EuroSciCon

DAY 1

Scientific Tracks & Abstracts

World Congress on

Materials Science & Engineering

August 23-25, 2018 Amsterdam, Netherlands

DAY 1

August 23, 2018

Sessions

Sessions: Nanostructured materials | Nanostructured Materials | Materials Chemistry | Carbon Materials In Energy | Materials Physics | Emerging Technologies In Material Science | Aerospace materials | Polymer Energy Materials

Session Chair
Roland Wiśniewski
Warsaw University of Technology, Poland

Session Co-Chair
Stoyan Sarg Sargoytchev
World Institute for Scientific Exploration, USA

Session Introduction

Title: **Electronic materials research for energy and power applications**
Tsvetanka S Zheleva, US Army Research Lab, USA

Title: **Proposed link between the periodic table and the standard model**
John O Roberts, Freelance and former Open University Tutor, UK

Title: **Material science fractal nature analysis and energy engineering frontiers**
Vojislav V Mitić, University of Niš, Serbia

Title: **Failure by cracking**
John Campbell, University of Birmingham, UK

Title: **Effect of Ni to Cu ratio on formation of oxide scale at high temperature**
Shrikant Jadhav, Bharat Forge Ltd, India

Title: **Study on reduction process of metal oxide under microwave irradiation**
Satoshi Fujii, National Institute of Technology/Tokyo Institute of Technology, Japan

Title: **Super-resolution optical microscopy for structure analysis of polymer materials**
Hiroyuki Aoki, J-PARC Center, Japan Atomic Energy Agency, Japan

Title: **Microstructural behaviour of Ti6Al4V during room temperature deformation**
Gajanan Kulkarni, Kalyani Centre for Technology and Innovation Bharat Forge Ltd, India

Title: **Synthesis and characterization of nanocrystalline CoFeMnNiAl high-entropy alloy**
M Yazdan Mehr, Delft University of Technology, The Netherlands

Title: **Improvement in wear resistance of AISI H13 steel by pack-boronizing method**
Niketan Manthani, Kalyani Centre for Technology and Innovation Bharat Forge Ltd, India

Tsvetanka S Zheleva et al., Nano Res Appl 2018, Volume: 4
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ELECTRONIC MATERIALS RESEARCH FOR ENERGY AND POWER APPLICATIONS

Tsvetanka S Zheleva and Edward C Shaffer
US Army Research Lab, USA

The demand for very high or extremely low power consumption, improved performance, and reduced cost, size, and weight, motivate the electronic materials research focus of the Energy and Power (E&P) programs at the US Army Research Laboratory (ARL). A brief overview of our programs on electronic materials will be provided. This includes growth, processing, characterization and fabrication of materials and devices, including modeling and simulation of materials characteristics and devices operation. Much of our efforts are on efficient energy conversion materials, including materials and devices for photovoltaics, thermophotovoltaics, betavoltaics, thermoelectrics, pyroelectrics and others. Examples from our programs on high power and low power electronics will be discussed in more detail. One aspect of our high power, high temperature electronics program includes research on wide bandgap materials and devices: correlation of structural, analytical and electrical characteristics of SiC MOS device structures. On the other side of the spectrum, the low power, low loss, energy efficient electronics, a new class of materials are emerging, quantum materials and the corresponding devices enabling unique electronic properties and functionalities. An example of our program on quantum materials includes PbSnTe-based topological insulators, including materials growth, processing and characterization of the topological device structures. Much of our research is performed in close collaboration with our partners from the open campus and the ARL extended capabilities. A brief summary of the various collaborative opportunities with ARL will be presented at the end.

Biography

Tsvetanka S Zheleva is the Associate Chief for the Energy and Power Division at ARL. Her expertise is in the areas of Applied Physics and Materials Science. She has published her research in over 150 publications in the areas of thin film physics, semiconductor materials and devices, interface engineering, structural analysis of device heterostructures. She holds 12 patents and her work is cited over 4000 times in peer reviewed journals and patent literature.

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PROPOSED LINK BETWEEN THE PERIODIC TABLE AND THE STANDARD MODEL

John O Roberts

Freelance and former Open University Tutor, United Kingdom

The patterns of stable quantum states in the periodic table are inverted and extended to infinity in both directions to accommodate spatial variation relative to the nucleus. The upper end leads to a cut off point for white matter. The lower end represents quantum states in plasma. At 10^{-15} m to 10^{-20} m the interaction between weak and strong gravity forces results in suitable boundary conditions for the production of elementary particles. Chemical classification of the elements requires convergence of chemical properties and quantum states. By defining group number as the maximum number of electrons in any one shell, Hydrogen and Helium are moved to the first set of $2(1)^2$ states first proposed by Janet. The atomic numbers are adjusted and mass number removed as it is an average of isotopes of each element produced in every supernova. This produces the Roberts Janet Nuclear Periodic Table which proposes two zero states, a cut off and start point, of the electric field in attractive than repulsive modes. By symmetry of these fields energy states emerge in plasma with the counter intuitive property that the nearer the nucleus the greater the number of energy states. Fusion results and the consequential recycling implies a more rapid collapse than supernovae given sufficient energy density that could create an as yet unobserved interaction at 10^{-50} m to 10^{-65} m between the strong and gravity forces. String theory and extra dimensions may be required to explain such mechanisms and multiverses.

Biography

John Owen Roberts has been an Open University Science Tutor for 30 years having attended Rutherford-Appleton Lab and CERN as a Summer School Student. He has been a freelance tutor of Maths, Physics and Chemistry for many years and wrote the book "Those Infinities and the Periodic Table" over a period of 5 years from an idea in December 2010.

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MATERIAL SCIENCE FRACTAL NATURE ANALYSIS AND ENERGY ENGINEERING FRONTIERS

Vojislav V Mitic[1,2], Goran Lazovic[3], Ljubisa Kocic[1], Vesna Paunovic[1], Hans J Fecht[4] and Branislav Vlahovic[5]

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[2]Institute of Technical Sciences of SASA, Serbia
[3]University of Belgrade, Faculty of Mechanical Engineering, Serbia
[4]University of Ulm, Germany
[5]North Carolina Central University, USA

In science and technology, means and tools are always adjusted to the problem. The orderly packed atomic structures suits Euclidian geometry, up to the nano sizes, but it is not suitable for rather characterized particles flows and irregular structures. In order to analyse these structures, our previous research open fractal approach new frontiers. The notable trend is that a wide range of disordered systems, e.g., linear and branched polymers, biopolymers, epoxy resins and percolation clusters can be characterized by the fractal nature over a microscopic correlation length. It is favourable to the fact that energy transformations are permitted on a small scale. The modern material science faces with very important priorities of the new perspectives which open new directions within deeper structure knowledge even down to nano and due to lack of energy, towards new and alternative energy sources. Through our up today research, we recognize that BaTiO3 and other ceramics, as well as synthetized diamonds, have fractal configuration nature based on three different phenomena: first, ceramic grains have fractal shape seeing as a contour in cross section or as a surface, second, there are so called "negative space", pores and inter-granular space plays an important role in micro-capacity, microelectronics, PTCR, and other phenomena, third, there is Brownian fractal motions process inside the material during and after sintering in the form of micro-particles flow (ions, atoms and electrons). The stress in this note is set on inter-granular supermicro-capacity in function of higher energy harvesting and energy storage. An attention is paid to components affecting overall impedances distribution, too. Fractal theory allows recognizing micro-capacitors with fractal electrodes. The method is based on iterative process of interpolation which is compatible with the model of grains itself. Inter-granular permeability is taken as a function of temperature as fundamental thermodynamic parameter. All our research and scientific approach is completed and fulfilled in the area of the microstructure Minkowski hull analysis, micro scales fractal relativization (mega-mezo-micro-nano), fractal curvatures tensor product, thermodynamic parameters (temperature, Gibbs energy and entropy), ferroelectric properties (Curie-Weiss law and Clausius-Mossotti equation), on the way to the new lights in future fractal microelectronics.

Biography

Mitic obtained his B.Sc. degree 1982 in Material science at the University of Nis; M.Sc. degree 1990 in Material science at the University of Belgrade and Ph.D. in Material science at the University of Nis. In 1995 he got position of research scientist at the Institute of Technical Sciences of the Serbian Academy of Sciences and Arts; 1999 Mitic was promoted to senior (higher) scientific associate at the Institute of Technical Sciences of the Serbian Academy of Sciences and Arts – elected into the Center for Multidisciplinary Studies, University of Belgrade - main research field: Electronic Ceramic Materials.

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FAILURE BY CRACKING

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Entrainment defects from the casting process are inherited by the solidified metal, leading to defects which are the source of the universal crack initiators, the Griffith cracks in metals. Examination of existing and accepted crack initiating mechanisms finds them all wanting; none currently appear to explain crack formation and propagation. It follows that the inherited casting defects may be the only source of failure. The elimination of these defects, which appears to be possible, should therefore lead to the elimination of cracking in metals. Evidence is accruing to indicate the truth of this prediction. The consequent elimination of the common failure processes such as fatigue, creep, stress corrosion cracking, etc. all appear possible. For aerospace, an enhanced electroslag (ESR) process for steels and Ni alloys is recommended but vacuum arc remelting (VAR) is not, it appears to be fundamentally flawed and unsuitable for safety critical applications.

Biography

John Campbell is a Physicist from Cambridge, Sheffield and Birmingham Universities. His interest is in the Liquid and Solid States during Metal Manufacture. He has worked in industry, developing casting processes, building and running casting operations for much of his life. As a Prof of Casting Technology at the University of Birmingham, he is responsible for the bifilm concept, and the development of the naturally pressurised filling system design for castings. He is the author of too many papers and patents and several books: his 'Complete Casting Handbook' is not for the faint-hearted. He is an indefatigable promoter for the manufacture of defect-free cast products.

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EFFECT OF NI TO CU RATIO ON FORMATION OF OXIDE SCALE AT HIGH TEMPERATURE

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Metals, which are especially used in the hot forging applications, are stable, when exposed to the atmosphere, at high and low temperatures. Metals such as iron, rusts and get oxidized very rapidly, while the other metals such as nickel, chromium corrode relatively slowly. Therefore it is important to study oxidation process along with film thickness of the oxide layer. The role of various alloying elements and its oxides during oxidation process need to be understood. Copper strongly influences the microstructure of micro alloyed steel since segregation of Cu occurs in steel during oxidation. Samples containing various Ni/Cu ratios are studied in scanning electron microscopy (SEM) and X-ray diffraction (XRD). Four samples of ratio of 1.8, 2.0, 2.5 and 5.0 with dimension size 25 mm X 25 mm are studied. The sample which has ratio of 1.8 gives better results since it shows minimal severity in cracking and optimum thickness is achieved.

Biography

Shrikant Jadhav has qualified Masters' of Engineering from IIT Bombay with experience in the industry across, Metallurgy, Quality Assurance, Mechanical Functions, Production Line, Operations, Safety and currently spearheading as metallurgical researcher with Bharat Forge Limited, Pune. He has expertise in Material Science and Manufacturing Process. Currently spread heading his knowledge in Research and development department in Bharat forges Ltd which is world's number one forging industry. He is well versed in conceptualizing and implementing new product development failure analysis and materials projects. He is responsible for design and develops the mechanical and thermal forging process to modify steel, aluminum and their alloy. Conduct chemical and physical analytical research on steel, aluminum and its alloys.

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Satoshi Fujii et al., Nano Res Appl 2018, Volume: 4
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STUDY ON REDUCTION PROCESS OF METAL OXIDE UNDER MICROWAVE IRRADIATION

Satoshi Fujii[1], Shuntaro Tsubaki[2], Eiichi Suzuki[2] and Yuji Wada[2]
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[2]Tokyo Institute of Technology, Japan

Chemical reactions carried out under microwave irradiation often have high reaction rates and high selectivities, which enable compact reactor sizes and energy-conservation processes. Thus, microwave chemical processing and chemical synthesis have attracted considerable interest, as they will be employed for greatly improving process efficiencies and conserving energy for realizing Green Chemistry or Green Engineering. We have applied this technology to reduction process of several metal oxides, such as magnesium oxide, scandium oxide, copper oxide, and magnetite. It was found that those reduction processes has been done with low temperature under microwave irradiation in comparison with conventional heat process. Sometimes, oxide does not absorb microwave energy well and does not generate heat well. So, when electrical conductivity material used as a reducing agent was mixed with metal oxide and made into an antenna structure, it became easier to absorb the microwave energy and reduce the temperature. In smelting of magnesium, we have successfully obtained small amount of magnesium metal using a microwave irradiation with high yield of 71%, and also showed quarter of energy consumption in comparison with conventional process, which is called Pidgeon process.

Biography

Satoshi Fujii was born in Osaka, Japan, in 1962. He received his BS and MS degrees in Material Science from Tsukuba University, Ibaragi, Japan, in 1985 and 1987, respectively. He received his PhD degree in Material Engineering from Kyoto Institute of Technology in 2007. In 1987, he joined Sumitomo Electric Industries and engaged in research on GaAs ICs in Opto-electronics Laboratories. Since 1992, he has been with Itami Research Laboratories, engaged in research on diamond SAW devices. In 2004, he moved to the Advanced Technology Development Center, Seiko-Epson Corp., in order to study diamond SAW devices and related modules. In 2009, he moved to Chiba University in order to encourage PhD students to become leaders in industry, and to continue his studies on diamond SAW devices and microwave chemistry with Prof. Wada. In 2015, he joined the faculty of the National Institute of Technology, Okinawa as a Professor.

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Hiroyuki Aoki, Nano Res Appl 2018, Volume: 4
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SUPER-RESOLUTION OPTICAL MICROSCOPY FOR STRUCTURE ANALYSIS OF POLYMER MATERIALS

Hiroyuki Aoki
J-PARC Center, Japan

A polymer material shows unique physical properties such as viscoelasticity. The origin of the various characteristic properties of polymers is the large degree of freedom of individual molecule, which has a long chain-like shape with large molecular weight. Therefore, the direct information of the conformation and dynamics of a single polymer chain is a key to understand the fundamental aspect of polymer physics. The most powerful method to observe single polymer chains is the fluorescence imaging of the dye-labelled polymer chain dispersed in the unlabelled polymer matrix. However, the information from the fluorescence microscopy has been limited because the structure smaller than 200 nm cannot be observed by optical microscopy because of the diffraction limit of light. Recent development of optical microscopy enabled the fluorescence imaging with the high spatial resolution of ~10 nm beyond the diffraction barrier. We employed the super-resolution fluorescence microscopy to study the structure and dynamics of polymer materials at the single chain level. The current talk deals with the principle of the super-resolution microscopy for polymers and its application to investigate the conformational dynamics of single polymer chain in macroscopic deformation processes.

Biography

Hiroyuki Aoki is a Senior Scientist in Materials and Life Science Division, J-PARC Center, Japan Atomic Energy Agency. He obtained his degrees of BE, ME, and PhD from Kyoto University in 1996, 1998, and 2001, respectively. He became an Assistant Professor of Department of Polymer Chemistry, Kyoto University in 2001 and promoted to an Associate Professor in 2006. In 2016, he moved to J-PARC as a Senior Scientist. His research interests are focused on structure and dynamics of polymer materials at the single molecule scale. He was awarded Inoue Research Award for Young Scientist from Inoue Foundation for Science (2002), Young Scientist Lectureship Award (2008), SPSJ Award for the outstanding paper in *Polymer Journal* (2008), and SPSJ Science Award from Society of Polymer Chemistry, Japan (2016).

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MICROSTRUCTURAL BEHAVIOUR OF TI6AL4V DURING ROOM TEMPERATURE DEFORMATION

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[2]Degfence Institute of Advanced Technology, India

This study investigates the effect of room temperature deformation on the microstructural behavior of Ti6Al4V alloy. To study this, room temperature uniaxial compression test was carried out at low strain rate of 0.01 s^{-1} with increase in 5% stepwise degree of deformation up to fracture. At each stage of the deformation, stress strain curve was correlated with change in microstructure and grain orientation. Microstructural evolution and grain orientations are mapped at each stage of deformation with the help of electron back scattered diffraction (EBSD) and optical microscopy. Fracture of material occurs within 30% of deformation and exhibit grain refinement. Flow stress increases with increase in deformation and indexed in terms of increase in strain hardening exponent and hardness. EBSD mapping and microstructural analysis confirms Alpha phase fragmentation and grain size reduction. Deformed sample exhibit basal texture with increasing deformation.

Biography

Gajanan Kulkarni has qualified Masters' of Engineering from Defense institute of advance technology (DIAT), Pune with experience in the industry across, metallurgy, quality assurance, mechanical functions, production line, operations, safety and currently spearheading as Metallurgical Researcher with Bharat Forge Limited, Pune. He has his expertise in Material Science and Manufacturing Process. Currently spreads heading his knowledge in Research and development department in Bharat forge Ltd which is world's number one forging industry. He is well versed in conceptualizing and implementing new product design and development, analysis and materials projects. He is responsible for designing and developing the mechanical and thermal forging process to modify steel, titanium, aluminum and their alloy. Conduct chemical and physical analytical research on steel, titanium, aluminum and their alloy.

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SYNTHESIS AND CHARACTERIZATION OF NANOCRYSTALLINE COFEMNNIAL HIGH-ENTROPY ALLOY

M Yazdan Mehr[2], M Sajjadi[1] and A Bahrami[1]
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[2]Delft University of Technology, Netherlands

This paper aims at synthesizing and characterization of nanocrystalline CoFeMnNiAl high-entropy alloy (HEA), using mechanical alloying (MA) and spark plasma sintering (SPS). Effects of mechanical alloying time on the morphology of powders, crystallite size and lattice strain of the synthesized powders were investigated, using X-ray diffraction (XRD) and scanning electron microscope (SEM). Synthesized powders were then consolidated by means of spark plasma sintering (SPS). Effects of sintering temperature on the mechanical properties of CoFeMnNiAl alloy were studied as well. Results show that single phase high entropy alloy; with FCC structure is formed after 30 h of milling. Further increase in milling time is associated with the appearance of BCC phase. As well, results show that SPS temperature has significant influence on the phase composition and mechanical properties of the synthesized alloy.

Biography

Maryam Yazdan Mehr did her PhD at Delft University of Technology from 2011 to till 2015, associated with Professor Zhang and Professor van Driel in the ECTM group at TUDelft. During her PhD, she worked on Organic Materials Degradation in Solid State Applications. During this project, the reliability and degradation of LEDs was for the first time studied from both materials and system perspective. One of the greatest achievements in this project was developing a high accelerated ageing test methodology. The set-up and the concept are now being used by Philips Lighting. So far, she has published almost 16 journal papers, more than 10 conference papers, and a book chapter. After her PhD, she applied for an HTSM grant as a Post-doc and it was granted in 2016. In June 2017, she started her Post- doc project entitled Reliability of Optical Materials in LED-based Products under Harsh Environments in the group of Professor Zhang at TU Delft.

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IMPROVEMENT IN WEAR RESISTANCE OF AISI H13 STEEL BY PACK-BORONIZING METHOD

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Kalyani Centre for Technology and Innovation Bharat Forge Ltd, India

Boronizing has been employed to increase the service life of parts such as orifices, ingot molds and dies for hot forming made of AISI H13steel. In this study, pack boronizing of AISI H13 Steel was done. Samples were boronized at 950OC for 0.5 hr, 1 hr and 4 hr. In all the specimens both the iron boride layers (FeB, Fe2B) were formed. It was seen that as soaking time increases, thickness of boride depth also increases. Continuous decrease in the hardness from surface to unboronized layer was observed. Boronized specimen at 950^{o}C for 4 hr showed better hardness and so was studied for further investigation. This study was compared with Nitrocarburized cycle at 550^{o}C for 12 hr. High wear resistance was observed in the boronized specimen than in nitrocarburized sample. COF was ranging from 0.40 to 0.70.

Biography

Niketan Manthani, has done his Post-graduation in Metallurgy from IIT Bombay with experience in the industry across, Metallurgy, Quality Assurance, Mechanical Functions, Production Line, Operations and Safety. His research interests include surface treatment process, failure analysis, new product development and currently spearheading as Metallurgical Researcher with Bharat Forge Limited, Pune. Bharat Forge Limited is metallurgical driven company which has expertise in material science and manufacturing process. Bharat forge is into many fields, and at present it is moving into non-automotive sector too. We are exploring our research into numerous fields ranging from Nanotechnology to Megastructures. Bharat Forge is rightly called the biggest forging company in world.

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DAY 2

Scientific Tracks & Abstracts

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DAY 2

August 24, 2018

Sessions

Material Science and Engineering | Advanced Engineering Materials | Nanostructured Materials | Composite Materials | Carbon Materials In Energy | Materials Physics

Session Chair
Genda Chen
Missouri University of Science and Technology, USA

Session Co-Chair
V A Levchenko
Lomonosov Moscow State University, Russia

Session Introduction

Title: **Functional materials: Development of nanostructured ceramic-metal xylan of a coating with the operated wetting**

V A Levchenko, Lomonosov Moscow State University, Russia

Title: **Specific features of electrons in nanostructured materials according to twin physics**

Anna C M Backerra, Independent Physicist, Netherlands

Title: **The effect of Mo addition on structure and glass forming ability of Ni-Zr alloys**

Zean Tian, Hunan University, China

Title: **The effect of silver nanoparticles on the antioxidant capacity and total soluble protein pattern in tomato seedlings under in vitro culture**

Roya Razavizadeh, Payame Noor University, Iran

Title: **Methylene blue sorption on CS/nano-γ alumina as a novel and environmentally friendly adsorbent**

Abbas Teimouri, Payame Noor University, Iran

Title: **Deformation behaviour of functionally graded shape memory alloys**

Bashir S. Shariat, The University of Western Australia, Australia

V A Levchenko et al., Nano Res Appl 2018, Volume: 4
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FUNCTIONAL MATERIALS: DEVELOPMENT OF NANOSTRUCTURED CERAMIC-METAL XYLAN OF A COATING WITH THE OPERATED WETTING

V A Levchenko, N V Novoselova and V N Matveenko
Lomonosov Moscow State University, Russia

On the basis of earlier developed nanotechnology of receiving functional coatings in the open atmosphere, synthesis of ceramic-metal xylan coatings with the operated wetting is carried out. The new type of the functional materials has no analogues in triboengineering. We have made a number of theoretical and experimental studies directed to optimal synthesis parameters finding, coatings structure and tribological characteristics analysing and establishing correlation between the mentioned factors (the triad "synthesis parameters- structure-performances"). The findings suggest that the carbon coatings with orientating effect on boundary layers are advantageous for improving antifriction characteristics and for governing processes of boundary lubrication. New type functional materials can be recommended for the application on the countertops of the responsible steel elements of friction pairs lubricated with mineral or synthetic oils.

Biography

Vladimir Levchenko completed his Doctorate in Physics at the Lomonosov Moscow State University in 1988 and Doctoral studies at Lomonosov Moscow State University in 1999. He is the Director of Nanotribology centre LMSU – BIES RAS (Lomonosov Moscow State University – Blagonravov Institute of Engineering Science, Russian Academy of Sciences). CEO Skolkovo. He is Member of 8 international scientific societies. He has published 3 monographs and more than 220 papers in reputed journals and serving as an Editorial Board Member of repute. He is awarded by the international 4 Grand Prix and more than 40 gold medals for achievements in a science.

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SPECIFIC FEATURES OF ELECTRONS IN NANOSTRUCTURED MATERIALS ACCORDING TO TWIN PHYSICS

Anna C M Backerra

Theoretical physicist, Netherlands

A formalism is developed, based on the concept that determinate and indeterminate aspects of phenomena are mutually independent, and that they occur joined in nature in such a manner that one of both dominates an observation. This so-called complementary language represents a dualistic way of considering the universe and creates a bridge between large- and small-scale phenomena. The quantization of Planck and the uncertainty relations of Heisenberg are incorporated from scratch. The basic item in the theory is the Heisenberg-unit (H-unit), defined as a constant amount of potential energy. By interaction with another Heisenberg unit, potential energy can be transformed into physical items. In this way, a series of elementary particles as well as neutron decay, the difference between gravity and electricity, and gravitational waves can be described. In this lecture we concentrate on four distinct descriptions of electrons, depending on rest mass and spin. Two of them are characteristic for nanostructured material, providing it with features being unknown in classical physics.

Biography

Anna Backerra (1953) finished in 1977 cum laude her studies as a physical engineer at the Technical University Eindhoven (Netherlands). During a few years she worked at Philips Research Laboratories. In 1980 she started independently a theoretical research, at first in addition to a job as a teacher, later in combination with a household. The aim was to describe physics in a complementary way, as suggested by the Heisenberg uncertainty relations. The main problem turned out to be the lack of imagination of indeterminacy, preventing the design of an adequate mathematical description. During a few years she considered everyday life ideas about complementarity, which emerged into a practical concept.

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THE EFFECT OF MO ADDITION ON STRUCTURE AND GLASS FORMING ABILITY OF NI-ZR ALLOYS

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[3]University of Michigan, USA

Understanding the structure and glass forming ability (GFA) of metals is crucial to establishing metallic glass theory and producing advance materials with excellent properties. The classical molecular dynamics simulation was conducted to investigate the effect of Mo atom addition upon atomic structure and glass-forming ability (GFA) of Ni64Zr36-xMox (x=0, 6, 12, 18, 21, 24, 27) metallic glasses (MGs), in terms of the system energy, radial distribution functions, and the largest standard cluster analysis. It is found that the Mo atoms do not simply replace Zr atoms, but change the chemical order, resulting in more stable and compact structures that are much complex indicated by the split of the first major peak on pair distribution function curves. Further analysis reveals that the addition of Mo atoms does not favour the formation of icosahedrons but enhances that of topologically close-packed (TCP) structures that are not only fully responsible for the shape evolution of the first major peak on the PDF curves, but also positive correlation with the glass forming ability (GFA) predicted by formation enthalpy. Thus TCP structures are the essential characteristic of MGs and the higher the forming ability of TCP structures, the better the GFA of Ni64Zr36-xMox alloys. These findings shed a new light on the understanding of microstructure and the structure-GFA relationship of MGs.

Biography

Zean Tian has completed his PhD at 2009 from Hunan University and Postdoctoral studies from the University of New South Wales. He has published more than 80 papers in reputed journals.

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Roya Razavizadeh, Nano Res Appl 2018, Volume: 4
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THE EFFECT OF SILVER NANOPARTICLES ON THE ANTIOXIDANT CAPACITY AND TOTAL SOLUBLE PROTEIN PATTERN IN TOMATO SEEDLINGS UNDER IN VITRO CULTURE

Roya Razavizadeh
Payame Noor University, Iran

Today, synthetic nanoparticles encompass a wide range of particles with unique properties and have many applications in the field of nanotechnology. Due to the emergence and lack of understanding of the consequences of using nanoparticles, investigating the effect of releasing these particles in the environment at various biological levels is important. In this study, the effects of nanoparticles of silver in concentrations of 0, 2.5, 5, 10, 20, 40, 80 and 100 ppm on physiological parameters such as total anthocyanin, total soluble protein and enzyme activities of catalase, ascorbate peroxidase and superoxide dismutase in tomato seedlings (*Solanum Lycopersicon*) under in vitro were evaluated. The results showed that in different concentrations of silver nanoparticles, the amount of anthocyanin, total solution protein and relative expression of some protein bands in root and shoot changed in different ways. The response of the plant was also detected with changes in the activities of antioxidant enzymes of root and stem.

Biography

Roya Razavizadeh is an professor in the Department of Biology in Payame Noor University.

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METHYLENE BLUE SORPTION ON CS/NANO-γ ALUMINA AS A NOVEL AND ENVIRONMENTALLY FRIENDLY ADSORBENT

Abbas Teimouri[1] and Leila Ghorbanian[2]
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Nowadays, the presence of hazardous dyes in the effluent of industries has been the most important environmental dange. The existence of dyes in water is noxious for both human and environment owing to having serious adverse health problem. Lately, several methods have been used for removal of toxic dyes from effluents of industries including flocculation, photocatalytic degradation, adsorption, membrane filtration and reverse osmosis, and etc. Among these, adsorption is one of the strategies that is vastly utilized because it has some advantages for example ease of operation, low cost, and good removal efficiency. Chitosan is a plentiful biopolymer has been announced to be extensively used in water purification. Alumina based adsorbent has some profits such as stability, high surface area, possible reuse, short adsorption contact time, and high mechanical characteristics. In the present study, CS/Nano-γ alumina was synthesized and characterized by Fourier transformation Infrared spectroscopy (FTIR), Field emission scanning electron microscopy (FESEM), X-ray diffraction (XRD) and Brunauer–Emmett–Teller (BET analysis). The influence of four parameters such as pH, initial dye concentration, contact time and adsorbent dosage were studied.

Biography

I am a graduate student at IUT University working under the direction of Professor Dabbagh in Sep 2006. Currently he is working as professor of organic in Payame Noor University. As my curriculum vitae shows, I have had excellent opportunities to teaching and experience combined with my course work and research background in synthesis, catalyst, biomaterials and theoretical studies.

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DEFORMATION BEHAVIOUR OF FUNCTIONALLY GRADED SHAPE MEMORY ALLOYS

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Functionally graded shape memory alloys have the advantage of joining the properties of shape memory materials and those of functionally graded structures. By proper material and structural design, they can exhibit new and complex thermo mechanical behaviour that are different from uniform shape memory alloys. One of their advantages is their expanded transformation stress and temperature windows which provide improved controllability in actuating application. This study reports on the general concept, fabrication, experimentation and modelling of several designs of functionally graded NiTi alloys, including compositionally graded, micro structurally graded and geometrically graded NiTi structures, and the various techniques that may be used to create them.

Biography

Bashir S. Shariat completed his PhD in 2013 at the University of Western Australia. He started a postdoctoral fellowship at the same university in 2015. He has published more than 20 papers in reputed journals in the field of mechanics and material science. His work on mechanics of functionally graded structures has been recognized internationally. He proposed the concept of functionally graded shape memory alloys, which can be used for different engineering applications including medical devices. He has presented his research outcome in many international conferences.

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