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The VIRTUAL Centre for Integration of INNOVATIVE synthesis and Processing methods for SUSTAINABLE advanced Materials operating under Extreme Conditions-SUPERMAT

Deliverable No. D 6.8

List of publications of coordinator during the 3 years preceding the start date of the project

Dissemination level: PUBLIC

Partner responsible for the Deliverable: IMNR

Authors:

Madalina Laura POPESCU, Adrian Mihail MOTOC

Institutul National de Cercetare-Dezvoltare pentru Metale Neferoase si Rare - IMNR

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The present Deliverable is related to WP6-Dissemination and Promotional Activities.

The aim of this Work Package is to maximise the dissemination and promotion of project results and activities of the SUPERMAT project in Romania and across the EU in order to enhance the visibility of IMNR and the Consortium.

The objective of deliverable D6.8 is to present the list of most important publications of the coordinator (IMNR) during the 3 years preceding the start date of the project.

The list provided is an important key performance indicator to evaluate the success of IMNR in the proposed fields and monitor the progress toward the strategic goals of SUPERMAT at regional, national and inter-regional lelvels

1. Articles in Journals

Title	Authors / Affiliation	Journal / Volume (No). / Date / DOI / web page	Pages	Open Access (Yes / No)
1. Influence of remelting on microstructure, hardness and corrosion behaviour of AlCoCrFeNiTi high entropy alloy	Soare, V.[1], Mitrica, D.[1], Constantin, I.[1], Badilita, V.[1], Stoiciu, F.[1], Popescu, A. -M.J.[2] Carcea, I.[3] 1 - National R&D Institute for Nonferrous and Rare Metals (IMNR), 102 Biruintei Blvd., Pantelimon, Ilfov County C.P. 077145, Romania 2 - Ilie Murgulescu Institute of Physical Chemistry of the Romanian Academy, 202 Splaiul Independentei, Bucharest C.P. 060021, Romania 3 - Gheorghe Asachi Technical University of Iasi, Faculty of Materials Science and Engineering, 67A Prof. Dr. Doc. Dimitrie Mangeron Blvd., Iasi C.P. 700050, Romania	Materials Science And Technology, Vol: 31, Issue: 10, JUL 2015, DOI: 10.1179/1743284715Y.0000000029 / http://www.maneyonline.com/toc/mst/31/10	1194-1200	No
Abstract: High entropy alloys are a newly developed class of alloys, which tend to forma single solid solution or a mixture of solid solutions with simple crystal structures. These alloys possess excellent mechanical properties, thermal stability and corrosion resistance. In the present paper, an AlCoCrFeNiTi high entropy alloy was obtained by induction melting, and the influence of the remelting process on the mechanical and corrosion resistance characteristics of the alloy was investigated. Thus, optical and scanning electron microscopy revealed less phase segregation and a fine dendritic structure for the remelted alloy, while corrosion tests indicated that present alloy, in remelted state, has better corrosion resistance than as cast alloy and stainless steel. The Vickers microhardness measurements demonstrated an improvement of the alloy microhardness by remelting process due to the decrease in phase segregation and the increase in dendrite refinement level.				
2.In-situ synthesis and attachment of colloidal ZnO nanoparticles inside porous carbon structures	Adrian M. Motoc[1], Ioan A.Tudor[1], Mirela Petriceanu[1], Viorel Badilita[1], Elena Palomo del Barrio[2], Prasanta Jana[3], Vanessa Fierro[3], Alain Celzard[3], Radu R.Piticescu[1] 1 - National R&D Institute for Nonferrous and Rare Metals – IMNR, 102 Biruintei blvd., Pantelimon, Ilfov 077145, Romania 2 – CNRS-Institute of Mechanical Engineering of Bordeaux I2M, Esplanade des Arts et Mettiers, Talance, France 3 - CNRS - Institute Jean Lamour I2J, Rond-point Marguerite de Lorraine, Nancy, France	Materials Chemistry and Physics vol. 161 / July 2015 / doi:10.1016/j.matchemphys.2015.05.039 / http://www.sciencedirect.com/science/article/pii/S0254058415300997	219-227	No
Abstract: A simple hydrothermal impregnation process enabling functionalization of carbon foams by attachment of nanostructured ZnO with flower-like morphology to control the interface interactions with some sugar alcohols based phase-change materials for thermal energy storage applications was developed. The process involves decomposition of urea in hydrothermal solution, formation of Zinc Carbonate Hydroxide Hydrate (ZCHH) as major solid phase and zinc hydroxide as minor phase, attachment of zinc carbonate hydroxides and zinc hydroxides to the carbon substrate and their decomposition on the inner walls of carbon foam by thermal treatment at temperatures in the range 250-400oC producing ZnO nanoparticles. The zeta potential of complex ZCHH particles with and without dispersants adsorbed on particles' surfaces				

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was studied. The results show that, during hydrothermal synthesis process, negative charges of hydroxylated zinc species are formed on the surface of tetrahedral ZHCC crystal habit that enable interactions with positive charges from the inner surface of the carbon foams.				
3.Hydrothermal synthesis of nanostructured materials for energy harvesting applications	Radu R. Piticescu[1] , Adrian M. Motoc[1], Albert I. Tudor[1], Cristina F. Rusti[1], Roxana M. Piticescu[1], Maria D. Ramiro-Sanchez[2] 1 - National R&D Institute for Nonferrous and Rare Metals – IMNR, 102 Biruintei blvd., Pantelimon, Ilfov 077145, Romania 2 - AIDICO-Technological Institute for Construction, Novelda, Alicante, Spain	Int. Journal of Materials Chemistry and Physics / Vol. 1, No. 1 / July 2015 / http://www.aiscience.org/journal/ijmcp	31-42	YES
Abstract: Hydrothermal synthesis is one a chemical method with high potential for obtaining nanostructured materials with controlled properties for energy harvesting applications. The main advantage of the hydrothermal processes is the ability to control nucleation and growth in complex systems containing a large number of components and dopants, without affecting the structural and morphological homogeneity. This is leading to some important technological and environmental advantages such as: one step process for direct production of crystalline ceramic powders, low energy consumption, products with much higher homogeneity than classical solid state processing, versatility in producing oxides, non-oxides and hybrid materials with different morphologies, possibility to be up-scaled to pilot and production levels. These features are proved for some selected nanomaterials with high impact in energy harvesting technologies: yttria doped zirconia nanomaterials for solid oxide fuel cells, lead zirconate titantate (PZT) used as piezoelectric materials in sensors, transducers and actuators, BST perowskite structures for sensors applications and zinc oxide as nanomatrix for encapsulating phase change materials in energy storage. The development of these complex materials was based on thermodynamic approaches and modelling methods to optimize the grain size and microstructure. Based on these approaches, future developments are expected to show the scalability of the processes from laboratory to pilot and industrial scale, thus opening new directions in the energy harvesting field.				
4. Kinetic studies on the hydrothermal crystallization of Co-doped nanostructured TiO2 anatase with ferromagnetic properties	Radu R. Piticescu[1], Sorina N. Valsan[1], Mirela Petriceanu[1], Viorel Badilita[1], Ioan A. Tudor[1], Dragos Taloi[1], Bogdan Vasile[2], Oana Raita[3] 1 - National R&D Institute for Nonferrous and Rare Metals – IMNR, 102 Biruintei blvd., Pantelimon, Ilfov 077145, Romania 2 - University Politehnica Bucharest, Faculty of Applied Chemistry and Materials Science, 313 Splaiul Independentei, Bucharest, Romania 3 - National R&D Institute of Isotopes and Molecular Technologies, 65-103 Donath Str., 400293, Cluj-Napoca 5, România	JOURNAL OF OPTOELECTRONICS AND ADVANCED MATERIALS / Vol. 17, Issue: 5-6 / MAY-JUN 2015 / http://joam.inoe.ro/	646-654	No
Abstract: Nanopowders based on Co-doped TiO2 anatase (with Co content in the range 0-5 at %) with rod-like structure and homogeneous distribution of the doping agent were obtained by hydrothermal synthesis in the temperature range 200-275 degrees C in the presence of KOH as mineralizing agent. The kinetic triplet of crystallization (activation energy, reaction orders and pre-exponential factors) were calculated from DSC measurements using Avrami-Erofeev equation. For pure				

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TiO2 the best fitting reaction order was found n=1 while for 2.5 and 5 at% Co-doped TiO2 the reaction order is n=2/3. The evolution the activation energy with increasing Co content may be attributed to the increasing of defects in the crystalline lattice, as suggested by EPR results. The EPR investigations show also different ferromagnetic behaviours with increasing Co concentration.				
5. The Mechanical and Corrosion Behaviors of as-cast and re-melted AlCrCuFeMnNi Multi-Component High-Entropy Alloy	Vasile Soare[1], Dumitru Mitrica[1], Ionut Constantin[1], Gabriela Popescu[2], Ioana Csaki[2], Mihai Tarcolea[2], Ioan Carcea[3] 1 - National R&D Institute for Nonferrous and Rare Metals – IMNR, 102 Biruintei blvd., Pantelimon, Ilfov 077145, Romania 2 - Faculty of Materials Science and Engineering, Polytechnic University of Bucharest, Splaiul Independentei nr. 313, sector 6, Bucuresti, ROMANIA Postal code: RO-060042 3 - Faculty of Materials Science and Engineering, Gheorghe Asachi Technical University of Iasi, Iassy, Romania	Metallurgical and Materials Transactions A Vol. 46, Issue 4 / April 2015 / DOI 10.1007/s11661-014-2523-7 / http://www.springer.com/materials/special+types/journal/11661	1468 -1473	No
Abstract: A multi-component AlCrCuFeMnNi high-entropy alloy, prepared by vacuum induction melting, was investigated for structural, mechanical, and corrosion characteristics, before and after the re-melting process. Optical microscopy analysis revealed a dendritic solidification behavior. The interdendritic area contains two main phases and occasionally small hard phases. The re-melting process produced a finer dendritic structure, with rounded dendrites and reduced interdendritic hard phases. The SEM-EDAX analysis showed that the dendrite region contains a Widmanstatten type of structure and are composed of Cr-Fe rich phases, whereas the interdendrite region contains Cu and Mn rich phases. XRD analysis revealed two disordered BCC type A2 structures with high Cr and Fe content and an FCC A12 type of structure for the Cu and Mn rich interdendritic phase. The lattice constants, determined by X-ray diffraction, are 2.87 and 2.91 Å for the A2 phases and 3.67 Å for A1 phase. The Vickers micro hardness increased with the homogeneity of the alloy, having a maximum value of 4370 MPa for the re-melted sample. Corrosion tests carried out in 3.5 wt pct sodium chloride aerated solution indicated that the corrosion resistance improved with the re-melting process, being 1.5 to 2 times better than that of 304 stainless steel.				
6. Synthesis and performance of Zn-Ni-P thin films	Soare, V.[1]; Burada, M.[1]; Constantin, I.[1]; Ghita, M.[1]; Constantin, V[2.]; Miculescu, F.[3]; Popescu, A.M.[2] 1 - National Research and Development Institute for Nonferrous and Rare Metals-IMNR, 102 Biruintei Blvd, Pantelimon, Ilfov-077145, Romania 2 - Institute of Physical Chemistry "Ilie Murgulescu", Laboratory of Molten Salts, 202 Splaiul Independentei, Bucharest-060021, Romania 3 - University Polytehnica of Bucharest, Center of Biomaterials (BIOMAT), 313 Splaiul Independentei, Bucharest-060042, Romania	CHINESE PHYSICS B / Vol.: 24 Issue: 3, MAR 2015 DOI:10.1088/1674-1056/24/3/036101 http://iopscience.iop.org/1674-1056/	-	No
Abstract: The electroplating of Zn-Ni-P thin film alloys from a sulfate bath containing phosphoric and phosphorous acid was investigated. The bath composition and the deposition parameters were optimized through Hull cell experiments, and the				

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optimum experimental conditions were determined (pH = 2, temperature = 298-313 K, zinc sulfate concentration = 30 $g.L^{-1}$, EDTA concentration = 15 $g.L^{-1}$, and current density = 1.0-2.0 A.dm(-2)). The SEM analysis of the coating deposited from the optimum bath revealed fine-grained deposits of the alloy in the presence of EDTA. Optical microscopy analysis indicated an electrodeposited thin film with uniform thickness and good adhesion to the steel substrate. The good adherence of the coatings was also demonstrated by the scratch tests that were performed, with a maximum determined value of 25 N for the critical load. Corrosion resistance tests revealed good protection of the steel substrate by the obtained Zn-Ni-P coatings, with values up to 85.89% for samples with Ni contents higher than 76%. The surface analysis of the thin film samples before and after corrosion was performed by X-ray photoelectron spectroscopy (XPS).				
7. Hydrothermal synthesis and characterization of rod-like co-doped anatase for spintronic applications	Sorina N. Valsan[1], Ioan A. Tudor[1], Viorel Badilita[1], Bogdan Vasile[2], Oana Raita[3], Radu R. Piticescu[1] 1 - National R&D Institute for Nonferrous and Rare Metals – IMNR, 102 Biruintei blvd., Pantelimon, Ilfov 077145, Romania 2- University Politehnica Bucharest, Faculty of Applied Chemistry and Materials Science, 313 Splaiul Independentei, Bucharest, Romania 3 - National R&D Institute of Isotopes and Molecular Technologies, 65-103 Donath Str., 400293, Cluj-Napoca 5, România	OPTOELECTRONICS AND ADVANCED MATERIALS-RAPID COMMUNICATIONS / Vol. 7, Issue: 11-12 / NOV-DEC 2013 http://oam-rc.inoe.ro/index.php	1011-1014	No
Abstract: Nanopowders based on Co-doped TiO2 anatase with homogeneous distribution of doping agents were obtained by kinetic controlled hydrothermal process in the presence of KOH as mineralizing agent. The rod-like structure may be explained by the formation in the initial phase of Potassium Hydrogen Titanium Oxide Hydrate that transforms with further increasing of hydrothermal treatment time to more stable anatase. The EPR investigations show two ferromagnetic behaviors: in the low temperature range 110-160K, the evaluated Curie temperature theta value is 110K while in the high temperature range 170-230K a value of 165K is obtained. The results support the great potential for further applications in spintronics.				
8. Recent advances in synthesis, characterization of hydroxyapatite/polyurethane composites and study of their biocompatible properties	L.M. Popescu[1,2], R.M. Piticescu[2], A. Antonelli[3], C. F. Rusti[2], E. Carboni[3], C. Sfara[3], M. Magnani[3], V. Badilita[2], E. Vasile[4], R. Trusca[4], T. Buruiana[1] 1 - "Petru Poni" Institute of Macromolecular Chemistry, Iasi, Romania 2 - National R&D Institute for Nonferrous and Rare Metals – IMNR, 102 Biruintei blvd., Pantelimon, Ilfov 077145, Romania 3 - Department of Biomolecular Sciences, University of Urbino "Carlo Bo", Urbino (PU), Italy	JOURNAL OF MATERIALS SCIENCE-MATERIALS IN MEDICINE / Vol. 24, Issue: 11 / NOV 2013 / DOI: 10.1007/s10856-013-5005-3 / http://www.springer.com/materials/biomaterials/journal/10856	2491-2503	No

Title	Authors / Affiliation	Journal / Volume (No). / Date / DOI / web page	Pages	Open Access (Yes / No)
	4 -S.C.METAV C-D, Bucharest, Romania			
Abstract: The development of engineered biomaterials that mimic bone tissues is a promising research area that benefits from a growing interest. Polymers and polymer– ceramic composites are the principle materials investigated for the development of synthetic bone scaffolds thanks to their proven biocompatibility and biostability. Several polymers have been combined with calcium phosphates (mainly hydroxyapatite) to prepare nanocomposites with improved biocompatible and mechanical properties. Here, we report the hydrothermal synthesis in high pressure conditions of nanostructured composites based on hydroxyapatite and polyurethane functionalized with carboxyl and thiol groups. Cell-material interactions were investigated for potential applications of these new types of composites as coating for orthopedic implants. Physical–chemical and morphological characteristics of hydroxyapatite/polyurethane composites were evaluated for different compositions, showing their dependence on synthesis parameters (pressure, temperature). In vitro experiments, performed to verify if these composites are biocompatible cell culture substrates, showed that they are not toxic and do not affect cell viability.				
9. Corrosion Protection of Steel Using ZnNiP Electroless Coatings	Elena Ionela Neacsu[1], Virgil Constantin[1], Vasile Soare[2], Petre Osiceanu[1], Mihai V. Popa[1] , Ana Maria Popescu[1] 1 - "Ilie Murgulescu" Institute of Physical Chemistry of the Romanian Academy, 202 Splaiul Independentei, 060022,Bucharest, Romania 2 - National Institute of Research and Development for Non-Ferous and Rare-Metals, New Materials and Technologies, 102 Biruintei Blv., 077145, Pantelimon-Ilfov, Romania	Revista de Chimie (Bucharest)/ Vol 64, Issue 9 / Sep. 2013/ www.revistadechimie.ro	994-999	No
Abstract: Electroless Zn-Ni-P thin films deposited on low carbon steel from sulphate-citrate aqueous electrolyte at pH=9.5 were investigated. The microstructure of the coatings was studied by scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDX) and X-ray diffraction (XRD). The high corrosion resistance of Zn-Ni-P alloy plated steel sheet was confirmed by the electrochemical measurements in 3.5% sodium chloride solution. The surface analysis of the thin film samples before/after corrosion was performed by Xray photoelectron spectroscopy (XPS) in an attempt to understand the chemistry of the obtained thin films. The element distribution within the coatings before and after the corrosion was evaluated along with the binding energies of the elements. The incorporation of Zn in Ni-P thin film is proved for all initial samples to be as a mixture of Zn and ZnO/Zn(OH)2 . Nickel was demonstrated to exist as a mixture of oxidized states Ni2+ and Ni3+ andP exists in and organic form. A passive film of a mixture of zinc oxide and hydroxides of zinc and nickel was formed on the surface and prevented the Zn-Ni-P corrosion.				
10. Structural and tribological properties of supersonic sprayed Fe-Cu-Al-Al2O3 nanostructured cermets	E.P. Georgiou[1], S. Achanta[2], S. Dosta[3], J. Fernandez[3], P. Matteazzi[4], J. Kusinski[5], R.R.Piticescu[6], J-P. Celis[1] 1 - KU Leuven, Dept. MTM, Kasteelpark Arenberg 44, B-3001 Leuven, Belgium 2 - Falex Tribology NV, Wingepark 23B, 3110 Rotselaar, Belgium 3 - Thermal Spray Centre (CPT), Dpt. Ciencia dels Materials I Enginyeria Metalurgica, Universitat de Barcelona Marti i Franques 1, E-08028, Barcelona, Spain	APPLIED SURFACE SCIENCE / Vol. 275 / DOI: 10.1016/j.apsusc.2013.01.072 / JUN 2013 / http://www.journals.elsevier.com/applied-surface-science/	142-147	No

Title	Authors / Affiliation	Journal / Volume (No). / Date / DOI / web page	Pages	Open Access (Yes / No)
	4 - CSGI and MBN Nanomaterialia, Via Bortolan 42, Vascon di C. (TV), Italy 5 - Faculty of Metal Engineering and Industrial Computer Science, University of Mining and Metallurgy, Mickiewicza 30 Ave., 30-059 Cracow, Poland 6 - National R&D Institute for Nonferrous and Rare Metals – IMNR, 102 Biruintei blvd., Pantelimon, Ilfov 077145, Romania			
Abstract: A nanostructured cermet coating consisting of alumina dispersed in a Fe-Cu-Al matrix was deposited by supersonic spraying. The experiments revealed a strong effect of deposition parameters and chemical composition of the powders on the structural characteristics of the Fe-Cu-Al + Al2O3 sprayed cermet. This cermet is made up of complex metallurgical phases as revealed by electron microscopy and X-ray diffraction. The mechanical properties of the different phases detected were determined by nanoindentation. Finally, the friction and wear behavior of this nanostructured sprayed cermet were compared to the ones of benchmark materials. It was found that the Fe-Cu-Al + Al2O3 cermet coating exhibit better tribological properties than the benchmark materials thanks to an appropriate balance of hard and soft phases, and a nanostructuring. The wear mechanism was investigated to establish a 'structure-property' relationship for this type of nanostructured cermet coatings.				
11. High Pressure Solutions-Turning the energy levels of inorganic-organic interfaces may open new applications in life sciences and energy storage	R.R. Piticescu / National R&D Institute for Nonferrous and Rare Metals – IMNR, 102 Biruintei blvd., Pantelimon, Ilfov 077145, Romania	Science & Technology / vol. 7 / June 2013 / http://www.paneuropeannetworks.com/ST7/#108/z	108	No
Abstract: Advanced materials are one of the key enabling technologies enabling design and fabrication of a large number of systems and components. Many of them require a perfect control over the interfaces and involve activities from modeling to process development and components integration. Nano-enabled surfaces are therefore one of the most interesting value chain for multi-sectorial applications. It is important to note that high pressure chemistry solution ensure the kinetic control toward different morphologies such as nano-rods, nano-whiskers, flower-like structures, etc. An example is the control of graphite-zinc oxide adhesion energy leading to interfaces with design hydrophobicity and thermal properties for energy storage systems. Furthermore other applications may be developed using the new research infrastructure developed by the institute with help from the Structural Funds Project High PTMET.				
12. Morphology and corrosion behaviour of Zn-Ni-P thin films electrolessly deposited from chloride baths	Ana Maria Popescu[1], Virgil Constantin[1], Mircea Olteanu[1], Vasile Soare[2], Marian Burada[2], Elena Ionela Neacsu[1] 1 - "Ilie Murgulescu" Institute of Physical Chemistry, 202 Splaiul Independentei, 060021, Bucharest, Romania 2 - National Institute of Research and Development for Non-Ferous and Rare-Metals, 102 Biruintei Blv., 077145, Pantelimon, Ilfov, Romania	Revista de Chimie (Bucharest)/ Vol 64, Issue 4 / April 2013/ www.revistadechimie.ro	417-424	No
Abstract: Electroless Zn-Ni-P thin film alloys deposits on steel substrate from chloride bath ($ZnCl_2$, $NiCl_2$) containing ammonium chloride as a buffer agent and sodium citrate as a complexing agent were investigated. The effects of deposition conditions (temperature, bath composition, time) on the final deposit composition were studied. It was found that the				

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percentages of zinc and phosphorus in the obtained Zn-Ni-P alloys never reach high values. Some physical characteristics such as morphology and corrosion properties of Zn-Ni-P coatings were assessed. Corrosion tests were done in 3.5 wt.% sodium chloride aerated solution. Corrosion rate values were determined to be 0.1283-0.0297 mm·year-1 comparative to 0.2104 mm·year-1 for the uncoated steel substrate.The surface analysis of the thin film samples before / after corrosion was performed by X-ray photoelectron spectroscopy (XPS) in an attempt to understand the chemistry of the obtained thin films.				
13. Co environment and magnetic defects in anatase CoxTi1-O-x(2) nanopowders	M.N. Grecu[1], D. Macovei[1], D. Ghica[1], C. Logofatu[1], S. Valsan[2], N.G. Apostol[1], G.A. Lungu[1], R.F. Negrea[1], R.R. Piticescu[2] 1 - National Institute of Materials Physics (NIMP), Magurele-Ilfov 077125, Romania 2 - National R&D Institute for Nonferrous and Rare Metals – IMNR, 102 Biruintei blvd., Pantelimon, Ilfov 077145, Romania	APPLIED PHYSICS LETTERS / Vol. 102, Issue:16 / APR 2013 / DOI: 10.1063/1.4802819 / http://scitation.aip.org		No
Abstract: Cobalt environment and magnetic defects nature in hydrothermal synthesized anatase CoxTi1−xO2 nanopowders ($0 \le x \le 0.1$) are investigated by x-ray diffraction and a variety of spectroscopic techniques. One shows that cobalt is partially inserted in the anatase lattice, as Co2+ ions located on substitutional and interstitial sites. The fraction of the diluted Co is limited to 3 at. % for $x \ge 0.05$, while the rest of the Co atoms gather into Co3O4 clusters. As found by electron paramagnetic resonance, the Co doping brings about hole- and electron-excess defects.				
14. Synthesis and characterization of acid polyurethane-hydroxyapatite composites for biomedical applications	L.M. Popescu[1,2], C.F. Rusti[2], R.M. Piticescu[2], T. Buruiana[1], T. Valero[3], S. Kintzios[3] 1 - Romanian Academy – Institute of Macromolecular Chemistry 'Petru Poni', Iasi, Romania 2 - National R&D Institute for Nonferrous and Rare Metals – IMNR, 102 Biruintei blvd., Pantelimon, Ilfov 077145, Romania 3 - Laboratory of Plant Physiology and Morphology, Agricultural University of Athens, Greece	JOURNAL OF COMPOSITE MATERIALS / Vol. 47 Issue: 5 / MAR 2013 / DOI: 10.1177/0021998312443396 / http://jcm.sagepub.com/	603-612	No
Abstract: This article aims to optimize the synthesis parameters and to establish the appropriate value of pressure for the design of polyurethane/hydroxyapatite organic matrix composites with an enhanced thermal and chemical stability. Strong interactions between Ca^{2+} ions and COO^- groups are favoured at 60 atm. For the first time, the potential of polyurethane/hydroxyapatite material to be used as synthetic scaffold for bone cancer diagnosis was tested. The ability of polyurethane/ hydroxyapatite coatings to be used as substrates for N2a cells attachment was studied using inverted optical microscopy. N2a cells presented a high birefringence and projected small prolongations of the soma comparable to control conditions, thus indicating the healthy state of the cells seeded on the composite substrates, especially in the case of composites prepared at 60–80 atm.				

2. Publication in Conference Proceeding/Workshop

Title	Authors	Type of activity / Event	Date	Place/Venue	Type of Audience
1. Study on corrosion resistance of high - entropy alloy in medium acid liquid and chemical properties	Florea, I.; Buluc, G.; Florea, R. M.; Soare, V.; Carcea, I.	3rd International Conference on Modern Technologies in Industrial Engineering (ModTech) Book Series: IOP Conference Series-Materials Science and Engineering Volume: 95 Article Number: 012013 DOI: 10.1088/1757-899X/95/1/012013	JUN 17-20, 2015	Mamaia, ROMANIA	Scientific community
Abstract: High-entropy alloy is a new alloy which is different from traditional alloys. The high entropy alloys were started in Tsing Hua University of Taiwan since 1995 by Yeh et al. Consisting of a variety of elements, each element occupying a similar compared with other alloy elements to form a high entropy. We could define high entropy alloys as having approximately equal concentrations, made up of a group of 5 to 11 major elements. In general, the content of each element is not more than 35% by weight of the alloy. During the investigation it turned out that this alloy has a high hardness and is also corrosion proof and also strength and good thermal stability. In the experimental area, scientists used different tools, including traditional casting, mechanical alloying, sputtering, splat-quenching to obtain the high entropy alloys with different alloying elements and then to investigate the corresponding microstructures and mechanical, chemical, thermal, and electronic performances. The present study is aimed to investigate the corrosion resistance in a different medium acid and try to put in evidence the mechanical properties. Forasmuch of the wide composition range and the enormous number of alloy systems in high entropy alloys, the mechanical properties of high entropy alloys can vary significantly. In terms of hardness, the most critical factors are: hardness/strength of each composing phase in the alloy, distribution of the composing phases. The corrosion resistance of an high entropy alloy was made in acid liquid such as 10% HNO_3-3% HF, 10% H_2SO_4, 5% HCl and then was investigated, respectively with weight loss experiment. Weight loss test was carried out by put the samples into the acid solution for corrosion. The solution was maintained at a constant room temperature. The liquid formulations used for tests were 3% hydrofluoric acid with 10% nitric acid, 10% sulphuric acid, 5% hydrochloric acid. Weight loss of the samples was measured by electronic scale.					
2.Tuned Sensitivity Towards H_2S and NH_3 with Cu Doped Barium Strontium Titanate Materials	C.E. Simion, A. Sackmann, V.S.Teodorescu , C.F. Rusti, R.M. Piticescu, A. Stanoiu	Oral presentation, AIP Conference Proceedings / ELECTROCERAMICS XIV CONFERENCE, vol. 1627 p. 92-97	June 16-20, 2014	Bucharest, Romania	Scientific community
Abstract: The different amount of Cu-doped Barium Strontium Titanate (BST) thick film materials have been tested for their gas-sensing performances towards NH3 and H2S under dry and 50% relative humidity (RH) background conditions. The optimum NH3 sensitivity was attained with 0.1mol% Cu-doped BST whereas the selective detection of H2S was highlighted using 5mol% Cu-doped BST material. No cross-sensitivity effects to CO, NO2, CH4 and SO2 were observed for all tested materials operated at their optimum temperature (200 degrees C) under humid conditions (50% RH). The presence of humidity clearly enhances the gas sensitivity to NH3 and H2S detection.					

Title	Authors	Type of activity / Event	Date	Place/Venue	Type of Audience
3. Research on electromagnetic properties of high entropy alloys	Florea, R.M. Florea, O. Baltatescu, V. Soare, C. Roman, I. Carcea	Conference Proceeding in Advanced Materials Research, vol. 837 (2013), 277-282 / ModTech International Conference on Modern Technologies in Industrial Engineering (ModTech 2013)	June 27-29, 2013	Sinaia, Romania	Scientific community

Abstract: In 1995, Yeh suggested the formation of an alloy made up of at least five metallic elements which have large mixing entropy solutions with many elements forming solide alloys. This alloy appeared because traditional alloys are characteised by high fragility and are difficult to process. High entropy alloys are alloys which have approximately equal concentrations, formed by a group of 5 to 11 elements majority in composition, mole fraction of each major metallic element in the alloy is between 5% and 30%. During the research it has been proved that this alloy has a high hardness and it is also corrosion proof and also resistance and good thermal stability It should be mentioned that High Entropy Alloys are characterized as alloys consisting of roughly equal concentrations of at least five metallic elements and are claimed to favor close-packed, disordered structures due to high configurational entropy. Such crystal structures, e.g. face-centered cubic (FCC), are advantageous in that they should offer multiple active slip systems usually observed in ductile metals and alloys. This opens the door to a large number of rich chemistries which would otherwise contain unacceptable volume fractions of intermetallic compounds to be useful in structural applications That way in this paper will carry out research to one specific high entropy alloy, we analyze the physical, chemical, electrical, magnetic, corrosion resistance of these materials, heat treatments corresponding and plastic deformation. This paper is divided into several chapters which will present application domains, and also a number of conclusions. Key words : high entropy alloys, properties of alloys, application domains, corrosion proof, thermal stability.