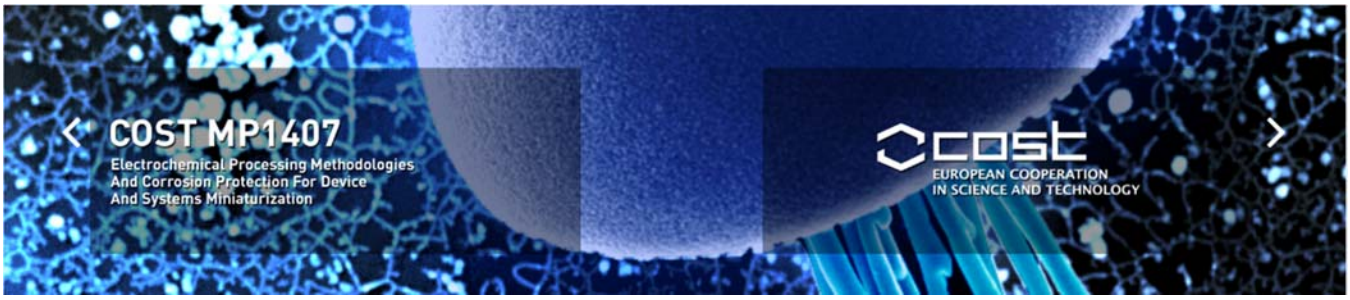


Abstracts

2nd COST Workshop, COST Action MP1407

October 12 – October 14, 2016

Athens, Greece

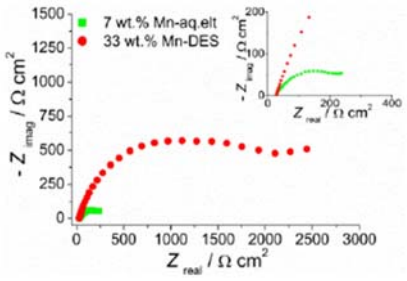
COST is supported by the EU
Framework Programme Horizon 2020

TALKS

WG 3, WG 1

M. Bučko, D. Culliton, A. J. Betts, J. B. Bajat

Corrosion stability of Zn-Mn coatings electrodeposited from a deep eutectic solvent

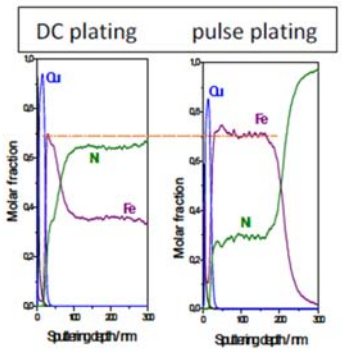


Zn-Mn coatings are electrodeposited from choline chloride-urea deep eutectic solvent (DES). Well adhered, homogenous coatings are obtained at current densities up to 8 mA cm-2. The corrosion stability of these deposits is compared with coatings deposited from a conventional water-based electrolyte. Deposition from DES enables incorporation of greater Mn amounts which, in turn affords superior corrosion resistance.

WG 1

K. Neuróhr, A. Csik, K. Vad, I. Bakonyi, L. Péter

Composition depth profile control of nanoscale electrodeposited Ni-Fe alloy films

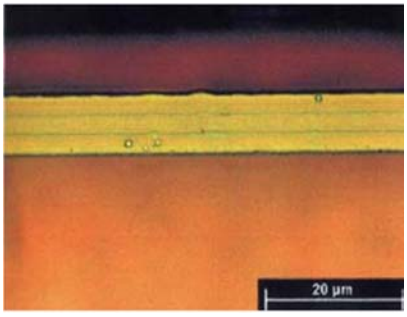


The reverse composition depth profile of electrodeposited Ni-Fe films was investigated by secondary neutral mass spectroscopy (SNMS). For DC plating, a strong composition profile was found which extended up to about 100 nm depth. With appropriate pulse-plating conditions, the composition profile remained homogeneous over the entire thickness. This helps achieving better soft magnetic properties (lower coercive force).

WG 1

M. Baumgärnter

Electrodeposition of Palladium - Iron Alloys



Pd and Fe were electrodeposited from a stable aqueous electrolyte. Tear-free layers show a laminar structure with small grains and good corrosion resistance. Complete solid solution of Pd and Fe is deposited as a fcc and bbc crystal structure depending on the composition. Deposits show promising properties in a wide range of composition including expected excellent magnetic properties.

WG 2

K. Berkesi, E. Hristoforou

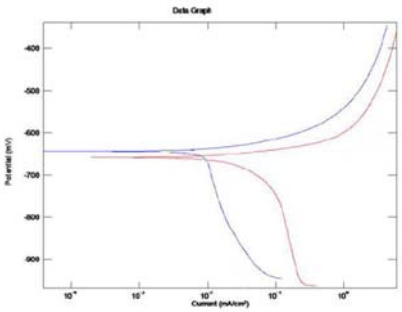
Electrochemical deposition and characterization of iron-based nanofoams

The escalating requirement of energy industry demands the development of new type micro- and nanostructured materials. Regarding the orders of magnitudes differences in efficiency metal nanofoams such as iron-based can be considered as excellent usable structure for energy storage purposes.

WG 3

B. Chagarlamudi, S Naher, D Brabazon, D. Culliton, and A. J. Betts

Assessment of the Corrosion Characteristics of Aluminium-Graphene Composites



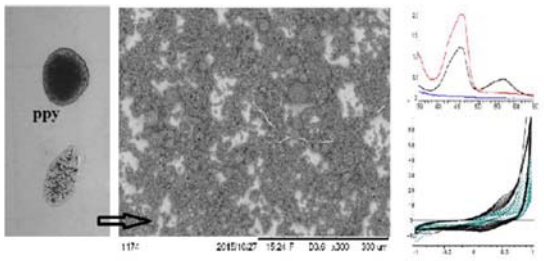
Aluminium-graphene composites were prepared over a range of compositions. These were then subjected to potentiodynamic polarisation in neutral aerated 0.1 mol dm^{-3} NaCl electrolyte. The corrosion characteristics of the composites were inferior to pure aluminium, possibly due to the influence of the graphene on both promotion of the oxygen reduction reaction and/or a microgalvanic effect.

WG 2, WG 4

R.-M. Apetrei, A. Datcu, A. Ramanavicius, and G. Cârâc

Enzymatically synthesized polypyrrole as functionalized biosurface

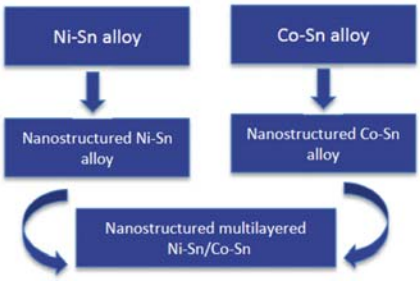
Functionalized biointerfaces between cells and electrodes, the synthesis of polypyrrole particles in situ using fungi strains has been studied by spectroelectrochemistry. The polymerisation process showed increased rate around cells and has impacted the redox mechanisms of the final product. Future perspectives include an explorative study to obtain thin films of polypyrrole coated cells deposited by Matrix Assisted Pulsed Laser Evaporation technique (MAPLE), onto solid substrates.



WG 1

E. Georgiou and J.-P. Celis

Development of nano-structured intermetallic alloy coatings



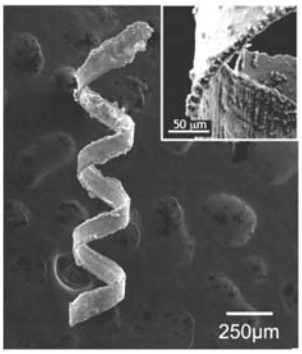
Starting from 3 metallic elements, namely Co, Ni, and Sn, different types of coatings with different compositions and/or structures can be electroplated. Such types are single elements, binary alloys, intermetallic, multilayered or gradient coatings. An overview will be given. Design tools are not yet available for selecting most promising combination of these three elements, and that problem will become even more complex for ternary alloys.

WG 4

G. Chatzipirpiridis, and S. Pané

Electroformed programmable magnetic micro devices

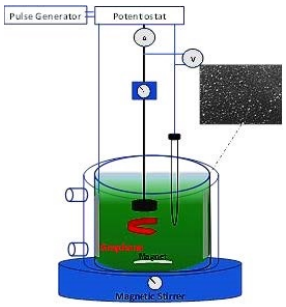
In this work we demonstrate magnetic programmable microdevices for minimal invasive drug delivery and assistance in surgical operations. Cobalt-based alloys are electroformed and characterized. Cobalt-platinum is used as hard-magnetic material with coercivities of 2 kOe and remanence of 0.2 T. The micro devices are guided with a custom magnetic manipulation setup and their behavior under applied fields is analyzed.



WG 1

N.D. Chronopoulou, D. Vozios, and E.A. Pavlatou

Electrodeposition and characterization of electroplated Ni/graphene composite coatings.



Ni/graphene coatings are produced using a Watt's type bath by applying both direct and pulsed current conditions, in presence or absence of additive in the electrolytic bath. The imposed current pulses ranging between 0.1 up to 1000 Hz, while the duty cycle is kept constant and equal to 50%.The surface morphology, the crystallographic orientations, as well as the mechanical properties are investigated.

WG 1

L. Bonin, N. Bains, V. Vitry , and A. J. Cobley

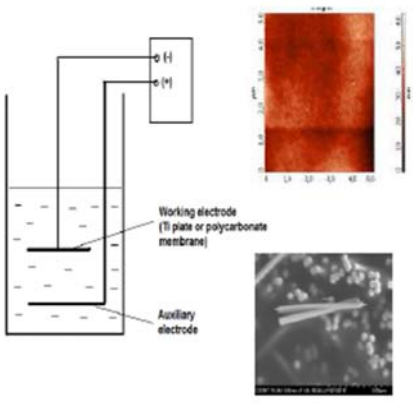
Ni-B plating and the resultant deposit characteristics

In this Short Term Scientific Mission (STSM) funded by the e-MINDS COST ACTION a researcher from the Université de Mons visited Coventry University to perform an investigation into the effect of low frequency ultrasound on the deposit characteristics of electroless Nickel-Boron (Ni-B) coatings. Three different types of electrolyte agitation were investigated (i) mechanical agitation at 300 rpm (ii) 20 kHz ultrasound and (iii) 35 kHz ultrasound. The microstructures of the resulting deposits were characterized morphologically, compositionally and mechanically.

WG

A. Cojocaru, A. Ghiulnare Pantazi, D. Balan, M. Enachescu, T. Visan, and L. Anicai

Electrochemical synthesis of various Ni-Fe alloy nanostructures



Ni-Fe alloys (6-50 wt. % Fe) are electrochemically prepared as thin metallic flexible foils and nanowires involving an optimized aqueous electrolyte. Homogeneous flexible foils of min.10 µm are electroformed using a Ti electrode both under direct and pulsed current. Ni-Fe alloy nanowires (200-400 nm diameter, 3-7 µm thickness) are electrodeposited using polycarbonate membranes as template. Morphological, structural, electrical and mechanical characterization of the obtained Ni-Fe nanostructures is discussed.

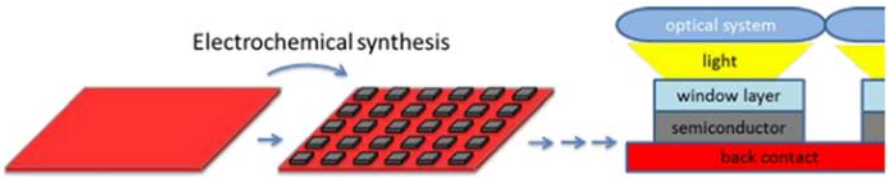
Invited Speaker

Philip Dale

S. Tombolato, P. Salomé, A. Malyeyev, D. Colombara, J. de Wild, E.V.C. Robert, S. Sadewasser, and P.J. Dale

Electrochemical synthesis of micron sized compound semiconductors for enhanced photovoltaic application

Electrodeposition allows the bottom up synthesis of arrays of arbitrary shaped micron sized semiconductors. This will enable low cost micro concentrator photovoltaic devices to be fabricated with enhanced light to electrical power conversion efficiency. Micron sized arrays of Cu(In,Ga) are electrodeposited from ionic liquid and are subsequently reacted with selenium to form Cu(In,Ga)Se2. Different templating methods will be discussed

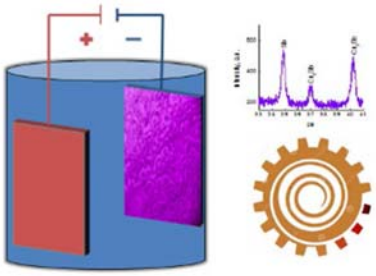


Phillip Dale is an Associate Professor in the Physics and Materials Science research unit of the University of Luxembourg. He received both his master's degree in chemistry and his PhD in colloid science from the University of Bristol. His career focuses on the growth, and characterization of thin film II-VI semiconductors for photovoltaic application using low energy methods, with particular attention to earth abundant materials. He has (co) authored over 70 publications, three book chapters, and holds three patents.

WG 1

V. Kostov, I. Krastev and Ts. Dobrovolska

Electrodeposition of Copper-Antimony Alloys

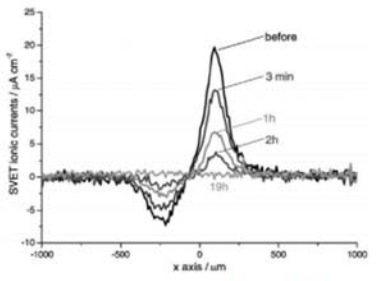


The establishments of the conditions of the electrodeposition of structured and unstressed purple-pink coatings of copper-antimony alloys, including their phase characterization are investigated.
The deposition rate, morphology and the phase composition of the obtained coatings are established. The phenomena of formation of spatio-temporal structures in this alloy are described.

WG 3

A.C. Bastos, O. V. Karavai, M. L. Zheludkevich, K. A. Yasakau, and M. G. S. Ferreira

Localized Electrochemical Measurements in the Investigation of Corrosion at Defects in Coated Aluminum Alloy



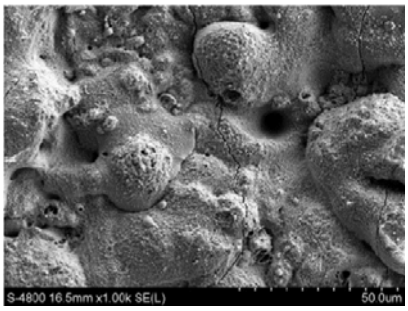
C.Bastos et al., Electroanalysis, 22 (2010) 2009.

The spatial distribution of the corrosion processes and associated species can be obtained by localized techniques. Scanning Vibrating Electrode Technique (SVET) makes possible to know the spatial evolution of cathodic and anodic processes in a corroding sample. Micropotentiometric measurements of pH and microamperometric measurements of dissolved oxygen were used as complements to SVET in the investigation of corrosion and inhibition of coated 2024-T3 aluminum alloy with artificial defects.

WG 4

R. Mann, S. Hansal, and W.E.G. Hansal

Particle enhanced plasma electrolytic oxidation (PEO) coatings

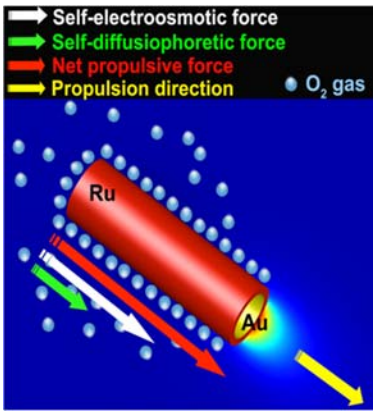


Surface modification of inert particles allows the structural modification of plasma electrolytically formed layers. While classical PEO coatings will provide excellent surface hardness and resistance against abrasion, the corrosion resistance is low due to pores and other structural defects. This problem can be overcome by the incorporation of particles in combination with high frequency pulses.

WG 1

B. Jang, B. J. Nelson, S. Pané

Fabrication of one-dimensional nanostructures, and their usages for a miniaturized robotic platform

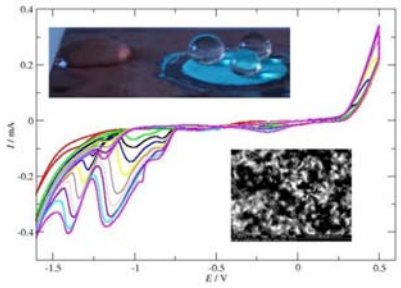


We demonstrate template-assisted electro-deposition technique to develop various one-dimensional nanostructures (nanowires). The properties of nanowires are easily tuned by changing electrodeposition parameters or with the help of additional fabrication processes, such as template bonding and layer-by-layer deposition. Specifically, the fabricated CoPt, Ni/Polymer multi-link, and Au/Ru core-shell nanowires show a unique magnetic, mechanical and chemical property, respectively. We show that these unique properties play important role in powering their motion in a liquid environment, proving an important concept for a miniaturized robotic platform.

Invited Speaker

A. Karantonis

Mechanism and properties of anodic and cathodic electrochemical fabrication of hydrophobic surfaces



Hydrophobic surfaces are fabricated by anodic and cathodic treatment of metallic electrodes. Anodic hydrophobic surfaces are developed by a single step method in appropriate methanolic and ethanolic baths containing myristic acid. The resulting layers exhibit hydrophobic properties due to their micro- and nano- structure. Cathodic hydrophobic surfaces are fabricated by a single step methodin ethanolic baths containing lanthanum, nickel or manganese salts. In order to improve hydrophobicity, pre-patterned electrodes are also treated. The anti-corrosive properties are discussed.

Antonis Karantonis is an Assistant Professor at the School of Chemical Engineering, National Technical University of Athens. He received his Chemistry degree and PhD diploma at the Department of Chemistry, Aristotle University of Thessaloniki. He has spent several years in Saitama University, Japan as a post-doc and research associate. His current research interests are non-linear electrochemical processes, electrochemical modeling, modification of electrochemical interfaces, enzyme electrode kinetics and corrosion

WG 3

W. Kautek, T. Nagy, U. Pacher, M. Weimerskirch, M. Pfaffeneder-Kmen, and G. Trettenhahn

In-situ siagnostics of protective galvanic coatings

Electrochemical in-situ techniques such as the electrochemical quartz microbalance, FTIR, scanning force microscopy, scanning electrochemical microscopy, and laser-induce de- and repassivation (Fig.) are applied at protective galvanic coatings such as plasma electrolytically oxidized aluminium and graphene**.**

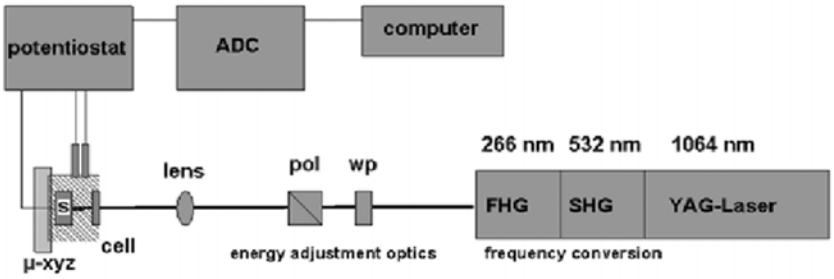


Fig. 1: Electrochemical ns-UV-laser-depassivation setup (266 nm).
s: sample. Pol: polarizer. wp: waveplate.)

WG 1

H. Kazimierczak, P. Ozga, E. Rosolymou, and E.A. Pavlatou

AAO template assisted electrodeposition of tin nanowires.

The first attempt to fabricate Sn nanowires by using template assisted electrodeposition from citrate electrolytes was conducted. In the first step, the studies of the citrate complexes formation and stability of citrate baths were carried out based on the thermodynamic models of solutions. Next, cyclic voltammetry was used to analyze the kinetics of tin reduction in aqueous citrate electrolytes. Then some trials to electrodeposit Sn nanowires by using direct and pulsed current were performed.

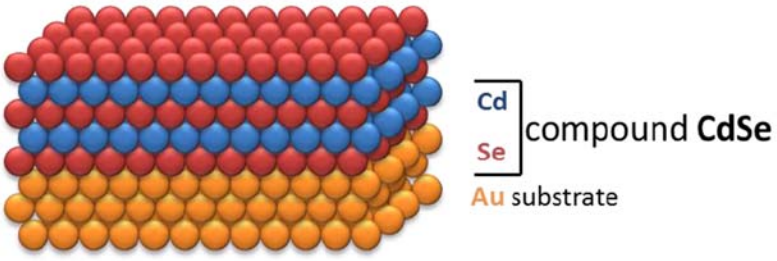
Acknowledgement:
The work results from the cooperation derived from the Short Term Scientific Mission within the framework of MP1407 COST Action.

WG 1

R. Kowalik, K. Kołczyk, D. Kutyła, and P. Żabiński

Electrodeposition of CdSe by Electrochemical Atomic Layer Deposition

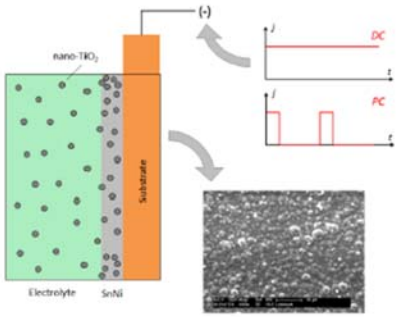
Cadmium selenide thin films were deposited on a gold substrate by the Electrochemical Atomic Layer Deposition (ECALD) method. This process was studied by classical electrochemical methods. The elemental analysis was carried out by stripping voltammetry and energy dispersive spectroscopy. The analysis of thin films obtained after different number of ECALD cycles suggests stoichiometric ratio very close to the semiconductor compound.



WG 3

M. Leimbach, U. Schmidt, and A. Bund

Electrochemical deposition of SnNi/TiO2 dispersion coatings



Tin-nickel alloy coatings with dispersed nano-scaled TiO2-particles are fabricated by electrodeposition using DC and PC plating. Properties and composition of the layers are examined. The average titanium dioxide content is 1.4 wt-%, while the ratio of tin and nickel remains almost constant. Besides the equimolar phase NiSn, other tin-nickel phases are observed in both pristine tin-nickel and dispersion coatings.

WG 3

M. Lekka, R. Offoiach, and L. Fedrizzi

Corrosion properties of Ni matrix composite electrodeposits containing either micro- or nano- aluminium particles: a localized approach

Mechanical metal components working at high temperature in aggressive atmospheres could undergo a strong reduction of the service life. A possible solution to increase the oxidation resistance is to use coatings containing oxide stabilizing elements. Composite coatings electroplating could be a valid and relatively low cost production method to codeposit either micro- or nanoparticles of Al in Ni matrix. The microstructural modifications caused by the incorporation of the particles in the metal matrix and the intermetallic phases which are formed after thermal treatments modify the mechanical and protective properties of the composite coating when compared to the pure nickel deposits.

WG 4

R. Bernasconi, F. Cuneo, G. Chatzipirpiridis, S. Pané, and L. Magagnin

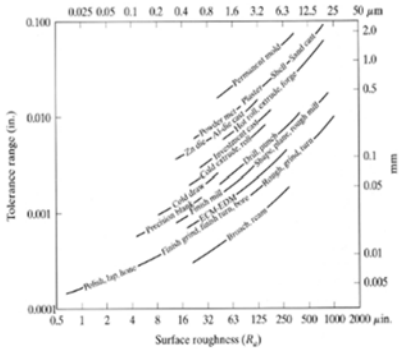
Additive manufacturing and metallization of microdevices for biological soft tissues selective abrasion

The field of microrobotics has attracted considerable attention in the last few decades due to its possible application in many sectors, including biomedicine and precision micromanipulation. The present work investigates the possibility to manufacture magnetically driven microdevices combining three different steps: stereolithography 3D printing, electroless copper metallization and electrolytic codeposition of a metal with hard particles. . (Work is outcome of an STSM.)

WG 1

Z. Pandilov

Electrochemical machining (tolerances, advantages and disadvantages)



Electro-Chemical Machining (ECM) is the generic term for a variety of electro-chemical processes. ECM is used to machine work pieces from metal and metal alloys irrespective of their hardness, strength or thermal properties, through the anodic dissolution, in aerospace, automotive, construction, medical equipment, micro-systems and power supply industries. Achievable tolerances, advantages and disadvantages of the Electro-Chemical Machining are presented.

WG 1

E.M. Dela Pena, and S. Roy

Pulse deposition of copper using additive-containing EnFACE electrolyte

Copper films are pulse-plated on stainless steel substrates from EnFACE electrolytes containing different concentrations of additives. Additives and pulsed current creates a fine-grained structure that is stronger, though less ductile and slightly resistive. The properties of the pulse-plated copper meet the industry standards. The use of pulsed current lowers the required additive by 67%.

WG 1

M. Poelman, G. Guilbert, J. Christophe, C. Buess-Herman, and M.-G. Olivier

CN-free silver plating for electrical applications

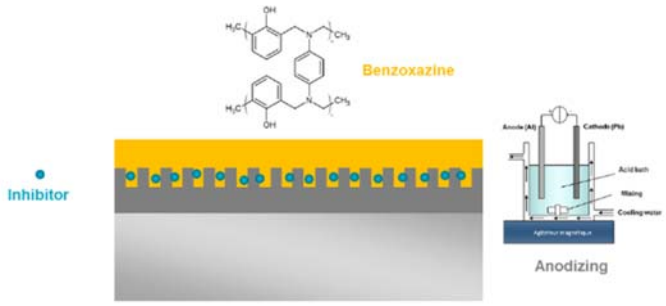
Stable and CN-free electrolytes are formulated for the deposition of silver, alloys and composites on copper (electrical applications). Optimized plating parameters allow at depositing thick non cracked silver coatings in a large range of process parameters compatible with industrial upscaling. By the way addition of alloying elements or nanoparticles is considered to improve the mechanical resistance of the coating for high voltage applications.

WG 1, WG 3

M. Poorteman, A. Renaud, C. Arrighi, and M.-G. Olivier

Optimisation of corrosion protection of aluminium substrates through benzoxazine based coatings.

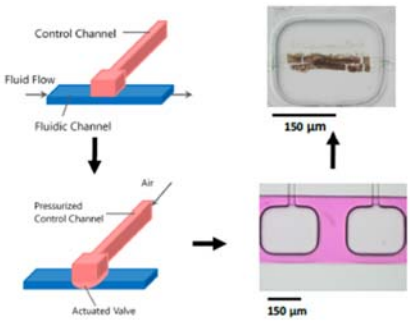
Benzoxazines are a new generation of thermoset polymers for the corrosion protection of metal substrates. Several recent papers have shown their ability in protecting such kind of substrates leading to very efficient corrosion barriers. Successful application is related to the conditioning of the substrate and anodizing appears to be a promising road. Further strategies are under development to combine the barrier properties with an active corrosion protection through incorporation of corrosion inhibitors.



WG 4

B. Ghimire, D. Amabilino, D. Maspoch, A. deMello, and J. Puigmarti-Luis

Patterning and template assisted growth of functional matter by microfluidics

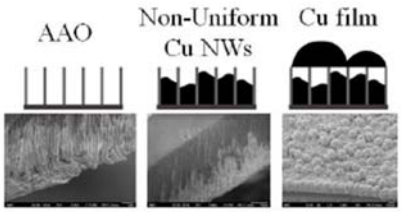


Microfluidic technologies are widely applied in biology scenarios for single cell analysis and diagnosis, i.e. for fabrication of point of care devices and micro total analysis systems (µ-TAS). Herein, we will describe how microfluidic platforms can also be used to create micrometer size patterns on surfaces, e.g. for a selective printing of a metal pattern, and how those can then template the synthesis of metal-organic functional materials.

WG 1

E. Rosolymou, S. Spanou, S. Hansal, W. Hansal, E.A.Pavlatou

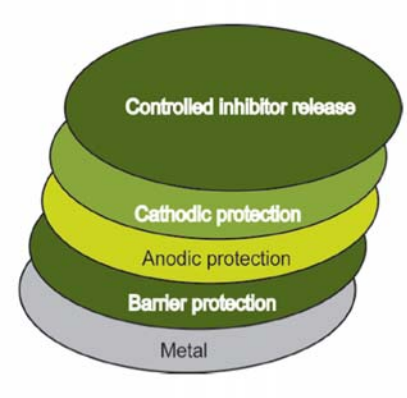
Synthesis of copper nanowires by applying template-assisted direct and pulse electrodeposition



Copper nanowires were fabricated by filling commercial AAO nanochannels by utilizing Direct and Pulse Current Electrodeposition. Uniform Cu nanowires were produced by using acidic copper baths at room temperature under specific pulse plating conditions. X-ray diffraction revealed the effect of pulse plating parameters on the crystalline structure of the Cu nanowires and Field Emission Microscopy was used to examine the pore filling of the template.

D. Sazou

Conducting polymers: Towards multifunctional smart coatings for metal protection



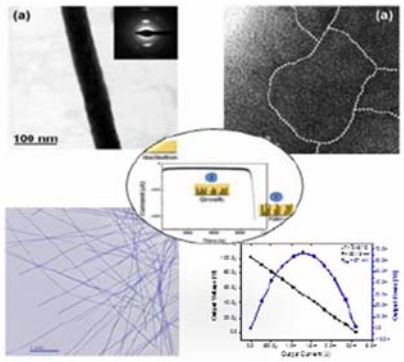
Devising environmental friendly anti-corrosive coatings with self-healing properties is an extremely desired goal for the metal protection technology. Intrinsically conducting polymers like polyaniline, polypyrrole, polythiophene, already used in a variety of applications, promise to provide the basis for the invention of such materials. Their physico-electrochemical properties can easily be optimized through doping, functionalization, nanostructuring and the combination with suitable inorganic fillers to produce conductive nanocomposite coating

Dimitra Sazou is a professor of Physical Chemistry in the Department of Chemistry at the Aristotle University of Thessaloniki (AUTH), Thessaloniki (Greece). She earned a Ph.D. in Chemistry from the AUTH. He was visiting researcher/professor at the Department of Chemistry, University of Houston (USA) and the Department of Physical Sciences, University of Cyprus. Prof. Sazou's recent research interests include the understanding of physico-electrochemical processes leading to uniform and localized corrosion of metals via the analysis of self-organization phenomena like current and potential oscillations associated with metal electrodissolution/ passivation reactions as well as the metal corrosion protection by using electrochemically deposited conducting polymers. She has authored or co-authored of many articles in international peer-reviewed journals and several books for education in science including the recently published book entitled as "Corrosion Protection of Metals by Intrinsically Conducting Polymers" (CRC Press, 2015). Prof. Sazou acts as a reviewer in numerous scientific journals and participated in many national and international scientific conferences. She is an active member of the International Society of Electrochemistry (ISE), The Electrochemical Society (ECS) and American Chemical Society (ACS).

WG 1

A. Danine, J. Schoenleber, C. Frantz, C. Boulanger, and N. Stein

Electrodeposition of Bismuth Telluride based nanowires for thermoelectric applications



Thermoelectric bismuth telluride based nanowire arrays were successfully synthesized by potentiostatic deposition in etched ion-track mesoporous membranes. Calibrated TEM-EDX analyses evidence high aspect ratio nanowires, whose composition is strongly dependent on the deposition potential. Moreover their transport properties were investigated in order to reveal in particular the importance of the chemical composition of the Bi2Te3 nanostructures for their thermoelectric applications.

K. Tschulik

Electrochemistry – a versatile tool for the production, detection and characterization of micro- and nanoscale magnetic materials

Electrochemistry is a well-established technique for the electrodeposition of thin films for corrosion protection or of 3D structures for integrated circuits. It is also key to most approaches for sustainable energy conversion and storage and it is widely utilized in sensors for the detection and quantification of ions and biomolecules. In this presentation novel concepts adopting classical electrochemical methods to fabrication and characterization of magnetic materials at the micro- and nanoscale.
The fabrication of structured electrodeposits in the milli- and micrometer range by application of magnetic gradient fields will be used to demonstrate advantages of magnetic field-controlled mass transport in electrochemistry.[1,2]
Electrochemistry will then be highlighted as a powerful tool for the characterization of magnetic nanoparticles beyond conventional imaging methods. Using magnetic Fe3O4 core protective Au shell nanoparticles as an example, the ease of quantitative assignment of the particle coating quality will be shown.[3] Advancing from this, single nanoparticle electrochemistry will be used to study magnetic field effects on single nanoparticles in suspensions. Thus, otherwise inaccessible insights into magnetic field effects on particle agglomeration and corrosion dynamics are gained

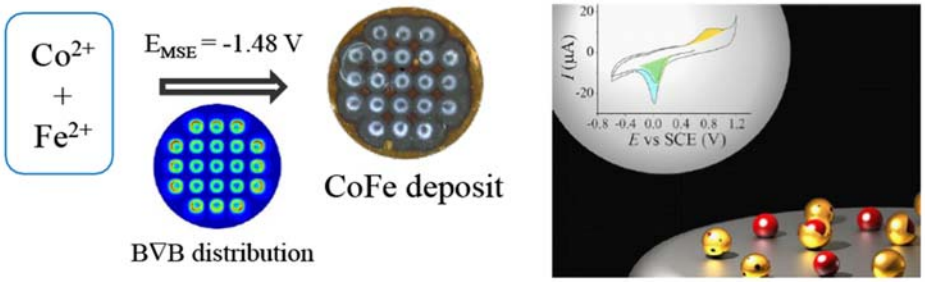


Fig. 1: Magnetic field controlled structuring of electrodeposits (left) and electrochemical characterization of magnetic core shell nanoparticles (right)

References:
[1] K. Tschulik, J. A. Koza, M. Uhlemann, A. Gebert, L. Schultz, Electrochem. Commun. 2009, 11, 2241–2244.
[2] K. Ngamchuea, K. Tschulik, R. G. Compton, Nano Res. 2015, 8, 3293–3306.
[3] K. Tschulik, K. Ngamchuea, C. Ziegler, M. G. Beier, C. Damm, A. Eychmueller, R. G. Compton, Adv. Funct. Mater. 2015, 25, 5149–5158.
[4] K. Tschulik, R. G. Compton, Phys. Chem. Chem. Phys. 2014, 16, 13909–13913.

Kristina Tschulik holds a ‘Diplom’ in Chemistry (German equivalent of a MSc degree) and received her doctoral degree from Dresden University of Technology (Germany) in April 2012. She performed her doctoral studies at the Leibniz Institute for Solid State and Materials Research Dresden (IFW Dresden, Germany). From 2012 - 2015 she joined Oxford University as a Marie Curie Intra European Fellow and post-doctoral researcher. In 2015 K.T. was granted a NRW Return Fellowship and moved to Ruhr-University Bochum (RUB, Germany) to establish an Early Career Researcher Group. At RUB K.T. holds the Junior Professorship for Micro- & Nano-Electrochemistry and her research focus is on nano-electrochemistry and magnetic field effects in electrochemistry. For her research, K.T. received the ‘Leibniz Association Young Scientists Award’ in 2013 and the ‘Young Researcher Award’ of the Division of Applied Electrochemistry from the German Chemical Society in 2012.

WG 3

Mustafa Ürgen,and Burçak Avcı

Measuring galvanic current by Zero Resistance Ammeter can be misleading when polarization of anode is low: A case study TiN--- Carbon Steel Couple

One of the tools for measuring galvanic current between two dissimilar conducting materials is zero resistance ammeter. In the method the potential difference between the two dissimilar materials is kept as zero by the help of a potentiostatic circuit and the resulting current is measured as galvanic current. In our attempt to measure the galvanic current between steel (anode) and TiN (cathode) couple, the measured galvanic current was lower than the corrosion current of the uncoupled steel in the same environment. The reason for this misleading result is explained by the low polarization of the anode upon coupling that is insufficient to carry its potential to the region where Tafelian behavior is exhibited. A method for correcting this misleading result is suggested and discussed.

WG 3

Stojana Veskovič Bukudur, Milan Bizjak, Damjan Klobčar, Janez Kovač, and Blaž Karpe

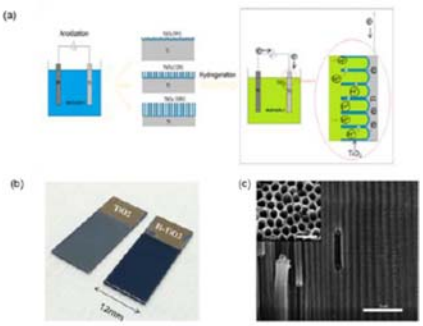
Aluminide coatings on Fe-Cr-Al alloys for high-temperature applications

FeCrAl alloys are used in a wide range of resistance and high-temperature applications such as wire heaters, furnace structure parts, etc. One of possible ways to improve high temperature oxidation resistance of FeCrAl alloy is to increase the Al concentration in the surface layer by pack aluminization process.

WG 4, WG 1

Qi Zhang, K. Du, G. Li, C. Yang, and K. Wang

Capacitance enhancement of electrochemically reduced titania nanotubes arrays

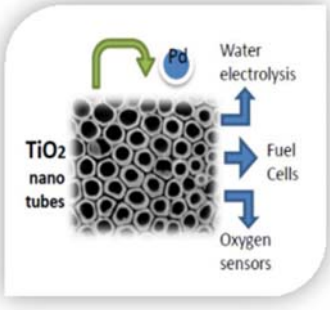


Electrochemical anodization and subsequently electrochemical reduction techniques have been used for preparing TiO_2 nanotubes as well as enhancing the oxide conductivity. In this work, we report capacitance enhancement of electrochemically reduced TiO_2 nanotube arrays as the length increases from 4 µm to 40 µm. The increased conductivity and long tube-length are beneficial parameters for supercapacatior applications.

WG 2

N.R.Elezovic, U. Č. Lačnjevac, P.Zabinski, V.R.Radmilovic, P. Ercius, and N.V. Krstajic

Pd nanoparticles on different supports for electrochemical conversion systems



Pd nanoparticles are deposited onto WC based and 3D - TiO2 oxide nanotubes supports, to obtain high surface area catalysts for electrochemical conversion systems. The synthesized materials are characterized by XRD, HRTEM, EELS, XPS and electrochemical techniques. Pd particles size of a few nm is estimated, even the clusters of Pd atoms. The catalytic activity for the oxygen reduction and hydrogen evolution are studied.

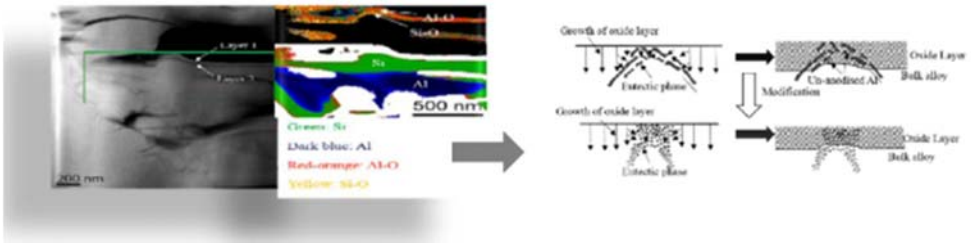
Acknowledgements: This work was financially supported by Ministry of Education, Science and Technological Development, Republic of Serbia, Contract No. 172054.
The authors would like to acknowledge networking support by the COST Action MP1407.

WG 3

B. Zhu, P. Leisner, and C. Zanella

Effect of Si content on Al alloy anodizing

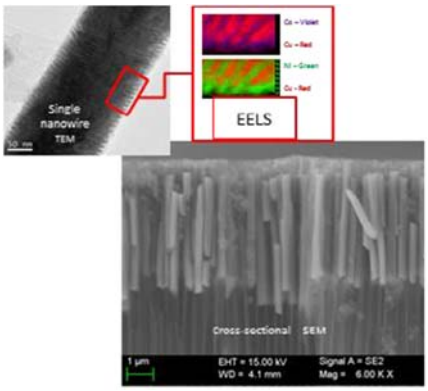
Si containing Al alloys anodizing layer growth mechanism was studied by TEM and electrochemical techniques. It was found, depending on the size and morphology of Si, that Al can be shielded by Si particles and prevented from oxidation and inducing internal stresses and cracks that influence the protection properties.



WG 1

S. Zsurzsa, I. Bakonyi, L. Péter, J. Sort, and E. Pellicer

Structural investigation of Ni-Co/Cu multilayered nanowires



Ni-Co/Cu multilayered nanowires were fabricated by template-assisted nanowire growth from an optimized aqueous electrolyte by using two-pulse plating. The magnetic (Ni-Co alloy) / non-magnetic (Cu) nanowire segmented structure was achieved during growth along the length of the nanowires. Structural characterization of the nanowires was carried out using SEM, TEM and EELS techniques. (Work is outcome of an STSM.)