and purification of various biomolecules by hydrophobic interaction chromatography.



As an experienced researcher together with Dr. K. Giannakopoulos he involved a group of young scientists (Ph.D. students B. Mojić, I. Stijepović and S. Ognjanović, and diploma students M. Kopanja and B. Bajac) in the field of synthesis and characterisation of core/shell particles. He helped them to understand the basic principles of assembling oppositely charged silica and ferrite nanoparticles on the surface of monodisperse silica core particles. One of the subjects in the training was functionalization of the silica surfaces by either 3-aminopropyltriethoxysilane (APTES) or poly(diallyldimethylammonium chloride) (PDDA). He also helped them with the preparation and presentation of the obtained results at international conferences:

1. B. Mojić, M. Nikolić, V. Srdić, K.P. Giannakopoulos, "Synthesis of nickel ferrite core/ silica shell nanoparticles", *2nd FP7 DEMATEN Workshop*, Chalkidiki, Greece, June 2010.
2. B. Mojić, M. Nikolić, I. Stijepović, K.P. Giannakopoulos, V.V. Srdić, "Synthesis of core/shell magnetic nanoparticles", *COST MP0904 Workshop*, Edinburg, Scotland, August 2010
3. M. Nikolić, B. Mojić, I. Stijepović, M. Antov, K.P. Giannakopoulos, V.V. Srdić, "Synthesis and characterization of silica based core-shell particles", *12th YUCOMAT Conference*, Herceg Novi, Montenegro, September 2010.
4. M. Nikolić, B. Mojić, I. Stijepović, K.P. Giannakopoulos, V.V. Srdić, "Particle surface modification as strategy for synthesis of core/shell particles", *COST MP0701 Workshop*, Novi Sad, September 2010.
5. M. Nikolić, B. Mojić, I. Stijepović, M. Antov, K.P. Giannakopoulos, V.V. Srdić, "Synthesis of silica based core-shell particles as supports for enzyme immobilization", *FP7 Workshop, Processing of Nanostructured Ceramics, Polymers, and Composites*, Belgrade, Serbia, November 2010.
6. B. Mojić, M. Nikolić, V.V. Srdić, "Synthesis of strontium titanate core/nickel ferrite shell nanoparticles", *The Ninth Young Researchers' Conference*, Belgrade, Serbia, December 2010
7. B. Mojić, M. Nikolić, K.P. Giannakopoulos, V.V. Srdić, "Preparation and characterization of titanate core/ferrite shell nanoparticles", *3rd FP7 DEMATEN Workshop, Processing of Nanostructured Ceramics and Nanocomposites*, Brno, Czech Republic, March 2011.

A part of his activities was the collaboration with Mr. Radislav Filipović and Mr. Zoran Obrenović, researchers from Faculty of Technology, University of East Sarajevo, Zvornik, Republic of Srpska, Bosnia and Herzegovina. Thus, he measured the average particle size and size distribution (on Malvern, Zetasizer Nano) of primary particles formed from different sodium silicate solutions and

aluminium hydroxide solutions for their Ph.D. thesis and helped them with the analysis of the obtained results.

It is also important to underline that some of his results were prepared in the form of scientific paper and published/submitted to international journals:

1. M.P. Nikolić, K.P. Giannakopoulos, V.V. Srdić, “Synthesis and characterization of mesoporous silica core-shell particles”, *Process. Applic. Ceram.*, **4** [2] (2010) 81–85.
2. M.P. Nikolić, K.P. Giannakopoulos, D. Stamopoulos, E.G. Moshopoulou, V. Srdić, “Synthesis and characterization of silica core/nano-ferrite shell particles”, *Materials Research Bulletin*, submitted 2011.
3. M.P. Nikolić, K.P. Giannakopoulos, V.V. Srdić, “Effect of surface functionalization and process parameters on synthesis of mesoporous silica core-shell particles”, *Ceramics International*, submitted 2011.

Dr. Konstantinos P. Giannakopoulos

Dr. Konstantinos P. Giannakopoulos, well recognized scientist with lot of experience in the field of nanostructured materials from the IMSNCSR Athens Greece, was employed at the Faculty of Technology, University of Novi Sad for 1½ month (from 21st January to 9th March 2010) in the second and 2 months (15th July to 11th September 2010) in the third Project year.

During his employment in the third project year he focused on his interaction with students and young researchers from the FTUNS and had a lot of different activities:

- Together with Mr. M. Nikolić he involved a group of young scientists (Ph.D. students B. Mojić, I. Stijepović and S. Ognjanović, and diploma students M. Kopanja and B. Bajac) in the field of synthesis and characterisation of core/shell particles. He helped them how to use scanning and transmission electron microscopy, as well as EDS in characterisation of core/shell structures.
- With B. Mojic he set four exercises in Microelectronic (ordered corresponding equipment, electronic components and spare parts, arranged experimental procedure and prepare a short introductory printing materials for students) for a course “Advanced Ceramics Materials”, at the Master Studying, for the study programme “Materials Engineering” at the FTUNS.
- He also had two-hour meetings (twice per week) with young scientists from the FTUNS (B. Mojic, S. Ognjanovic, I. Ristić, I. Stijepović, J. Pavličević, I. Ristić, O. Bera and M. Jovičić) with the open discussion about their research on their Ph.D. thesis.

Dr. Giannakopoulos continued with his advisory role in: i) improvement of measurement on the existing SEM microscope, ii) the upgrading of existing TEM microscope and iii) possible purchasing of a new instrument. His main effort in this task had been to explain the limitations of the current tools and the possible use of a new High resolution TEM.

Dr. Giannakopoulos participated to the fifth PMB Meeting held on 8th September 2010 in Herceg Novi, Montenegro, as a substitute of the PMB member from the IMSNCSR, Greece Dr. E. Moshopoulos. He informed PMB members about progress in WP-1 “Mobility and training” and confirmed that even though a lot training/visits have been organized, there are still lots of activities within WP1 that have to be realized before the end of April. K. Giannakopoulos also gave basic information about the second RP-DEMATEN Workshop: “*Structural and Functional Characterisation of Complex Materials*”, which was held in Ourinopoulo, Chalkidiki, Greece from 3rd to 5th June 2011. He pointed out that the scientific level of the Workshop was very high and invited speakers presented exciting recent developments and cutting edge challenges in nanotechnology.

K. Giannakopoulos participated in the 12th Annual Conference YUCOMAT 2010, held from 6th to 10th September 2010 in Heceg Novi, Montenegro. He was the co-author of two papers: “Synthesis

and characterization of silica based core-shell particles” and “The influence of In^{3+} and Y^{3+} ions on structure and magnetic properties of nanocrystalline ZnFe_2O_4 ” and actively participated in the discussion of presented papers. He met a lot of scientists from Serbia and abroad and very constructive discussions were with Prof. K.D. Becker, Prof. H. Hahn, Prof. D. Janačković, Dr. R. Kraehnert, Prof. R. Sieger and Prof. D. Uskoković.



3.4 WP 4 - Upgrading research capacities

3.4.1 Summary

The objectives of the proposed project are reinforcement of research potential of the DEMATEN and strengthening partnerships among centers of excellence established in the EU and the Western Balkan Countries (WBC). Thus, upgrading and renewal of S&T research equipment is one of the most important activities which should be realized through WP 4.

The plan for **the whole three Project years** was completely realized: i) Waters Gel Permeation Chromatograph and Malvern Zetasizer Nano ZS were purchased and delivered to the Department of Materials Engineering, Faculty of Technology, University of Novi Sad (*please see the figure below*) and ii) young scientists from the FTUNS were successfully trained on the installed equipment.



3.4.2 Gel Permeation Chromatography system

Gel Permeation Chromatography (GPC) system was purchased from the Water Corporation USA (in accordance with the legal procedure within the frame of Serbian laws), delivered and installed already in the first Project year. During the third year young/experienced researchers from the FTUNS used it for research activities, as well as in teaching process for students of master and PhD studies. It is also important to note that regular service of Waters Gel Permeation Chromatograph (GPC) was done by “Hemtek” D.O.O. Belgrade and some parts of the injector were replaced.

In the third project year, the Waters Gel Permeation Chromatograph (GPC) (based on HPLC system) was additionally equipped with compatible BioSuite Phenyl, 1000, 13 μm HIC preparative column and 5 mL sample loop. This was financially supported by sources outside the FP7 project. In this way HPLC system was enabled to be used for preparative purposes – for isolation and purification of various biomolecules by hydrophobic interaction chromatography. This preparative chromatographic system has been applied for isolation and purification of fungal cellulase by their fractionation according to a modified method described by Tomaz and Queiroz (1999).

3.4.3 Malvern Zetasizer Nano

Zetasizer Nano ZS, with Multi-purpose titration was purchased from the Malvern Instruments UK on 10th April 2009 in accordance with the legal procedure within the frame of Serbian laws. It was delivered on 14th May 2009 and installed on 9th and 10th June 2009. This is a newly developed technique, based on dynamic light scattering (measures Brownian motion and relates it to the

particle size), which enable measurement of size, molecular weight and zeta potential of dispersed particles and molecules in solution. During the third year young/experienced researchers from FTUNS used Malvern Zetasizer Nano for their research activities, as well as in teaching process for students of master and PhD studies. The official representative of the company Malvern Instruments Ltd., from United Kingdom, Stuart Macaulay, gave the special training for young researchers from DEMATEN, FTUNS in Novi Sad on 23rd May 2010. In practical training he helped them in better understanding of all important things for improved measurement and data analysing.

3.5 WP 5 – Workshops and training schools

3.5.1 Summary

Training schools, workshops and conference, organized within the frame of the RP-DEMATEN Project, are crucial for knowledge dissemination as well as education of scientists (especially young researchers) in recent development in nanotechnology, nanometrology and improved reliability of measurement and analysis at the nano-level.

The plan for **the first year of the RP-DEMATEN Project** was completely realized – the first Training school was held from 18th to 20th March 2009 at the Institute of Materials Research, Slovak Academy of Science, Košice, Slovakia.

The plan for **the second year of the RP-DEMATEN Project** was completely realized – the first Workshop (the Main conference) and the second Training school were held from 3rd to 6th December 2009 at the Faculty of Technology, University of Novi Sad, Serbia.

The plan for **the third year of the RP-DEMATEN Project** was completely realized: i) the second Workshop was held from 3rd to 5th of June 2010 in Ourinopoulo, Chalkidiki, Greece and ii) the third Workshop was held from 3rd till 5th March 2011 at the Faculty of Mechanical Engineering, Brno University of Technology, Brno, Czech Republic.

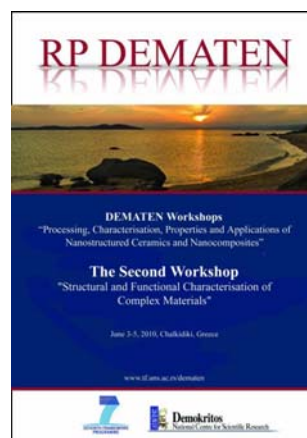
3.5.2 The second Workshop

On the second PMB Meeting in Košice it was proposed that the second Workshop will be organized by Dr. E. Moshopoulou and held at Chalkidiki, Greece in June 2010 and on the third PMB Meeting in Novi Sad Dr. E. Moshopoulou and Dr. K. Giannakopoulos gave a detailed presentation about the Workshop. Activities on organization of the second Workshop started already in December 2009 and continued through electronic communication among the members of the RP-DEMATEN Project. The invited speakers were selected and contacted electronically. Web-site was continuously updated with new information. The most important data and the Registration form were distributed electronically and on-line registration (at our web-site) was arranged. The final program for the Workshop was prepared on beginning of May, 2010 (*please see the Appendix 1*).

The second RP-DEMATEN Workshop “*Structural and Functional Characterisation of Complex Materials*” was held in Hotel “Aristoteles”, Ourinopoulo, Chalkidiki, Greece from 3rd to 5th of June 2010. The Workshop gathered 44 participants from Europe and United States, 25 of them were young scientists carrying out their PhD thesis or their postdoctoral training mainly at the FTUNS, but also at other European universities and institutes (DCPBUT, IMRSAS, IMCASC, ESRF etc.). The Workshop was focused on modern characterization techniques of complex materials. Accurate structural and functional characterization of materials, have invaluable importance in understanding the properties of materials, in tailoring their functionalities and in guiding the design of novel materials. The techniques chosen to be discussed at the Workshop were the most relevant for the characterization of the materials investigated by the DEMATEN groups.

The second Workshop was opened by Dr. E. Moshopoulou. Eight invited speakers, coming from United States and Europe, presented exciting recent developments and cutting edge challenges of these techniques. In addition, 18 participants gave contributed talks and 13 participants presented posters. The extended abstracts of all presentations were published in the booklet “Programme and Book of Abstracts”, edited by E.G. Moshopoulou, K. Giannakopoulos, D. Kechrakos. Invited speakers were:

1. Prof. Markus Winterer (University of Duisburg-Essen, Germany) who presented capabilities of the innovative technique for synthesis of superior nanopowders in his talk: *"Nanocrystalline Zinc Oxide: From Particles to Devices"*.
2. Dr. Alan Hurd (Los Alamos National Laboratory, Los Alamos, USA) introduced the audience on the capabilities of neutron scattering and spectroscopy as powerful tools for probing the structural and dynamical properties of complex nanostructured materials, by giving a talk on *"Neutron Success Stories in Complex and Structural Materials Physics"*.
3. Prof. Joseph Keddle (University of Surrey, Surrey, United Kingdom) underlined the applications of nanomaterials and the university-industry links that these materials enable, by presenting a *"Design of Colloidal Nanocomposite Adhesives: Optimisation through Nanostructural Control"*.
4. Dr. Mauro Rovezzi (Johannes Kepler University, Linz, Austria), gave the talk *"From Dilute to Condensed Magnetic Semiconductors: A Protocol for Systematic Characterizations"*.
5. Prof. Maria Katsikini (Aristotle University, Thessalonica, Greece) introduced the audience to synchrotron radiation as applied to the characterisation of complex materials, through her talk on *"Synchrotron Radiation: a Novel Research Tool in Materials Science"*.
6. Dr. Mark Green (National Institute of Bureau and Standards at Washington DC and University of Maryland, USA) emphasized the complementarities of neutron and synchrotron radiation studies for a complete structural characterisation of complex materials, by his talk on *"Structural Characterization of Emerging Materials by Neutron and Synchrotron X-ray Scattering"*.
7. Dr. Milena Špírková (Academy of Sciences of the Czech Republic, Prague, Czech Republic) gave a talk on *"Epoxy-Based Organic-Inorganic Nanocomposites: Preparation and Characterization"*.
8. Prof. A.G. Konstandopoulos (Centre for Research & Technology Hellas and Aristotle University, Thessalonica, Greece) addressed the pressing issue of energy production by his talk on *"Nanoparticle Functionalized Reactors for Green Mobility and Energy Production"*.



The second RP-DEMATEN Workshop was closed at 5th June by Dr. Evagelia Moshopoulou and Prof. Vladimir Srdić. We believe that bringing together the specialists for the synthesis, processing and characterization of nanostructured ceramics and nanocomposites the Workshop gave possibility for better understanding (especially for young scientists) of structure, processing and characterization of nanostructured materials with complex structures. Apart from gaining theoretical knowledge, young scientists had opportunity to meet and exchange their experiences in more casual manner, since a few social events were organized after the official program. In this way, we believe that the second Workshop resulted in maximum benefit for the attendants in terms of knowledge, scientific experience and new possible cooperation.



3.5.3 The third Workshop

On the second PMB Meeting in Košice it is proposed that the third Workshop (chair will be Prof. Karel Maca) could be held in Brno in October/November 2010 or February 2011 and the final term (the end of February or beginning of March 2011) was approved at the third PMB Meeting in Novi Sad. Detailed structure of the third RP-DEMATEN Workshop in Brno – “*Processing of Nanostructured Ceramics and Nanocomposites*” was defined at the fifth PMB Meeting, Herceg Novi, Montenegro. Prof. Karel Maca, as the main organizer, informed the PMB members that the third Workshop will be held at the Faculty of Mechanical Engineering, Brno University of Technology from 3rd to 5th March 2011. At the fifth PMB meeting he defined that the main goals for the Workshop will be high scientific level of invited and oral presentations and creation of stronger relationship between researchers from different European centres. K. Maca listed the possible invited speakers: Prof. Aldo. R. Boccaccini (Erlangen, Germany), Prof. Horst Hahn (Karlsruhe, Germany), Dr. Zhijian Shen (Stockholm, Sweden) and Prof. Markus Winterer (Duisburg, Germany). The organization activities for the third Workshop started as early as June 2010 and continued through electronic communication among the members of the Project. The selected invited speakers were contacted electronically and most of them accepted the invitation, but in the meantime the list of invited speakers was extended with Prof. Jean-François Gerard (Lion, France), Prof. Josef Jancar (Brno, Czech Republic) and Dr. Stanislav Kamba (Prague, Czech Republic). The web-site was continuously updated with new information. The most important data and the Registration form were distributed electronically and on-line registration (on our web-site) was arranged. The final program for the Workshop was prepared in January, 2011 (*please see the Appendix 2*).

The third Workshop “*Processing of Nanostructured Ceramics and Nanocomposites*” was held from 3rd till 5th March 2011 at the Faculty of Mechanical Engineering, Brno University of Technology. The third Workshop was opened by the Dean of the Faculty of Mechanical Engineering, Prof. Miroslav Doupovec. The key objective of this final workshop was to learn how to tailor, at the nanoscale, novel material systems with new or improved properties and performance based upon better understanding of material nanostructure. Thus the three main topics of the workshop were:

1. Synthesis of nanopowders
2. Processing of advanced ceramics and polymers
3. Properties and application of advanced ceramics and nanocomposites

The programme was dedicated for the young researchers and strengthening of the partnerships between the European centres of Excellence. To extend the knowledge of young researchers, six invited lectures (45 min. each, together with discussion) had the presentation of their work:

1. Prof. Markus Winterer (University Duisburg-Essen, Germany) – “*Chemical Engineering of Chemical Vapor Synthesis*”;
2. Dr. Zhijian Shen (Stockholm University, Sweden) – “*Producing of Advanced Ceramics not by Sintering*”;
3. Prof. Aldo. R. Boccaccini (University of Erlangen-Nuremberg, Germany) – “*Electrophoretic Deposition: from Traditional Ceramics to Nanotechnology*”;
4. Prof. Josef Jancar (Brno University of Technology, Czech Republic) – “*Role of Chain-Nanoparticle Interactions in Synthetic and Bio-Based Nanocomposites*”;
5. Dr. Stanislav Kamba (Academy of Sciences of the Czech Republic, Czech Republic) – “*Multiferroics and Search for the Permanent Electric Dipole Moment of the Electron*”;
6. Prof. Horst Hahn (Karlsruhe Institute of Technology, Germany) – “*Some Novel Ideas for the Control of Materials*”.

In addition to the invited lectures, 19 oral presentations (15 min. each) and 19 posters (in two 90 min. sessions) were presented. The workshop had about 60 participants from DEMATEN project and was also open for scientists and students outside of the project. The abstracts of all presentations were published in the booklet “Programme and Book of Abstracts”, edited by Prof. K. Maca and Prof. M. Trunec, and printed in Novi Sad. In addition to scientific presentations and lectures, a social evening was organized where young and experienced researchers alike had the opportunity to strengthen their relationships.

After all presentations and poster sessions, the lab tour was organized. The third RP-DEMATEN Workshop was closed on 5th March after the Project Management Board Meeting by Prof. Karel Maca and Prof. Vladimir Srdić.



4. Project management

4.1 Introduction

Main tasks of management of the project are: detailed planning of technical work, deliverables, planning and organization of PMB Meetings, training school and workshops, detailed monitoring of technical progress, preparation of technical progress reports, setting deadlines, approving of time records and other steps in the field of administration.

The plan for **the first year of the RP-DEMATEN Project** was completely realized. The most important activities were: i) organization of the Kick-off Meeting (the first PMB meeting) in Novi Sad and the second PMB meeting in Košice, ii) control of the hiring process of young researchers, iii) organization of all trainings and visits, iv) control of the complete procedure of purchasing new equipments, v) organization of a the training school and vi) dissemination of information.

The plan for **the second year of the RP-DEMATEN Project** was completely realized. The most important activities were: i) organization of the main conference and the second training school, ii) organization of the third PMB meeting in Novi Sad, iii) organization of all trainings and visits, iv) control of the complete procedure of installation of new equipment and trainings, v) dissemination of information.

The plan for **the third year of the RP-DEMATEN Project** was completely realized. The most important activities were: i) organization of two workshops, ii) organization of three PMB meetings, iii) organization of all trainings and visits, iv) control of the hiring and v) dissemination of information.

4.2 Achievements

Coordination of all activities in RP-DEMATEN was done in continuous communication among all PMB members mostly electronically and by phone. However, meetings/contacts done during a short visits and international conferences were also used to manage most important subjects and clarify some current problems. Of course, PMB meetings were the most important place, for analysis of all questions, tasks and duties, connected with the RP-DEMATEN.

The Project Coordinator, Prof. Vladimir V. Srdić, has communicated very often with the Project Officer, Dr. Salvatore La Rosa, mostly electronically. The Project Officer carefully followed progress of the RP-DEMATEN, and often with very constructive suggestions and instructions helped us a lot in solving of for us crucial problems and defining of our future way.

The Project Coordinator, V. Srdić, has communicated also often with the Project Adviser Prof. Horst Hahn, who was carefully following progress in RP-DEMATEN and agreed that financial support from RP-DEMATEN was very helpfull for FTUNS and very efficiently used in realization of proposed activities.

4.2.1 The fourth PMB Meeting

The fourth Project Management Board (PMB) Meeting was held on 3rd (17:00 to 19:00 h) June 2010, in Aristoteles Hotel, Chalkidiki, Greece.

All seven nominated members of the Project Management Board (PMB) were present (*see figure below*). A total number of ten delegates from all six beneficiaries attended the Meeting:

1. Prof. Dr. Jaroslava BUDINSKI-SIMENDIĆ, FTUNS – Novi Sad
2. Dr. Klara ČASTKOVA, DCPBUT – Brno
3. Prof. Dr. Jan DUSZA, IMRSAS – Košice
4. Dr. Frantisek LOFAJ, IMRSAS – Košice
5. Prof. Dr. Karel MACA, DCPBUT – Brno
6. Dr. Evagelia MOSHOPOULOU – Athens
7. Dr. Branka PILIĆ, FTUNS – Novi Sad
8. Dr. Milena ŠPIRKOVÁ, IMCASC – Prague
9. Prof. Dr. Vladimír V. SRDIĆ, FTUNS – Novi Sad
10. Prof. Dr. Markus WINTERER, UDE – Duisburg



Discussions were done in accordance to the Agenda, prepared before the meeting and distributed to all members of the Project Management Board. The draft minutes of the fourth PMB meeting is given in the Periodic Report.

4.2.2 The fifth PMB Meeting

The fifth Project Management Board (PMB) Meeting was held on 8th (15:30 to 18:00 h) September 2010, in a Conference room, Hotel Plaza, Herceg Novi, Montenegro.

Five nominated members of the Project Management Board (PMB) were present. A total number of six delegates from five beneficiaries and the Project Advisor Prof. Dr. Horst Hahn attended the Meeting:

1. Prof. Dr. Jaroslava BUDINSKI-SIMENDIĆ, FTUNS – Novi Sad
2. Prof. Dr. Jan DUSZA, IMRSAS – Košice
3. Prof. Dr. Horst HAHN, KIT – Karlsruhe
4. Prof. Dr. Karel MACA, DCPBUT – Brno
5. Dr. Konstantinos GIANNAKOPOULOS – IMSNCSR, Athens
6. Dr. Milena ŠPIRKOVÁ, IMCASC – Prague
7. Prof. Dr. Vladimír V. SRDIĆ, FTUNS – Novi Sad



Discussions were done in accordance to the Agenda, prepared before the meeting and distributed to all members of the Project Management Board. The draft minutes of the fifth PMB meeting is given in the Periodic Report.

4.2.3 The sixth PMB Meeting

The sixth Project Management Board (PMB) Meeting was held on 5th (9:00 to 10:30 h) March 2011, at the Faculty of Mechanical Engineering, Brno University of Technology, Brno, Czech Republic.

Six nominated members of the Project Management Board (PMB) were present. A total number of twelve delegates from all six beneficiaries together with Project Advisor Prof. Dr. Horst Hahn attended the Meeting:

1. Prof. Dr. Jaroslava BUDINSKI-SIMENDIĆ, FTUNS – Novi Sad
2. Dr. Klara ČASTKOVA, DCPBUT – Brno
3. Mr. Ruzica DJENADIĆ, UDE – Duisburg
4. Prof. Dr. Jan DUSZA, IMRSAS – Košice
5. Prof. Dr. Horst HAHN, KIT – Karlsruhe
6. Dr. Konstantinos GIANNAKOPOULOS – IMSNCSR, Athens
7. Dr. Frantisek LOFAJ, IMRSAS – Košice
8. Prof. Dr. Karel MACA, DCPBUT – Brno
9. Dr. Branka PILIĆ – FTUNS – Novi Sad
10. Dr. Milena ŠPIRKOVÁ, IMCASC – Prague
11. Prof. Dr. Vladimir V. SRDIĆ, FTUNS – Novi Sad
12. Prof. Dr. Markus WINTERER, UDE – Duisburg

Discussions were done in accordance to the Agenda, prepared before the meeting and distributed to all members of the Project Management Board. The draft minutes of the five PMB meeting is given in the Periodic Report.

5 Budget

Project RP-DEMATEN consists of six WPs, and five of them are devoted to SSA, while WP6 is related to management activities. Detailed description of budget for each WP is given bellow.

5.1 Budget WP1 – Mobility and training

Plan

1. Six-month trainings in UDE-Duisburg for 2 young researches from FTUNS-Novı Sad (average amount per person is 1.300,00 € per month and up to 400,00 € for travelling costs) **16.400,00 €**.
2. Two-month trainings in EU institution for 7 young researches from FTUNS-Novı Sad, IMRSAS- Košice and DCPBUT-Brno (average amount per person is 1.300,00 € per month and up to 400,00 € for travelling costs) **21.000,00 €**.
3. One-month trainings in EU institution for 11 young researches from FTUNS-Novı Sad, IMRSAS-Košice and DCPBUT-Brno (average amount per person is 1.300,00 € per month and up to 400,00 € for travelling costs) **18.700,00 €**.
4. One-month visits to FTUNS-Novı Sad for 5 researchers from EU institutions (average amount per person is 2.200,00 € per visit and up to 400,00 € for travelling costs) **13.000,00 €**.
5. Two-week visits to FTUNS-Novı Sad for 4 senior researchers from EU institutions (average amount per person is 1.600,00 € per visit and up to 400,00 € for travelling costs) **8.000,00 €**.
6. One-week visits in EU institution for 5 scientists from FTUNS-Novı Sad (average amount per person is 600,00 € per visit and up to 400,00 € for travelling costs) **5.000,00 €**.
7. One-week visits for 21 researchers from EU institutions (average amount per person is 800,00 € per visit and up to 400,00 € for travelling costs) **25.200,00 €**
8. Deliverables for host institutions (except FTUNS) regarding direct costs for young researchers, which will be spent during training (such as chemicals, precursors, laboratory glasses, standard samples etc.) (1.000,00 € per month, i.e. 37 x 1.000,00 €) **37.000,00 €**.

Realization in the third year

1. Six-month trainings **15.624,50 €** was spent in the third Project year
(I. Stijepović - UDE)
 - Accommodation and living costs for I. Stijepović (Novı Sad, Serbia) – 2.503,00 € (for the second two months/1);
 - Travel expenses (plain ticket) for I. Stijepović (Novı Sad, Serbia) – 176,82 € (for the third two months/1);
 - Accommodation and living costs for I. Stijepović (Novı Sad, Serbia) – 2.853,00 € (for the third two months/1);
 (B. Mojić, S. Ognjanović and E. Csehova - UDE)
 - Travel expenses (plain ticket) for B. Mojić (Novı Sad, Serbia) – 91,69 + 113,09 € (for the 1st month/2);
 - Travel expenses (plain ticket) for S. Ognjanović (Novı Sad, Serbia) – 193,12 € (for the 1st month/2);
 - Travel expenses (plain ticket) for E. Csehova (Novı Sad, Serbia) – 193,12 € (for the 1st month/2);
 - Accommodation and living costs for B. Mojić/E. Csehova (Novı Sad, Serbia) – 522,00 € (for the 1st month/2);
 - Workshop fees for S. Ognjanović, B. Mojić, E. Csehova, M. Kachlik – 600,00 € (for the 1st month/2);

- Travel expenses (plain ticket) for S. Ognjanović (Novi Sad, Serbia) – 161,00 € (for the 2nd, 3rd and 4th months/2);
 - Accommodation and living costs for S. Ognjanović (Novi Sad, Serbia) – 4.995,00 € (for the 2nd, 3rd and 4th month/2);
 - Travel expenses (plain ticket) for B. Mojić (Novi Sad, Serbia) – 112,76 € (for the 5th month/2);
 - Accommodation and living costs for B. Mojić (Novi Sad, Serbia) – 1.206,55 € (for the 5th month/2);
 - Travel expenses (plain ticket) for B. Mojić (Novi Sad, Serbia) – 153,35 € (for the 6th month/2);
 - Accommodation and living costs for B. Mojić (Novi Sad, Serbia) – 1.750,00 € (for the 6th month/2).
2. Two-month trainings **9.536,07 €** was spent in the third Project year
(P. Tatarko and M. Kašiarova – IMSNCSR)
- Accommodation and living costs for P. Tatarko (Košice, Slovakia) – 1.813,97 € (for the 1st month);
 - Accommodation and living costs for M. Kasiarova (Košice, Slovakia) – 1.870,52 € (for the 2nd month);
- (N. Vukić, B. Mojić and V. Simendić – IMRSAS,
- Travel, accommodation and living costs for N. Vukić, B. Mojić and V. Simendić (Novi Sad, Serbia) – 1.457,20 + 716,54 €;
- (M. Kachlik in UDE)
- Travel costs (plane ticket) for M. Kachlik (Brno, Czech Republic) – 187,18 €;
 - Accommodation and living costs for M. Kachlik (Brno, Czech Republic) – 3.490,66 €;
3. One-month trainings **11.468,35 €** was spent in the third Project year
(I. Ristić – IMCASCAR)
- Travel costs (train ticket) for I. Ristić (Novi Sad, Serbia) – 74,55 €;
 - Accommodation and living costs for I. Ristić (Novi Sad, Serbia) – 1.624,46 €;
- (S. Ognjanović – UDE)
- Travel costs (train ticket) for S. Ognjanović (Novi Sad, Serbia) – 176,82 €;
 - Accommodation and living costs for S. Ognjanović (Novi Sad, Serbia) – 1.523,19 €;
- (B. Mojić – IMSNCSR)
- Travel costs (train ticket) for B. Mojić (Novi Sad, Serbia) – 277,56 €;
 - Accommodation and living costs for B. Mojić (Novi Sad, Serbia) – 250,00 €;
- (V. Simendić and N. Vukić – IMRSAS)
- Travel costs (car) for V. Simendić and N. Vukić (Novi Sad, Serbia) – 274,18 + 13,47 + 33,27 + 30,49 €;
 - Accommodation and living costs for V. Simendić (Novi Sad, Serbia) – 521,78 €;
 - Accommodation and living costs for N. Vukić (Novi Sad, Serbia) – 521,78 €;
- (V. Puchy – DCPBUT)
- Travel, accommodation and living costs for V. Puchy (Košice, Slovakia) – 1.219,76 €;
- (A. Duszova – UDE)
- Travel costs for A. Duszova (Košice, Slovakia) – 306,61 €;
 - Accommodation costs for A. Duszova (Košice, Slovakia) – 400,05 €;
 - Living costs for A. Duszova (Košice, Slovakia) – 2.082,05 €;
- (E. Bartoničkova and M. Kachlik – IMSNCSR)
- Travel costs (plane ticket) for M. Kachlik (Brno, Czech Republic) – 353,65 €;

- Accommodation (hotel) costs for M. Kachlik (Brno, Czech Republic) – 320,00 €;
 - Living costs for M. Kachlik (Brno, Czech Republic) – 254,22 €;
- (D. Drdlik – IMRSAS)
- Travel costs (insurance) for D. Drdlik (Brno, Czech Republic) – 21,80 €;
 - Accommodation and living costs for D. Drdlik (Brno, Czech Republic) – 1.188,66 €;
4. One -month visits **3.323,02 €** was spent in the third Project year
- (M. Špírková – FTUNS)
- Travel, accommodation and living costs for M. Špírková (Prague, Czech Republic) – 936,44 € (for the second two weeks);
- (P. Tatarko – FTUNS)
- Travel, accommodation and living costs for P. Tatarko (Košice, Slovakia) – 1.584,46 € (for the 1st, 2nd and 3rd weeks);
 - Travel, accommodation and living costs for P. Tatarko (Košice, Slovakia) – 802,12 € (for the 4th weeks);
5. Two-weeks visit **2.943,09 €** was spent in the third Project year
- (K. Maca, K. Častková, M. Trunec – FTUNS,
- Travel, accommodation and living costs for K. Maca, K. Častková, M. Trunec (Brno, Czech Republic) – 1.915,21 + 28,56 €;
- (E. Csehová in FTUNS)
- Travel accommodation and living costs for E. Csehová (Košice, Slovakia) – 999,32 €;
6. One-week visits **1.547,24 €** was spent in the third Project
- (V. Srdić – IMSNCSR)
- Travel costs (plane ticket) for V. Srdić (Novi Sad, Serbia) – 268,37 €;
 - Travel costs (transportation to/from airport) for V. Srdić (Novi Sad, Serbia) – 59,17 €;
 - Accommodation (hotel) costs for V. Srdić (Novi Sad, Serbia) – 350,00 €;
- (J. Budinski-Simendić – IMCASCAR)
- Accommodation and living costs for J. Budinski-Simendić (Novi Sad, Serbia) – 342,00 €;
- (J. Budinski-Simendić – IMRSAS)
- Travel, accommodation and living costs for J. Budinski-Simendić (Novi Sad, Serbia) – 527,70 €;
7. Four one-week visits **12.250,45 €** was spent in the third Project year
- (K. Giannakopoulos in UDE)
- Travel, accommodation and living costs for K. Giannakopoulos (Athens, Greece) – 857,40 €;
- (K. Giannakopoulos in DCPBUT)
- Travel, accommodation and living costs for K. Giannakopoulos (Athens, Greece) – 825,25 €;
- (M. Špírková – DCPBUT)
- Travel, accommodation and living costs for M. Špírková (Prague, Czech Republic) – 20,72 € (for the second part);
- (M. Čubová-Urbánová in FTUNS)
- Travel, accommodation and living costs for M. Čubová-Urbánová (Prague, Czech Republic) – 723,91 €;
- (M. Špírková in IMSNCSR)

- Travel, accommodation and living costs for M. Spirkova (Prague, Czech Republic) – 1.029,93 €;
- (F. Lofaj in IMSNCSR)
 - Travel costs (transportation to airports) for F. Lofaj (Košice, Slovakia) – 25,80 €;
 - Accommodation and living costs for F. Lofaj (Košice, Slovakia) – 443,50 €;
 - Travel costs (plane ticket) for F. Lofaj (Košice, Slovakia) – 437,61 €;
 - Accommodation and living costs for F. Lofaj (Košice, Slovakia) – 828,32 €;
- (J. Dusza in UDE)
 - Travel costs (plane ticket) for J. Dusza (Košice, Slovakia) – 407,72 €;
 - Accommodation costs for J. Dusza (Košice, Slovakia) – 430,05 €;
 - Living costs for J. Dusza (Košice, Slovakia) – 249,10 €;
- (P. Hvizdos in FTUNS)
 - Travel, accommodation and living costs for P. Hvizdos (Košice, Slovakia) – 801,05 €;
- (J. Dusza in DCPBUT)
 - Travel, accommodation and living costs for J. Dusza (Košice, Slovakia) – 888,09 €;
- (M. Kasiarova in FTUNS)
 - Travel, accommodation and living costs for M. Kasiarova (Košice, Slovakia) – 1.012,72 €;
- (A. Duszova in IMCASCAR)
 - Accommodation and living costs for A. Dusza (Košice, Slovakia) – 304,31 €;
 - Travel costs (plane ticket) for A. Dusza (Košice, Slovakia) – 380,00 €;
- (K. Maca – IMCASCAR)
 - Travel, accommodation and living costs for K. Maca (Brno, Czech Republic) – 140,57 + 2,04 €;
- (K. Maca – IMSNCSR)
 - Travel costs (plane ticket) for K. Maca (Brno, Czech Republic) – 363,19 €;
 - Accommodation and living costs for K. Maca (Brno, Czech Republic) – 676,20 €;
- (K. Maca and M. Trunec – UDE)
 - Travel costs (plane tickets) for K. Maca, M. Trunec (Brno, Czech Republic) – 786,76 €;
 - Travel costs (transportation to airports) for K. Maca, M. Trunec (Brno, Czech Republic) – 11,28 + 11,28 €;
 - Accommodation and living costs for K. Maca, M. Trunec (Brno, Czech Republic) – 593,65 €;
- (R. Djenadic – FTUNS)
 - Costs were covered from another project.

8. Deliverables **19.369,17 €** was spent in the third Project year

The third Project year

- For training of V. Pouchly at FTUNS (held in the second year) **271,12 €** was spent:
 - 241,72 € - sealants
 - 29,40 € - 2 PTFE tubes
- For training of M. Maletin, P. Tatarko, M. Kasiarova, B. Mojić, M. Kachlik at IMSNCSR **2.770,37 €** was spent:
 - 83,17 € - library use
 - 86,95 € - library use
 - 91,50 € - office supplies
 - 36,89 € - office supplies
 - 14,25 € - office supplies
 - 32,70 € - office supplies

- 91,00 € - supplies for chemistry laboratory
- 104,70 € - office supplies
- 50,33 € - supplies for chemistry laboratory
- 52,02 € - supplies for chemistry laboratory
- 48,36 € - supplies for chemistry laboratory
- 1.615,00 € - supplies for chemistry laboratory
- 36,37 € - laboratory supplies
- 44,64 € - laboratory supplies
- 47,73 € - laboratory supplies
- 47,93 € - laboratory supplies
- 32,70 € - office supplies
- 105,00 € - supplies for chemistry laboratory
- 101,40 € - supplies for chemistry laboratory
- 47,73 € - laboratory supplies
- For training of V. Puchy at DCPBUT **999,54 €** was spent:
 - 999,54 € - chemicals – alumina powders
- For training of I. Stijepović, S. Ognajnović, B. Mojić and M. Kachlik at UDE **12.147,78 €** was spent:
 - 2.985,00 € - graphite dyes for sintering
 - 345,57 € - protective masks
 - 3.912,65 € - chemicals and gases: Gd-tetramethylheptanedionate, Zn-tetrabutyl, Li-tetramethylheptanedionate, Ti-diisopropoxide, K-acetate, DMSO Aceto, ethanol, isopropanol, butanol, Acetylacetone, Terpeneol, HNO₃, H₂SO₄, NaCl, H₂O₂, pH indicator stripes, Argon, Helium, Oxygen
 - 1.186,60 € - ceramics tubes
 - 1.269,35 € - glass tubes
 - 200,00 € - copper gaskets
 - 639,74 € - laboratory consumables: wiping tissues, gloves etc.
 - 34,80 € - shipping documents
 - 1.574,07 € - chemical supplies, tubes, gaskets
- For training of D. Drdlik at IMRSAS **587,00 €** was spent:
 - 241,50 € - dimond suspension
 - 345,50 € - dimond cutting wheel
- For training of V. Simendić and N. Vukić at IMRSAS **659,00 €** was spent:
 - 659,00 € - dimond suspension, liquid for polishing
- For training of I. Ristić and A. Duszova at IMCASC **1.934,36 €** was spent:
 - 40,17 € - Hexanediol, Hydroquinone
 - 717,03 € - Isosorbide, Trifluoromethanesulfonic acid, Dimethyl-Dioxane, Chloroform
 - 47,20 € - Nitrogen gas
 - 48,63 € - Dimethyl, Dioxane
 - 6,52 € - Dichlormethan
 - 66,18 € - Nitrogen liquid
 - 442,45 € - MASS Rotor for NMR spectroscopy
 - 40,29 € - Dioxane
 - 66,18 € - Nitrogen liquid
 - 66,18 € - Nitrogen liquid
 - 198,55 € - Nitrogen liquid
 - 95,71 € - Nitrogen gas
 - 33,09 € - Nitrogen liquid
 - 66,18 € - Nitrogen liquid

Overall budget WP1

Planned	144.300,00 €
Total payment for the 3 rd year	76.061,89 € (52,71 %)
TOTAL (for three years)	116.083,15 € (80,45 %)

5.2 Budget WP2 – Dissemination of information**Plan**

1. Web site (design 1.000,00 €; installation 150,00 €; training personnel for updating 550,00 €). **Total 1.700,00 €.**
2. Flyer-1 (design 400,00 €; printing 200,00 € per 1000 peaces). **Total 600,00 €.**
3. Pamphlet (design 500,00 €; printing 400,00 € per 1000 peaces). **Total 900,00 €.**
4. Flyer-2 (design 400,00 €; printing 200,00 € per 1000 peaces). **Total 600,00 €.**

Realization in the third year

1. Web site – for design and updating **500,00 €** was paid in the third Project year)
3. Pamphlet - design and printing “Final report” in the form of brochure / pamphlet **1.236,96 €** was spent in the third Project year)

Overall budget WP2

Planned	3.800,00 €
Total payment for the 3 rd year	1.736,96 € (45,71 %)
TOTAL (for three years)	3.918,73 € (103,12 %)

5.3 Budget WP3 – Strengthening the human potential**Plan**

1. Hiring of the first young researcher at FTUNS for 36 months (650,00 € per month). **Total 23.400,00 €.**
2. Hiring of the second young researcher at FTUNS for 36 months (650,00 € per month). **Total 23.400,00 €.**
3. Hiring of the experienced researcher coming back to FTUNS for 24 months (900,00 € per month). **Total 21.600,00 €.**
4. Hiring of the experienced senior researcher, from IMCASC, to FTUNS for 3 months (3.000,00 € per month). **Total 9.000,00 €.**

Realization in the third year

- 1a. Hiring of the first young scientist - Jelena Pavičević - **4.662,76 €** was spent in the third Project year.
- 1b. Hiring of the first young scientist - Oskar Bear - **3.900,01 €** was spent in the third Project year.

2. Hiring of the second young scientist - Ivan Stijepović - **8.451,71 €** was spent in the third Project year.
- 3a. Hiring of the experienced researcher - Mr. Milan Nikolić - **11.425,85 €** was spent in the third Project year.
- 3b. Hiring of the experienced senior researcher - Dr. Konstantinos Giannakopoulos - **3.731,17 €** was spent in the third Project year.
4. Hiring of the experienced senior researcher from IMCASC (Dr. Milena Špírková, Dr. Adam Strachota and Dr. J. Brus) - **6.377,36 €** was spent in the third Project year).
 - Dr. Adam Strachota was employed from 11th April to 2nd May 2010 and got 2.079,94 €
 - Dr. Jiri Brus was employed from 19th March to 4th April 2011 and got 1.571,58 €
 - Dr. Milena Špírková was employed from 1th April to 28th April 2011 and got 2.725,84 €

Overall budget WP3

Planned	77.400,00 €
Total payment for the 3 rd year	38.548,86 € (49,80 %)
TOTAL (for three years)	70.259,46 € (90,78 %)

5.4 Budget WP4 – Upgrading research capacities

Plan

1. Malvern Zetasizer Nano ZS with MPT-2 Multi-purpose titration. **Total 91.256,00 €.**
2. GPC with corresponding equipment. **Total 36.104,00 €.**

Realization in the third year

2. Gel Performance Chromatography (GPC), for injector/diitung **403,10 €** was paid in the third Project year

Overall budget WP4

Planned	127.360,00 €
Total payment for the 3 rd year	403,10 € (0,32 %)
TOTAL (for three years)	127.757,60 € (100,31 %)

5.5 Budget WP5 –Workshops and training schools

Plan

1. The first Training school (renting of the room and laboratories, direct consumption for exercises, samples preparation, preparation of announcements, mailing, secretarial staff 3.700,00 €; costs for four invited lecturers 4.800,00 €; costs for staff from IMRSAS- Košice, directly involved in the training 1.200,00 €; financial support for six young participants 3.000,00 €). **Total 12.700,00 €.**
2. The first Workshop (renting of the workshop room, preparation of announcements, mailing, secretarial staff and preparation of proceedings 3.500,00 €; costs of four invited speakers 4.000,00 €; financial support for eight young participants 4.000,00 €). **Total 11.500,00 €.**
3. The main Conference (renting of the conference sales, costs of the Conference dinner and catering 6.500,00 €; preparation of announcements, mailing and secretarial staff, and preparation of proceedings 3.400,00 €; costs for six invited lecturers 7.200,00 €; financial support for five young participants 2.700,00 €). **Total 19.800,00 €.**
4. The second Training school (renting of the room and laboratories, direct consumption for exercises, samples preparation, preparation of announcements, mailing, secretarial staff 3.700,00 €; costs for four invited lecturers 4.800,00 €; costs for staff from DEMATEN-FTUNS, directly involved in the training 1.200,00 €; financial support for six young participants 3.000,00 €). **Total 12.700,00 €.**
5. The second Workshop (renting of the workshop room, preparation of announcements, mailing, secretarial staff and preparation of proceedings 3.500,00 €; costs for four invited speakers 4.000,00 €; financial support for eight young participants 4.000,00 €). **Total 11.500,00 €.**

Realization in the third year

2. The second Workshop was held from 3rd to 5th June 2010 at Chalkidiki, Greece (**16.002,54 €** was spent in the third Project year)
 - Salary for the secretary of the workshop – 650,00 €;
 - F. Lofaj, accommodation (hotel) – 340,00 €;
 - E. Csehova, accommodation (hotel) – 230,00 €;

- V. Puchy, accommodation (hotel) – 230,00 €;
- A. Duszova, accommodation (hotel) – 230,00 €;
- P. Hvizdos, accommodation (hotel) – 240,00 €;
- P. Tatarko, accommodation (hotel) – 230,00 €;
- A. Hurd, accommodation (hotel) – 489,00 €;
- A. Hurd, travel - plane ticket – 1.289,97 €;
- A. Hurd, travel - shuttle – 167,00 €;
- A. Hurd, local travel expenses and meals – 175,00 €;
- M. Green, accommodation (hotel) – 340,00 €;
- M. Green, travel - plane ticket – 1.546,65 €;
- M. Green, local travel expenses and meals – 225,00 €;
- J. Keddie, accommodation (hotel) – 255,00 €;
- J. Keddie, travel - plane ticket – 449,71 €;
- J. Keddie, travel -shuttle– 120,00 €;
- J. Keddie, local travel expenses and meals – 175,00 €;
- M. Rovezzi, accommodation (hotel) – 340,00 €;
- M. Rovezzi, travel - plane ticket – 517,63 €;
- M. Rovezzi, local travel expenses and meals – 150,00 €;
- M. Katsikini, accommodation (hotel) – 170,00 €;
- M. Katsikini, expenses for travel by car (gasoline) – 132,92 €;
- M. Katsikini, local travel expenses and meals – 131,80 €;
- E. Sarakinou, accommodation (hotel) – 115,00 €;
- E. Sarakinou, expenses for travel by car (gasoline) – 82,75 €;
- E. Sarakinou, local travel expenses and meals – 146,80 €;
- D. Kechrakos, accommodation (hotel) – 340,00 €;
- D. Kechrakos, travel - plane ticket – 110,18 €;
- D. Kechrakos, local travel expenses and meals – 133,68 €;
- E. Gamari, accommodation (hotel) – 340,00 €;
- E. Gamari, travel - plane ticket – 110,18 €;
- E. Gamari, local travel expenses and meals – 125,89 €;
- K. Giannakopoulos, accommodation (hotel) – 430,00 €;
- K. Giannakopoulos, travel - plane ticket – 110,18 €;
- K. Giannakopoulos, local travel expenses and meals – 112,00 €;
- D. Stamopoulos, accommodation (hotel) – 170,00 €;
- D. Stamopoulos, travel - plane ticket, – 177,18 €;
- D. Stamopoulos, local travel expenses and meals – 63,20 €;
- D. Drdlik, accommodation (hotel) – 340,00 €;
- D. Drdlik, travel - plane ticket – 140,00 €;
- K. Castkova, accommodation (hotel) – 340,00 €;
- M. Trunec, accommodation (hotel) – 340,00 €;
- B. Stojanovic, travel - plane ticket – 156,80 €;
- I. Stijepovic, expenses for travel by car (gasoline, tolls) – 255,00 €;
- I. Stijepovic, local travel expenses and meals – 40,20 €;
- O. Bera, expenses for travel by car (gasoline, tolls) – 255,00 €;
- O. Bera, local travel expenses and meals – 40,20 €;
- R. Rafal, accommodation (hotel) – 230,00 €;
- R. Rafal, travel - plane ticket – 168,90 €;
- R. Rafal, local travel expenses and meals – 150,00 €;
- Travel costs Spirkova – 491,04 €;

- B. Pilić and L. Nikolić accommodation – 224,21 €;
- O. Bera, I. Stijepović and M. Nikolić, accommodation – 300,30 €;
- Pavlicevic, Jovicić and Mojić, accommodation – 300,30 €;
- J. Budinski Simendić, accommodation – 125,75 €;
- V. Simendić, accommodation – 125,75 €;
- N. Vukić, accommodation – 125,75 €;
- Printing of conference proceedings – 461,62 €;

3/4. The main Conference (the first Workshop) and the Second Training School were organized from 3rd to 6th December 2009 in Novi Sad (**6.538,85 €** was spent in the third Project year)

- Author's fee for J. Brus – 338,49 €;
- J. Gerard, travel (plane) costs – 316,82 €;
- J. Shen, travel (plane) costs – 478,18 €;
- Program of KUD Sonja Marinkovic – 98,96 €;
- Costs for staff administration – 1.300,00 €;
- Main Conference/Training school – rooms/laboratories TF – 3.010,00 €;
- Renting of Laboratories PMF XRD – 497,18 €;
- Renting of Laboratories PMF SEM – 499,22 €;

5 The third Workshop was held from 3rd to 5th March in Brno, Czech Republic (**14.374,69 €** was spent in the third Project year)

- Salaries for two secretaries – 498,85 €;
- Salaries for organizing team – 604,85 €;
- Salary for six invited lecturers – 1.808,51 €;
- Hotel Continental (invited lecturers) – 833,00 €;
- Hotel Palacky (young participants) – 1.427,06 €;
- Social evening – 1.608,53 €;
- Coffee breaks (4x) – 533,01 €;
- Two lunches – 261,71 €;
- Conference materials (office supplies, souvenirs, badges) – 56,77 € + 360,04 € + 15,79 €;
- Renting conference rooms – 1.239,16 €;
- Reimbursements for participants and invited lecturers – 2.403,20 €;
- Travel costs Spirkova – 18,24 €;
- Printing of posters for researchers from IMRSAS – 156,00 €;
- B. Mojić travel (plane Koln-Wiena) costs – 80,50 €;
- S. Ognjanović, travel (plane Koln-Wiena-Koln) costs – 115,83 €;
- Printing of conference proceedings – 554,64 €;
- J. Budinski Simendić, living costs – 102,00 €;
- V. Srdić, living costs – 136,00 €;
- B. Pilić, living costs – 102,00 €;
- I. Stijepović, living costs – 136,00 €;
- N. Vukić, living costs – 136,00 €;
- V. Simendić, living costs – 136,00 €;
- O. Bera, living costs – 136,00 €;
- B. Mojić, living costs – 119,00 €;
- I. Ristić, living costs – 136,00 €;
- Workshop Brno/Greece text preparation – 660,00 €;

Overall budget WP5

Planned	68.200,00 €
Total payment for the 3 rd year	36.916,08 € (54,13 %)
TOTAL (for three years)	66.295,30 € (97,21 %)

5.6 Budget WP6 – Project management**Plan**

1. Organisation of the Kick-off meeting and three PMB meetings (4.000,00 € for the Kick-off meeting which will be held in Novi Sad, 4.000,00 € for the first PMB meeting which will be held in Brno, 5.000,00 € for the second PMB meeting which will be held in Košice and 5.000,00 € for the third PMB meeting which will be held in Athens). **Total 18.000,00 €.**
2. Salary for the project coordinator (in the same time the coordinator of WP6). **Total 4.500,00 €.**
3. Salaries for WP-coordinators (for: FTUNS 2.700,00 €; IMSNCSR 1.800,00 €; IMRSAS 1.350,00 € and DCPBUT 1.500,00 €). **Total 7.350,00 €.**
4. Salary for secretaries (for: FTUNS 1.800,00 €; IMSNCSR 1.050,00 €; IMRSAS 750,00 € and DCPBUT 900,00 €). **Total 4.500,00 €.**
5. External Auditors which will conduct financial business of the project as well as the annual budget and annual financial report, i.e. certificate on financial statement. **Total 3.600,00 €.**
6. Costs for the project advisor for travelling costs and salary. **Total 8.500,00 €.**

Realization in the third year

1c. The fourth PMB Meeting was held on 5th June 2010, at Chalkidiki, Greece (**3.438,36 €** was spent in the third Project year):

- accommodation costs for K. Maca – 340,00 €
- travel, accommodation and living costs for J. Budinski Simendić – 295,20 €
- travel, accommodation and living costs for M. Winterer – 937,84 €
- travel, accommodation and living costs for M. Spirkova – 948,00 €
- travel, accommodation and living costs for E. Moshopoulou – 459,70 €
- travel, accommodation and living costs for V. Srdić – 457,62 €

1d. The fifth PMB Meeting was held on 8th September 2010, in Herceg Novi, Montenegro (**965,17 €** was spent in the third Project year):

- travel costs for K. Giannakopoulos – 96,00 €
- travel costs for V. Srdić – 164,23 €
- accommodation and living costs for K. Maca – 390,71 €
- travel costs (plane ticket) K. Maca – 307,38 €
- travel insurance K. Maca – 6,85 €

1e. The sixth PMB Meeting was held on 6th March 2011, in Brno, Czech Republic (**4.004,22 €** was spent in the third Project year):

- renting the meeting room – 520,44 €
- PMB dinner 02/03/11 – 131,08 €
- PMB dinner 04/03/11 – 96,93 €
- PMB lunch 05/03/11 – 82,22 €
- accommodation for all participants – 833,00 €
- travel costs for M. Winterer – 762,61 €

- travel costs for H. Hahn – 248,39 €
 - travel costs for M. Spirkova – 190,88 €
 - travel costs for R. Djenadic – 173,00 €
 - travel costs for V. Srdić – 396,61 €
 - travel costs for B. Pilić – 12,73 €
 - travel costs for J. Dusza – 280,00 €
 - travel costs for K. Giannakopoulos – 276,33 €
2. Salary for Project coordinator V. Srdić (Novi Sad, Serbia),
- in the third year **1.500,00 €** was spent
3. Salaries for coordinators of Work packages in the first year were (**2.929,50 €** was spent in the third Project year)
- Salary for E.Moshopoulou (Athens, Greece) as the coordinator of WP1 (for 2nd and 3rd years) paid in the third year – 1.195,62 €;
 - Salary for J. Dusza (Košice, Slovakia) as the coordinator of WP2 in the third year – 450,00 €;
 - Salary for Lj. Nikolić (Novi Sad, Serbia) as the coordinator of WP3 in the third year – 450,00 €;
 - Salary for B. Pilić (Novi Sad, Serbia) as the coordinator of WP4 in the third year – 450,00 €;
 - Salary for K. Maca (Brno, Czech Republic) as the coordinator of WP5 in the third year – 383,88 €.
4. Salaries for secretaries (**1.779,75 €** was spent in the third Project year)
- Salary for secretary at FTUNS Novi Sad, Serbia in the third year – 600,00 €;
 - Salary for secretary at IMSNCSR Athens, Greece (for 2nd and 3rd years) paid in the third year – 700,00 €;
 - Salary for secretary at IMRSAS Košice, Slovakia in the third year – 250,00 €;
 - Salary for secretary at DCPBUT Brno, Czech Republic in the third year – 229,75 €.
5. External Auditors (**3.625,53 €** was spent in the third Project year)
- External Auditors was paid in the third year – 3.085,53 €;
 - Preparation all finances for external audit – S. Vajc – 540,00 €.
6. Costs for the project advisor (**5.213,94 €** was spent in the third Project year)
- Salary for Prof. H. Hahn - the project advisor – 2.257,33 €;
 - Travel costs Prof. H. Hahn – PMB meeting Herceg Novi – 486,81 €;
 - Accommodation costs Prof. H. Hahn – PMB meeting Herceg Novi – 212,80 €;
 - Salary for Prof. H. Hahn - the project advisor – 2.257,00 €;

Overall budget WP6

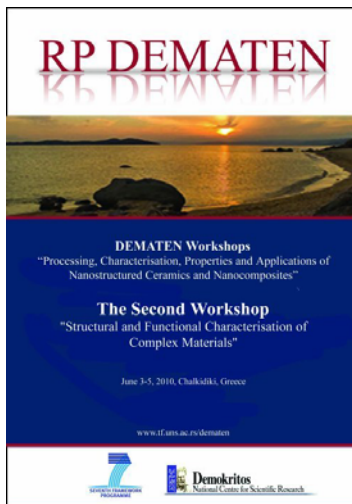
Planned	46.450,00 €
Total payment for the 3 rd year	23.456,47 € (50,50 %)
TOTAL (for three years)	40.688,55 € (87,60 %)

TOTAL COSTS IN THE THIRD PROJECT YEAR **177.123,36 €**
+ Overhead **12.398,64 €**

TOTAL COSTS IN THREE PROJECT YEARS **425.002,79 €**
+ Overhead **29.750,20 €**

APPENDIX – 1 (Page 1/4)

FP7 RP-DEMATEN, the Second Workshop
“Structural and Functional Characterisation of Complex Materials”
June 2010, Chalkidiki, Greece



Thursday, June 3, 2010	09.25 – 09.30 h – Welcome
	09.30 – 10.55 h – Session 1 (Chair: Kostas Giannakopoulos) Markus Winterer , Moazzam Ali, Ruzica Djenadic, Ahmed Khalil (Invited) Nanocrystalline Zinc Oxide: From Particles to Devices <i>Nanoparticle Process Technology, University Duisburg-Essen, Duisburg, Germany</i> Ivan Stijepovic¹ , Miroslav Kolar ¹ , Azad Darbandi ² , Vladimir V. Srdic ¹ Electrical characterization of Co and Ni doped LSGM ceramics ¹ <i>Department of Materials Engineering, Faculty of Technology, University of Novi Sad, Novi Sad, Serbia</i> ² <i>Gemeinschaftslabor Nanomaterialien, Forschungszentrum Karlsruhe- TU Darmstadt, Darmstadt, Germany</i> J. Dusza Microstructures and grain boundaries of ceramic nanocomposites <i>Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovak Republic</i>
	10.55 – 11.30 h – Coffee Break
	11:30 – 12:55 h – Session 2 (Chair: Vladimir Srdic) Mauro Rovezzi¹ , A. Navarro-Quezada ¹ , B. Faina ¹ , T. Devillers ¹ , T. Li ¹ , A. Grois ¹ , F. d'Acapito ² , R. T. Lechner ¹ , G. Bauer ¹ , W. Stefanowicz ^{3,4} , D. Sztenkiel ³ , R. Jakiela ³ , M. Sawicki ³ , T. Dietl ^{3,5} and A. Bonanni ¹ (Invited) From Dilute to Condensed Magnetic Semiconductors: A Protocol for Systematic Characterizations ¹ <i>Institut für Halbleiter-und-Festkörperphysik, Johannes Kepler University, Linz, Austria</i> ² <i>IOM-OGG, Consiglio Nazionale delle Ricerche, c/o ESRF GILDA, Grenoble, France</i> ³ <i>Institute of Physics, Polish Academy of Sciences, Warszawa, Poland</i> ⁴ <i>Laboratory of Magnetism, Bialystok University, Bialystok, Poland</i> ⁵ <i>Institute of Theoretical Physics, University of Warsaw, Warszawa, Poland</i> Karel Maca¹ , Martin Kachlik ¹ , Veronica Goian ² The influence of phase and structural purity on infrared reflectivity of EuTiO₃ magnetoelectric ceramics ¹ <i>Brno University of Technology, Brno, Czech Republic</i> ² <i>Institute of Physics, ASCR Prague, Czech Republic</i> P. Hvizdos Micro/nano indentation behaviour of ceramic nanocomposites <i>Institute of Materials Research, Slovak Academy of Sciences, Košice, Slovak Republic</i>
	12:55 – 14:30 h – Lunch

	<p>14:30 – 16:30 h – Session 3 (Chair: Karel Maca)</p> <p><u>Milena Špírková</u>¹, Petr Duchek², Adam Strachota¹, Jiří Brus¹, Josef Baldrian¹, Jiří Kotek¹, Miroslav Šlouf¹ (Invited) Epoxy-based organic-inorganic nanocomposites: preparation and characterization ¹<i>Institute of Macromolecular Chemistry, Academy of Sciences of Czech Republic Prague, Czech Republic</i> ²<i>Faculty of Mechanical Engineering, University of West Bohemia, Plzeň, Czech Republic</i></p> <p><u>H. Zois</u>^{1,2}, A. Kanapitsas¹, Ye. P. Mamunya³ Electrical/dielectric properties and study of PTC effect of polymer composites with metal inclusions ¹<i>Technological Educational Institute (TEI) of Lamia, 3rd km Old National Road Lamia-Athens, Lamia, Greece</i> ²<i>National Technical University of Athens, Department of Physics, Zografou Campus, Athens, Greece</i> ³<i>National Academy of Sciences of Ukraine, Institute of Macromolecular Chemistry, Kiev 02160, Ukraine</i></p> <p><u>Libor Kobera</u>, Martina Urbanová, Jiri Brus Alumino-silicate inorganic polymers modified by cellulose <i>Institute of Macromolecular Chemistry, Academy of Science of the Czech Republic, Prague, Czech Republic</i></p> <p><u>Eleni Gamari</u> The genesis and development of the National Center for Scientific Research Demokritos <i>Institute of Materials Science, National Center for Scientific Research "Demokritos", Greece</i></p>
	<p>16.30 – 18.00 h – Coffee Break and Poster Session</p>
	<p>17:00 – 19:00 h – Management Board Meeting</p>
	<p>20:00 – 22:00 h – Dinner</p>
Friday, June 4, 2010	<p>09:30 – 10:55 h – Session 4 (Chair: Evagelia Moshopoulou)</p> <p><u>Alan Hurd</u> (Invited) Neutron success stories in complex and structural materials physics <i>Lujan Neutron Scattering Center, Los Alamos National Laboratory, Los Alamos, New Mexico, USA</i></p> <p><u>D. Calzolari</u>¹, D. Pontoni¹, J. Daillant² Solvent-mediated nanoparticle self-assembly: the role played by evaporation rate ¹<i>European Synchrotron Radiation Facility, Beamline ID15, Grenoble, France</i> ²<i>Laboratoire Interdisciplinaire sur l'Organisation Nanométrique et Supramoléculaire, France</i></p> <p><u>Milan Nikolic</u>^{1,2}, Mirjana Antov², <u>Vladimir V. Srdic</u>¹, Konstantinos P. Giannakopoulos³ Synthesis of core-shell particles as supports for enzyme immobilization ¹<i>Department of Materials Engineering, Faculty of Technology, University of Novi Sad, Serbia</i> ²<i>Department of Applied Chemistry, Faculty of Technology, University of Novi Sad, Serbia</i> ³<i>Institute of Materials Science, National Center for Scientific Research "Demokritos", Greece</i></p>
	<p>10.55 – 11.30 h – Coffee Break</p>
	<p>11.30 – 12.55 h – Session 5 (Chair: Dimitris Kechrakos)</p> <p><u>Joseph L. Keddie</u> (Invited) Design of Colloidal Nanocomposite Adhesives: Optimisation through Nanostructural Control <i>Department of Physics and Surrey Materials Institute, University of Surrey, Surrey, United Kingdom</i></p> <p><u>Hynek Beneš</u>^{1,2}, Jocelyne Galy², Jean-François Gerard², Ludovic Vallette³ Hybrid organic/inorganic epoxy materials prepared by sol-gel process ¹<i>Institute of Macromolecular Chemistry AS CR, Prague, Czech Republic</i> ²<i>Ingénierie des Matériaux Polymères UMR CNRS, Université de Lyon – INSA Lyon, Villeurbanne, France</i> ³<i>DOW Chem., Texas Operation, Freeport, Texas, USA</i></p> <p><u>J. Pavličević</u>¹, M. Špírková², A. Strachota², O. Bera¹, R. Poręba², K. Mészáros Szécsényi³, J. Budinski-Simendić¹ Preparation of polyurethane nanocomposite materials for high temperature application ¹<i>Faculty of Technology, University of Novi Sad, Novi Sad, Serbia</i> ²<i>Institute of Macromolecular Chemistry ASCR, Prague, Czech Republic</i> ³<i>Faculty of Sciences, Novi Sad, Serbia</i></p>
	<p>12.55 – 14.30 h – Lunch</p>
	<p>14.30 – 15.55 h – Session 6 (Chair: Biljana Stojanovic)</p> <p><u>Maria Katsikini</u> (Invited) Synchrotron Radiation: a novel research tool in materials science <i>Aristotle University of Thessaloniki, School of Physics, Section of Solid State Physics, Thessaloniki, Greece</i></p> <p><u>F. Lofaj</u>, P. Hviščová, A. Duszová, J. Dusza AFM characterization of topography and mechanical properties of nanocomposite PECVD WC-C coatings <i>Institute of Materials Research of Slovak Academy of Sciences, Watsonova Košice, Slovak Republic</i></p> <p><u>Lenka Benešová</u> Mechanical properties of the geopolymers filled with short polypropylene fibers</p>

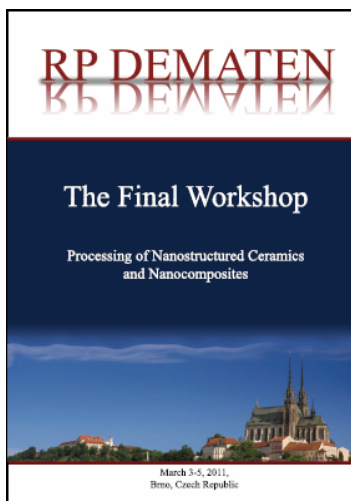
	<p><i>Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Prague, Czech Republic</i></p> <p>15.55 – 16.30 h – Coffee Break</p> <p>14.30 – 15.55 h – Session 7 (Chair: Eleni Gamari)</p> <p><u>A. G. Konstandopoulos</u>^{1,2} (Invited) Nanoparticle Functionalized Reactors for Green Mobility and Energy Production ¹<i>Aerosol & Particle Technology Laboratory, CERTH/CPERI, Thessaloniki, Greece</i> ²<i>Department of Chemical Engineering, Aristotle University, Thessaloniki, Greece</i></p> <p><u>Ivan S. Ristic</u>¹, Jaroslava Budinski-Simendic¹, Radmila Radicevic¹, Katalin Meszaros Secenyi², Ayse Aroguz³, Ivan Krakovsky⁴, Helena Valentova⁴ The influence of titanium(IV)oxide nanoparticles on the properties of polyurethane composites based on renewable resources ¹<i>Department of Material Engineering, Faculty of Technology, University of Novi Sad, Serbia</i> ²<i>Faculty of Science, University of Novi Sad, Serbia</i> ³<i>Engineering faculty, University of Istanbul, Turkey</i> ⁴<i>Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic</i></p> <p><u>B. Radovanovic</u>¹, <u>V. Simendic</u>², H. Valentova³, G. Markovic⁴, J. Budinski-Simendic¹, M. Marinovic⁵ Viscoelasticity of elastomeric nano-composites based on chlorosulfonated polyethylene as network precursor ¹<i>Faculty of Science, Niš, Serbia</i> ²<i>Faculty of Technology, University of Novi Sad, Serbia</i> ³<i>Charles University, Faculty of Mathematics and Physics, Prague, Czech Republic</i> ⁴<i>Tigar, Pirot, Serbia</i> ⁵<i>Institute of Nuclear Science Vinca, Belgrade, Serbia</i></p>
<p>Saturday, June 5, 2010</p>	<p>09.30 – 11.15 h – Poster Session 8 (Chair: Kostas Giannakopoulos)</p> <p><u>Mark A. Green</u> (Invited) Structural Characterization of Emerging Materials by Neutron and Synchrotron X-ray Scattering <i>NIST Center for Neutron Research, National Institute of Standards and Technology and Department of Materials Science and Engineering, University of Maryland, College Park, MD, USA</i></p> <p><u>Eleni Sarakinou</u> New techniques for TEM nano-analysis: precession diffraction and 3D diffraction tomography for structure determination and (EBSD-TEM like) high resolution phase/orientation maps <i>Physics Department, Aristotle University of Thessaloniki, GR54124, Thessaloniki, Greece</i> Collaborator, NanoMEGAS SPRL, Brussels, Belgium</p> <p><u>Olivia Policianova</u>, Jiri Brus Study of molecular properties of specific pharmaceutical materials based on solid solutions and dispersions of active ingredients in polymer matrix <i>Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Prague, Czech Republic</i></p> <p>Jovanovic Vojislav¹, Simendic Borislav², <u>Tanasic Ljiljana</u>³, Jovanovic-Samarzija Suzana¹, Budinski-Simendic Jaroslava³ Multi-scale structuring of elastomeric nanocomposites based on different network precursor ¹<i>Faculty of Science, Kosovska Mitrovica, Serbia</i> ²<i>The Higher Educational Technical School of Professional Studies, Novi Sad, Serbia</i> ³<i>Faculty of Technology, University of Novi Sad, Novi Sad, Serbia</i></p> <p>11.15 – 11.30 h – Closing</p>

APPENDIX – 1 (Page 4/4)**PARTICIPANTS IN THE SECOND WORKSHOP**

1. **L. Beneš**, IMCASCR, Prague, Czech Republic
2. **L. Benesova**, IMCASCR, Prague, Czech Republic
3. **O. Bera**, FTUNS, Novi Sad, Serbia
4. **J. Budinski-Simendić**, FTUNS, Novi Sad, Serbia
5. **D. Calzolari**, Aristotle University, Thessaloniki, Greece
6. **K. Častkova**, DCPBUT, Brno, Czech Republic
7. **E. Csehová**, IMRSAS, Kosice, Slovakia
8. **D. Drdlik**, DCPBUT, Brno, Czech Republic
9. **J. Dusza**, IMRSAS, Kosice, Slovakia
10. **A. Duszová**, IMRSAS, Kosice, Slovakia
11. **K. Giannakopoulos**, IMSNCSR, Athens, Greece
12. **M. Green**, National Inst. Bureau & Standards, Washington DC; University of Maryland, USA
13. **A. Hurd**, Los Alamos National Laboratory, Los Alamos, USA
14. **P. Hvizdoš**, IMRSAS, Kosice, Slovakia
15. **M. Jovičić**, FTUNS, Novi Sad, Serbia
16. **M. Katsikini**, Aristotle University, Thessaloniki, Greece
17. **J. Keddie** University of Surrey, Surrey, United Kingdom
18. **D. Kechrakos**, IMSNCSR, Athens, Greece
19. **L. Kobera**, IMCASCR, Prague, Czech Republic
20. **A.G. Konstandopoulos** Centre Res. & Technol. Hellas; Aristotle University, Thessaloniki, Greece
21. **F. Lofaj**, IMRSAS, Kosice, Slovakia
22. **K. Maca**, DCPBUT, Brno, Czech Republic
23. **L. Melidis**, University of Surrey, Surrey, United Kingdom
24. **M. Milanović**, FTUNS, Novi Sad, Serbia
25. **B. Mojić**, FTUNS, Novi Sad, Serbia
26. **E. Moshopoulou**, IMSNCSR, Athens, Greece
27. **J. Pavličević**, FTUNS, Novi Sad, Serbia
28. **B. Pilić**, FTUNS, Novi Sad, Serbia
29. **O. Policianova**, IMCASCR, Prague, Czech Republic
30. **R. Poreba**, IMCASCR, Prague, Czech Republic
31. **V. Puchy**, IMRSAS, Kosice, Slovakia
32. **J. Rotrekl**, IMCASCR, Prague, Czech Republic
33. **M. Rovezzi**, Johannes Kepler University, Linz, Austria
34. **B. Simendić**, High Technical School, Novi Sad, Serbia
35. **V. Simendić**, FTUNS, Novi Sad, Serbia
36. **M. Spirková**, IMCASCR, Prague, Czech Republic
37. **V. Srdić**, FTUNS, Novi Sad, Serbia
38. **D. Stamopoulos**, IMSNCSR Athens, Athens, Greece
39. **I. Stijepović**, FTUNS, Novi Sad, Serbia
40. **Lj. Tanasić**, FTUNS, Novi Sad, Serbia
41. **P. Tatarko**, IMRSAS, Košice, Slovakia
42. **M. Trunec**, DCPBUT, Brno, Czech Republic
43. **N. Vukić**, FTUNS, Novi Sad, Serbia
44. **M. Winterer**, UDE, Duisburg, Germany

APPENDIX – 2 (Page 1/5)

FP7 RP-DEMATEN, the Third Workshop
“Processing of Nanostructured Ceramics and Nanocomposites”
March 2011, Brno, Czech Republic



PROGRAMME OF THE THIRD WORKSHOP

1.1.1

Thursday, March 3, 2011	08.30 – 16.00 h – Registration
	09.00 – 09.30 h – Opening Miroslav Doupovec , Dean of the Faculty of Mechanical Engineering <i>Brno University of Technology, Brno, Czech Republic</i> Karel Maca , Local Organizer <i>Brno University of Technology, Brno, Czech Republic</i> Vladimir V. Srdic , Project Coordinator <i>University of Novi Sad, Novi Sad, Serbia</i>
	09.15 – 10.30 h – Session 1 (Chairperson: V. Srdic) <u>Markus Winterer</u> , Invited lecture 1 Chemical Engineering of Chemical Vapor Synthesis <i>Nanoparticle Process Technology, Department of Engineering Sciences, and CeNIDE, University Duisburg-Essen, Duisburg, Germany</i> <u>Ivan Stijepovic</u> ¹ , <u>Ruzica Djenadic</u> ² , <u>Vladimir V. Srdic</u> ¹ , <u>Markus Winterer</u> ² , O1 Synthesis and sinterability of lanthanum-gallate nanopowder obtained by CVS method ¹ <i>Department of Materials Engineering, Faculty of Technology, University of Novi Sad, Novi Sad, Serbia</i> ² <i>Nanoparticle Process Technology, Department of Engineering Sciences, and CeNIDE, University Duisburg-Essen, Duisburg, Germany</i> <u>Ruzica Djenadic</u> , <u>Markus Winterer</u> , O2 Control of nanoparticle particle agglomeration in chemical vapor synthesis <i>Nanoparticle Process Technology, Department of Engineering Sciences, and CeNIDE, University Duisburg-Essen, Duisburg, Germany</i>
	10.30 – 11.00 h – Coffee Break
	11:00 – 12:30 h – Session 2 (Chairperson: M. Trunec) <u>Zhijian Shen</u> , Invited lecture 2 Producing of advanced ceramics not by sintering

	<p><i>Department of Materials and Environmental Chemistry, Arrhenius Laboratory, Stockholm University, Stockholm, Sweden</i></p> <p>Frantisek Lofaj, Milan Ferdinandy, Peter Hornak, O3 PECVD WC-C coating technology optimization <i>Institute of Materials Research, SAS, Kosice, Slovakia</i></p> <p>Klara Castkova, Jaroslav Cihlar, Eva Bartonickova, Jaroslav Cihlar, jr., O4 The effect of synthesis conditions on a morphology of doped ceria particles <i>Department of Ceramics and Polymers, Brno University of Technology, Brno, Czech Republic</i></p> <p>Eva Bartonickova, Jaroslav Cihlar, jr., Jaroslav Cihlar, O5 Synthesis and characterization of catalytic-active perovskites based on La-(Ca)-M-(Al)-O (M=Co, Cr) <i>Department of Ceramics and Polymers, Brno University of Technology, Brno, Czech Republic</i></p>
	12:30 – 13:30 h – Lunch
	13:30 – 15:00 h – Session 3 (Chairperson: J. Dusza)
	<p>Aldo R. Boccaccini, Invited lecture 3 Electrophoretic deposition: from traditional ceramics to nanotechnology <i>Institute of Biomaterials, University of Erlangen-Nuremberg, Erlangen, Germany</i></p> <p>Daniel Drdlik¹, Hynek Hadraba^{1,2}, Zdenek Chlup², Viktor Puchy³, O6 The study of alumina/CNF ceramic composites produced by electrophoretic deposition ¹<i>Department of Ceramics and Polymers, Brno University of Technology, Brno, Czech Republic</i> ²<i>Institute of Physics of Material, ASCR, Brno, Czech Republic</i> ³<i>Institute of Materials Research, SAS, Kosice, Slovakia</i></p> <p>Naoum Vaenas¹, A. G. Kontos¹, T. Stergiopoulos¹, V. Likomidos¹, N. Boukos², P. Falaras¹, O7 Self-assembled and vertically aligned titania nanotubes for dye-sensitized solar cells ¹<i>Institute of Physical Chemistry, NCSR "Demokritos", Athens, Greece</i> ²<i>Institute of Materials Science, NCSR "Demokritos", Athens, Greece</i></p> <p>Lenka Benesova¹, David Kolousek², Bojan Dimzoski¹, Martina Cubova-Urbanova¹, O8 Thermal treatment of sodium silicate free inorganic polymers based on fly-ash ¹<i>Institute of Macromolecular Chemistry ASCR, Prague, Czech Republic</i> ²<i>Institute of Chemical Technology Prague, Prague, Czech Republic</i></p>
	15:00 – 15:30 h – Coffee Break
	15:30 – 17:00 h – Session 4 (Chairperson: M. Spirkova)
	<p>Jean-Francois Gerard, Invited lecture 4, canceled Processing organic-inorganic nanohybrids: from random and block copolymers based on metal-oxo clusters to preformed nanoparticles <i>Ingénierie des Matériaux Polymeres, IMP@INSA - INSA de Lyon, France</i></p> <p>Josef Jancar, Invited lecture 5 Role of chain-nanoparticle interactions in synthetic and bio-based nanocomposites <i>Institute of Materials Chemistry, Brno University of Technology, Brno, Czech Republic</i></p>
	18:00 – 24:00 h – Social evening in the wine cellar
	09:00 – 10:30 h – Poster Session I
	10:30 – 11:00 h – Coffee Break
	11:00 – 12:30 h – Session 5 (Chairperson: K. Giannakopoulos)
Friday, March 4, 2011	<p>Stanislav Kamba, Invited lecture 6 Multiferroics and search for the permanent electric dipole moment of the electron <i>Institute of Physics, ASCR, Prague, Czech Republic</i></p> <p>Marija Milanovic¹, Konstantinos Yannakopoulos^{2,3}, Dimosthenis Stamopoulos², Eamonn Devlin², Athanassios G. Kontos⁴, Vladimir V. Srdic¹, Evangelia G. Moshopoulou², O9</p> <p>Evolution of structure and magnetism as a function of size and doping in the ZnFe₂O₄ nanoparticles ¹<i>Department of Materials Engineering, Faculty of Technology, University of Novi Sad, Novi Sad, Serbia</i> ²<i>Institute of Materials Science, NCSR "Demokritos", Athens, Greece</i> ³<i>Institute of Microelectronics, NCSR "Demokritos", Athens, Greece</i> ⁴<i>Institute of Physical Chemistry, NCSR "Demokritos", Athens, Greece</i></p> <p>Athanassios G. Kontos¹, Marija Milanovic², Konstantinos Giannakopoulos³, Dimosthenis Stamopoulos³, Eamonn Devlin³, Vladimir V. Srdic², Evangelia G. Moshopoulou³, O10 Structural characterization of sol-gel ZnFe₂O₄ annealed at variable temperatures via Raman spectroscopy</p>

	<p>¹<i>Institute of Physical Chemistry, NCSR "Demokritos", Athens, Greece</i> ²<i>Department of Materials Engineering, Faculty of Technology, University of Novi Sad, Novi Sad, Serbia</i> ³<i>Institute of Materials Science, NCSR "Demokritos", Athens, Greece</i></p> <p>Martin Kachlik¹, Karel Maca¹, Devendraprakash Gautam², O11 Preparation of bulk EuTiO₃ ¹<i>Department of Ceramics and Polymers, Brno University of Technology, Brno, Czech Republic</i> ²<i>Nanoparticle Process Technology, Department of Engineering Sciences, and CeNIDE, University Duisburg-Essen, Duisburg, Germany</i></p>
	<p>12.30 – 13.30 h – Lunch</p>
	<p>13.30 – 15.00 h – Session 2 – Session 6 (Chairperson: F. Lofaj)</p> <p>Horst Hahn, <i>Invited lecture 7</i> Some novel ideas for the control of materials <i>Institute of Nanotechnology, Karlsruhe Institute of Technology, Karlsruhe, Germany</i></p> <p>Devendraprakash Gautam, Markus Winterer, O12 Pulsed electric current sintering of silicon nanoparticles for thermoelectric applications <i>Nanoparticle Process Technology, Department of Engineering Sciences, and CeNIDE, University Duisburg-Essen, Duisburg, Germany</i></p> <p>Vaclav Pouchly¹, Zhijian Shen², Karel Maca¹, O13 Densification prediction of alumina ceramics sintered by spark plasma sintering ¹<i>Department of Ceramics and Polymers, Brno University of Technology, Brno, Czech Republic</i> ²<i>Department of Materials and Environmental Chemistry, Arrhenius Laboratory, Stockholm University, Stockholm, Sweden</i></p> <p>Jan Dusza, O14 Hardness of individual planes of Si₃N₄ crystals <i>Institute of Materials Research, SAS, Kosice, Slovakia</i></p>
	<p>15.00 – 15.30 h – Coffee Break</p>
	<p>15.30 – 17.00 h – Session 7 (Chairperson: J. Budinski-Simendic)</p> <p>Monika Kasiarova¹, Jan Dusza¹, Miroslav Hnatko², Pavol Sajgalik², O15 High temperature mechanical properties of Si₃N₄ nanocomposites ¹<i>Institute of Materials Research, SAS, Kosice, Slovakia</i> ²<i>Institute of Inorganic Chemistry, SAS, Bratislava, Slovakia</i></p> <p>Oskar Bera¹, Martin Trunec², O16 The gelation process in alumina suspensions with dissolved monomers ¹<i>Department of Materials Engineering, Faculty of Technology, University of Novi Sad, Novi Sad, Serbia</i> ²<i>Institute of Materials Science and Engineering, Brno University of Technology, Brno, Czech Republic</i></p> <p>Milena Spirkova¹, Jelena Pavlicevic¹, Rafal Poreba¹, Adam Strachota¹, Mirjana Jovicic², Jaroslava Budinski-Simendic², Oskar Bera², O17 The characterization of novel polycarbonate-based polyurethane hybrid materials ¹<i>Institute of Macromolecular Chemistry ASCR, Prague, Czech Republic</i> ²<i>Department of Materials Engineering, Faculty of Technology, University of Novi Sad, Novi Sad, Serbia</i></p> <p>Rafal Poreba, Milena Spirkova, Adam Strachota, Jelena Pavlicevic, O18 Influence of the composition on mechanical, thermomechanical and surface properties of polycarbonate-based polyurethane/clay nanocomposites <i>Institute of Macromolecular Chemistry ASCR, Prague, Czech Republic</i></p> <p>Ivan Ristic¹, Ljubisa Nikolic², Vesna Nikolic², Suzana Cacic², Radmila Radicevic¹, Ivan Krakovsky³, Jaroslava Budinski-Simendic¹, O19 Properties of polymeric nanocomposites based on epoxy resin and silicium(IV)oxide ¹<i>Department of Materials Engineering, Faculty of Technology, University of Novi Sad, Novi Sad, Serbia</i> ²<i>University of Nis, Nis, Serbia</i> ³<i>Department of Macromolecular Physics, Charles University, Prague, Czech Republic</i></p>
<p>Saturday, March 5, 2011</p>	<p>09.00 – 10.30 h – Poster Session II</p>
	<p>09.00 – 10.30 h – Project Management Board Meeting</p>
	<p>10.30 – 11.00 h – Closing</p> <p>Karel Maca, Local Organizer <i>Brno University of Technology, Brno, Czech Republic</i></p> <p>Vladimir V. Srdic, Project Coordinator <i>University of Novi Sad, Novi Sad, Serbia</i></p>

APPENDIX – 2 (Page 4/5)**PARTICIPANTS IN THE THIRD WORKSHOP****Invited Speakers:**

1. **A.R. Boccaccini**, University of Erlangen-Nuremberg, Germany
2. **H. Hahn**, Karlsruhe Institute of Technology, Germany
3. **S. Kamba**, Academy of Sciences of the Czech Republic, Czech Republic
4. **J. Jancar**, Brno University of Technology, Czech Republic
5. **P.J.Z. Shen**, Department of Physical, Stockholm University, Sweden
6. **M. Winterer**, University Duisburg-Essen, Germany

Participants:

1. **E. Bartonicková**, DCPBUT, Brno, Czech Republic
2. **L. Benesova**, IMCASCR, Prague, Czech Republic
3. **O. Bera**, FTUNS, Novi Sad, Serbia
4. **J. Budinski-Simendić**, FTUNS, Novi Sad, Serbia
5. **M. Busch**, UDE, Duisburg, Germany
6. **K. Castkova**, DCPBUT, Brno, Czech Republic
7. **J. Cihlar**, DCPBUT, Brno, Czech Republic
8. **E. Csehová**, IMRSAS, Kosice, Slovakia
9. **K. Depa**, IMCASCR, Prague, Czech Republic
10. **R. Djenadić**, UDE, Duisburg, Germany
11. **D. Drdlik**, DCPBUT, Brno, Czech Republic
12. **J. Dusza**, IMRSAS, Kosice, Slovakia
13. **A. Duszova**, IMRSAS, Kosice, Slovakia
14. **M. Ferdinandy**, IMRSAS, Kosice, Slovakia
15. **D. Gautam**, UDE, Duisburg, Germany
16. **K. Giannakopoulos**, IMSNCSR, Athens, Greece
17. **L. Hedegusova**, IMRSAS, Kosice, Slovakia
18. **P. Hornak**, IMRSAS, Kosice, Slovakia
19. **V. Jan**, DCPBUT, Brno, Czech Republic
20. **S. Jilicikova**, DCPBUT, Brno, Czech Republic
21. **M. Kachlik**, DCPBUT, Brno, Czech Republic
22. **M. Kasiarova**, IMRSAS, Košice, Slovakia
23. **L. Kobera**, IMCASCR, Prague, Czech Republic
24. **A.G. Kontos**, IMSNCSR, Athens, Greece
25. **A. Kovalcikova**, IMRSAS, Kosice, Slovakia
26. **F. Lofaj**, IMRSAS, Kosice, Slovakia
27. **K. Maca**, DCPBUT, Brno, Czech Republic
28. **M. Marinović-Cincović**, University of Belgrade, Serbia
29. **A. Matousek**, DCPBUT, Brno, Czech Republic
30. **V. Mičić**, Faculty of Technology, Zvornik, Bosnia and Herzegovina
31. **A. Mojić**, FTUNS, Novi Sad, Serbia
32. **S. Ognjanović**, FTUNS, Novi Sad, Serbia
33. **J. Pavličević**, IMCASCR, Prague, Czech Republic
34. **B. Pilić**, FTUNS, Novi Sad, Serbia
35. **S. Ponyrko**, IMCASCR, Prague, Czech Republic
36. **R. Poreba**, IMCASCR, Prague, Czech Republic
37. **V. Pouchly**, DCPBUT, Brno, Czech Republic
38. **I. Ristić**, FTUNS, Novi Sad, Serbia
39. **J. Rotrekl**, IMCASCR, Prague, Czech Republic
40. **V. Simendić**, FTUNS, Novi Sad, Serbia

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