

National Scientific Conference
NOVEL TRENDS
OF POLISH SCIENCE

2018

December 6-7
Zakopane

The Book of Abstracts



**National Scientific Conference
„Novel Trends of Polish Science”**

The Book of Abstracts

Zakopane, December 6-7, 2018



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Promovendi Foundation

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Promovendi Foundation Publishing

Address:

17/19/28 Kamińskiego st.
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CONFERENCE INFORMATION

The National Scientific Conference „Najnowsze Trendy Polskiej Nauki 2018”
is organized especially for you.

The Conference has an interdisciplinary character, is addressed to young scientists, starting with first and second degree students, through Ph.D. students, to people who have obtained a doctoral promotion in the last 3 years.

Our initiative aims to create opportunities for exchange of experiences and good scientific practices by representatives of the scientific community. Additionally, it aims to underline the important role of young researchers in the development of Polish science.

In the Conference, two types of participation are possible: passive or active, with active participation giving the opportunity to choose an oral presentation or poster. The conference materials will be published in the form of the Book of Abstracts and Book of Conference Articles with assigned ISBN numbers.

Scientific part of the Conference is supervised by Scientific Committee which contains of doctors and independent research workers from various Polish and foreign universities and industry representatives.



CONFERENCE PLACE

Catering and Hospitality Services Centre FIAN is a comfortable hospitality facility situated in a charming part of Zakopane in the vicinity of aerial tramway to Kasprowy Wierch, Nosal ski complex, Wielka Krokiew (The Rafter) and close to the Centre of Zakopane. FIAN offers high quality hotel and catering services. Guests have rooms with bathrooms and family studio equipped with TV LCD, radio and phone at their disposal. FIAN resort has got an air-conditioned conference room for 70 people.





CONFERENCE SCHEDULE

Catering and Hospitality Services Centre FIAN

38 Tytusa Chałubińskiego, Zakopane

December 6-7, 2018

THE FIRST DAY (6 DECEMBER, THURSDAY)

13:00 – 14:00	DINNER	
14:00 – 15:00	ACCOMMODATION	
15:00 – 15:30	OPENING OF THE CONFERENCE	
15:30 – 17:30	POSTER SESSION	
P-01	Ciolek Sylwia	FORMATION OF METASTABLE HIGH-ALUMINUM PHASES IN THE EUTECTIC AREA FROM THE FE-AL BINARY SYSTEM
P-02	Duda Sylwia	CAREER APTITUDE AND MOTIVES FOR CHOOSING FIELDS OF STUDY AMONG DIETETICS STUDENTS
P-03	Gomółka Emilia	THEORETICAL INVESTIGATION OF PROPERTIES OF INASSB/ALSB HETEROSTRUCTURE
P-04	Gorczyca Kinga	IMPROVING THE TECHNOLOGY OF SAMPLE PREPARATION FOR HALL EFFECT MEASUREMENTS
P-05	Gulda Dominika	THE DYNAMICS OF DISPERSION OF THE MOUFLONS' HERD - THE ASSESSMENT OF THE REACTIVITY OF ANIMALS KEPT IN ZOO IN BYDGOSZCZ
P-06	Gulda Dominika	IMAGING OF SURFACE THERMICS - KELOIDS IN CHILDREN (CASE REPORT)
P-07	Karpowicz Magdalena	MAGNESIUM HYDRIDES AND THEIR USE AS HYDROGEN STORAGE
P-08	Kluczny Robert	SELECTION OF COMPOSITE FOR USE IN THE PRODUCTION OF SPECIAL VEHICLES SUPERSTRUCTURES EXPOSED TO DIRECT CONTACT WITH FIRE
P-09	Kobędza Piotr	NEW, UNCONVENTIONAL ELASTOMERIC BLENDS
P-10	Kołodziejska Dominika	EXPERIENCE OF EXISTENTIAL ANXIETY. ADULT STUDY
P-11	Kulik Aleksandra	THE PHENOMENON OF PROCRASTINATION AMONG THE STUDENTS OF DIETETICS
P-12	Lik Monika	MORPHOMETRICS IN MOVEMENT BIOMECHANICS OF EGYPTIAN FRUIT BAT (ROUSETTUS AEGYPTIACUS)
P-13	Lubiak Katarzyna	USAGE CATALYTIC ACTIVITY OF FUNGI IN SYNTHESIS OF USEFUL CHEMICAL COMPOUNDS
P-14	Łukasiewicz Justyna	THE USE OF Ti6Al4V TITANIUM ALLOY AND LENS TECHNIQUE IN BIOMEDICAL ENGINEERING
P-15	Nowicki Arkadiusz	DETERMINATION OF A SELECTED ORGANOPHOSPHORUS PESTICIDE USING PLANAR CHROMATOGRAPHY COMBINED WITH AN IMAGE ANALYSIS TECHNIQUE
P-16	Olejniak Anna	NEW ELASTOMERIC MATERIALS WITH INCREASED RESISTANCE TO FLAME
P-17	Pęska Magda	SOLID STATE HYDROGEN STORAGE



P-18	Sobolewska Aleksandra	TRAINING OF HUMOR ABILITIES: THE IMPACT ON DEPRESSION AND DEALING WITH STRESSFUL EVENTS
P-19	Strzelczyk Rafał	ANALYSIS OF USEFULNESS OF ADHESIVE JOINTS IN THE INNOVATIVE CONSTRUCTION OF TRUCK'S HYBRID BODY
P-20	Szeląg-Pieniek Sylwia	THE EXPRESSION OF SELECTED ABC TRANSPORTERS AND POTENTIAL ROLE OF MICRORNAS IN DRUG TRANSPORT IN WILSON'S DISEASE
P-21	Szeląg-Pieniek Sylwia	CELL CULTURES AND ANIMAL MODELS IN RESEARCH ON WILSON'S DISEASE
P-22	Wojtko Kamil	FINISHING OF WORM HELIX SURFACE WITH SLIDING BURNISHING METHOD AND INDUCTIVE ANNEALING
P-23	Zgagacz Wiktoria	DETERMINATION OF SULPHIDE IONS USING PYRIDYL SALTS IN NATURAL SULFIDE WATER USING HPLC / UV-VIS
P-24	Zielińska Wioletta	THE ROLE OF CALCIUM IONS IN THE COURSE OF INFLAMMATORY REACTION OF THE VASCULAR ENDOTHELIUM
17:30 – 19:30	WORKSHOP „PROTOKÓŁ DYPLOMATYCZNY I SAVOIR-VIVRE W ŚWIELE ZASAD PANUJĄCYCH NA POLSKICH UCZELNIACH” Michał Brzóska	
20:00	INTEGRATION DINNER	

THE SECOND DAY (7 DECEMBER, FRIDAY)

08:00 – 09:00	BREAKFAST	
09:00 – 13:00	PLENARY SESSION	
09:00 – 09:10	Kowalik Jakub	PROSPECT OF USING POST-PRODUCTION ACORN EXTRACTS TO PRODUCTION BIOSTATIC AGENTS
09:10 – 09:20	Lik Monika	MODELLING DESIRED BEHAVIOUR PATTERNS IN MEERKATS (SURICATA SURICATTA) IN THE ZOO
09:20 – 09:30	Bożejewicz Daria	USE OF POLYMER INCLUSION MEMBRANES FOR METALS RECOVERY
09:30 – 09:40	Kołodziej Michał	FORCED CONVECTION EVAPORATION FOR BULK PROTEIN CRYSTALLIZATION
09:40 – 09:50	Marek Wojciech	APPLICATION OF AQUEOUS TWO-PHASE EXTRACTION AND CENTRIFUGAL PARTITION CHROMATOGRAPHY IN PURIFICATION OF MONOCLONAL ANTIBODIES
09:50 – 10:00	Olbrycht Maksymilian	PURIFICATION OF ANTIBODIES BY CRYSTALLIZATION
10:00 – 10:10	Zielińska Wioletta	COMPARISON OF THE INFLUENCE OF UV RADIATION AND THE PROTECTIVE EFFECT OF NIACINAMIDE ON TWO MELANOMA CELL LINES - METASTATIC AND DERIVED FROM PRIMARY CANCER SITE.
10:10 – 10:20	Polechoński Jacek	THE COMPARISON OF THE ENERGY EXPENDITURE WHILE PLAYING VIRTUAL VIDEO GAME USING TYPICAL CONTROLLERS AND MULTI-DIRECTIONAL TREADMILL
10:20 – 10:30	Budzyńska Sylwia	DENDROREMEDIATION – PHYTOREMEDIATION WITH THE USE OF TREES
10:30 – 10:40	Boroń Kinga	EVALUATION OF THE POROSITY OF THE ALSI7MG ALLOY PRODUCED BY THE SQUEEZE CASTING METHOD



10:40 – 10:50	Czajkowska Aleksandra	ENVIRONMENTAL PROTECTION AGAINST POLLUTANT EMISSIONS DURING PRODUCTION ELECTRICITY
10:50 – 11:00	Czajkowska Aleksandra	THE DEVELOPMENT OF ELECTROSTATIC PRECIPITATORS IN TERMS OF INCREASING THE EFFICIENCY OF DUST REMOVAL
11:00 – 11:20	COFFEE BREAK	
11:20 – 11:30	Kozdra Sylwia	POWDER PROPERTIES MODIFICATION BY MIXING IN A PLANETARY BALL MILL
11:30 – 11:40	Leś Karolina	HIGH ENERGY MIXING AS A METHOD OF COHESIVE POWDERS FLOWABILITY IMPROVEMENT
11:40 – 11:50	Nakonieczna Paulina	THE INFLUENCE OF SOLID PHASE PARTICLES CONTENT ON THE RHEOLOGICAL AND FORCE ABSORBING PROPERTIES OF SHEAR THICKENING FLUIDS
11:50 – 12:00	Przywara Mateusz	COMPUTER SIMULATIONS OF THE INFLUENCE OF MOISTURE OF BIOMASS ON MECHANICAL PROPERTIES WITH DEM METHOD
12:00 – 12:10	Waś Leszek	R&D BY THE COMPANY „WAŚ” IN TO THE USE OF LASER TECHNOLOGY FOR PROTOTYPES OF DRIVING LAMPS
12:10 – 12:20	Murgrabia Michał	DEPRESSION, ANXIETY AND SUICIDAL THOUGHTS IN PEOPLE SUFFERING FROM ATOPIC DERMATITIS
12:20 – 12:30	Murgrabia Michał	THE ROLE OF STRESS IN ATOPIC DERMATITIS
12:30 – 12:40	Peterman Szymon	POST-TRAUMATIC STRESS DISORDER- METHODS OF THERAPY AND TREATMENT
12:40 – 12:50	Łukasiewicz Piotr	THE POSSIBILITIES OF LOCAL ELECTROMAGNETIC FORCE MEASUREMENTS
12:50 – 13:00	Prędkiewicz Dorota	AUTISM AND MIRROR NEURONS
13:00 – 13:15	END OF THE CONFERENCE	
13:15	DINNER	



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POSTER SESSION



FORMATION OF METASTABLE HIGH-ALUMINUM PHASES IN THE EUTECTIC AREA FROM THE FE-AL BINARY SYSTEM

Sylvia Ciolek*, Stanisław Jóźwiak

Military University of Technology in Warsaw

*sylvia.ciolek@wat.edu.pl

A few words about the author:

I am a PhD student. My faculty is Material Engineering. My research area is intermetallic composites.

Abstract:

Modern construction solutions require the use of increasingly lighter, yet more durable materials. This causes that composites made of light metals in various configurations with other groups of materials are increasingly used. This creates new design possibilities. A commonly known and used metal in this area is aluminum and its alloys.

In the Fe-Al equilibrium system, at ambient temperature, there are three high-aluminum phases: ζ -FeAl₂, η -Fe₂Al₅ and θ -Fe₄Al₁₃ (FeAl₃), which due to low symmetry and large volume of crystalline cells is characterized by high hardness, which predisposes them to use as reinforcing phases. According to the equilibrium system, the eutectic point is located at the content of about 2% wt. iron. At other contents of this element, as a final result, an eutectic mixture of aluminum and θ phase-Fe₄Al₁₃ is obtained. It is also possible to nucleate and release less-studied phases with a high aluminum content in the eutectic region. A careful analysis of the Al-Fe equilibrium system in the eutectic area shows that depending on the technological parameters such as temperature, the cooling rate, in addition to the stable Fe₄Al₁₃ phase, can also occur during the crystallization of the alloy of approximately eutectic composition, metastable structures such as FeAl₆, FeAl_m or FeAl_x, Fe₂Al₉ and FeAl_p. In the connection with the above, tests were carried out to check which of the above phases is the easiest to form by diffusion.

Keywords:

FeAl, intermetallic, diffusion



CAREER APTITUDE AND MOTIVES FOR CHOOSING FIELDS OF STUDY AMONG DIETETICS STUDENTS

Sylwia Duda*, Aleksandra Kulik

*Department of Toxicology and Health Protection. School of Public Health in Bytom,
Medical University of Silesia, Katowice, Poland*

*sduda@sum.edu.pl

A few words about the author:

I graduated in Public Health. I work in Department of Toxicology and Health Protection, Medical University of Silesia. I'm a PhD student at the Medical University of Silesia in Katowice.

Abstract:

Motives for choosing a field of study constitute an important aspect in quality of academic education. Awareness in choosing fields of study is equally important. Material and methods: 224 dietetics students. For the purpose of this study, an original respondents' personal details form, as well as the Occupational Preferences Questionnaire JOB-6, the theoretical basis of which are Holland's concepts, were used. Results: According to the subjective opinion of respondents, sensitivity is the highest-rated trait of character possessed by them, awarding it with 10/10 points (36.0%). The type of personality characteristic of this group is 'realistic'. As the only one, it achieved a 'high' sten score of 39.0%. 'Low' sten scores were obtained by personality types such as: research, enterprising, social and artistic. The dominating motive for the choice of the field of study among dietetics students was the belief that the field of study was concurrent with their interests and their willingness to work in this profession (63.0%). Conclusions: It seems necessary to increase the educational awareness of young people in making decisions about the choice of a field of study. It is suggested to increase the scope of occupational guidance for young people in order to raise their awareness of their own professional aptitudes and help them choose a field of study in accordance with the profile of their personality.

Keywords:

personality types, professional abilities, motivation



THEORETICAL INVESTIGATION OF PROPERTIES OF INASSB/ALSB HETEROSTRUCTURE

Emilia Gomółka

Institute of Applied Physics, Military University of Technology

emilia.gomolka@wat.edu.pl

A few words about the author:

I am a graduate student at Military University of Technology in Warsaw with major in Material Engineering. My research focus on III-V compound semiconductor based optoelectronic devices such as infrared detectors.

Abstract:

In this work we present the theoretical investigation of the electrical and optical properties of high operating temperature (HOT) mid-wavelength infrared detectors ($5\ \mu\text{m}$ at 230 K) based on InAsSb/AlSb heterostructure.

Generally, barrier detector (nBn) proposed by A.M. White consists of a MWIR-absorbing n-type semiconductor, large band gap undoped barrier, and a second thin n-type cap layer. The primary advantage of the nBn design is the suppression of the dark current due to Shockley-Read-Hall (SRH) generation recombination (GR) processes and surface leakage contribution.

In this work the performance comparison of barrier detectors with different type of absorbing layers: n-type and p type doped is presented. The barrier structure was simulated by commercially available software APSYS.

We report on the dependence of the calculated current responsivity on the active layer thickness for a different type and doping concentration. The results show that the device performance depends on absorber layer type, absorber thickness and doping concentration.

Keywords:

Infrared detector, Barrier detector, High-operating temperature



THE DYNAMICS OF DISPERSION OF THE MOUFLONS' HERD - THE ASSESSMENT OF THE REACTIVITY OF ANIMALS KEPT IN ZOO IN BYDGOSZCZ

Dominika Gulda*, Tamara Samsonowicz, Ewelina Wnuk

*Rada Naukowo-Dydaktyczna Ogrodu Zoologicznego w Bydgoszczy,
Leśny Park Kultury i Wypoczynku w „Myślęcinek” sp. z o.o. w Bydgoszczy
ul. Gdańska 173-175, 85-674 Bydgoszcz*

*dominika.gulda@o2.pl; zoo.rada@myslecinek.pl

A few words about the author:

The authors are members of the Scientific and Didactic Council which is a non-profit organization that was established at the Bydgoszcz ZOO. We deal with nanoscience research for the diversity of species and maintaining animal welfare in zoo.

Abstract:

The research assumption adopted in this experiment was an attempt to assess the individual reaction of mouflons to the strong stress associated with the dispersion of food and the feed in three different places on the paddock. Feeding resulted from the normal rhythm of animal life in a zoo, however, the concentrate was usually fed to one feeder and hay to the other.

The experience consisted of the simultaneous distribution of three types of feed into three different places. Each of the herd's individuals had to decide which springs would benefit. If a mouflon followed a larger group of animals, it had less concentrated feed and was under the stress of strong competition. On the other hand, if the mouflon chose to detach himself from the herd and go to a less crowded pasture individual had to fight with a strong self-preservation instinct - the group gives a sense of security.

Using a camera with a motion sensor, the behavior of the herd was being recorded, followed by behavioral characteristics and statistical analysis of the animal's reactivity level. Preliminary studies show that animals take risks, but these are always the same individuals, interestingly about the different social status.

Keywords:

dynamics of dispersion, mouflons, zoo



IMAGING OF SURFACE THERMICS - KELOIDS IN CHILDREN (CASE REPORT)

Dominika Gulda*, Monika Lik, Brygida Gulda

SNZPOZ Przychodnia Zatorze Brygida Gulda, ul. Lotnicza 51, 82-300 Elbląg

*dominika.gulda@o2.pl

A few words about the author:

The authors are a team of practitioners who help burn children through their actions. The pediatrician medicine doctor Brygida Gulda - treated the described patient, PhD Dominika Gulda -thermovision expert and PhD Monika Lik - kinesiotaping expert.

Abstract:

The presented studies describe the case of a boy aged 8 years, whose chest skin was burned and a result keloid was created. Therapy began after 3 years, that is, worked with the "old" scar. The therapy together with the research lasted 20 months.

At the beginning an attempt was made to assess the degree of blood supply (nutrition and oxidation) of growing scar tissue in the changed area. The diagnostic tool was a thermal imaging camera (FTi110) with the function of dynamic image recording and dedicated software. To stimulate microcirculation and leveling adhesions between the layers of the skin, the method of taping was used, using Clasic Kinesio tapes.

A thermal normative range was determined for adjacent tissues, which were not affected by injury and the temperature range changed in the area of damage.

In the first half-year of therapy, the temperatures of the areas covered by the burn decreased, only on the edges of the change, and from the seventh month of the therapy actually on the whole change.

That time coincided with a significant flattening of the scar and the return of the skin to a normal color. The patient showed an improvement in the dynamics and flexibility of movement, the elimination of the sensation of contracture associated with the adhesions of the scar tissue.

According to the authors, the combination of thermal imaging methods with appropriately selected kinetic tape applications influenced the effectiveness of the therapy.

Keywords:

keloid, kinesiology taping, thermal imaging method



MAGNESIUM HYDRIDES AND THEIR USE AS HYDROGEN STORAGE

Magdalena Karpowicz

Military University of Technology in Warsaw

magdalena.karpowicz@wat.edu.pl

A few words about the author:

I am a PhD student. My faculty is Material Engineering. My research area is hydrogen storage, especially in solid phase. My interests are mainly science (materials science, chemistry, mechanics) but also sport and an active and healthy lifestyle.

Abstract:

Hydrogen storage technologies have been very popular around the world for many years. Researchers are trying to develop the most effective methods for storing and acquiring hydrogen energy. Currently, three ways of storing hydrogen are known: in the gas, liquid and solid phases. Each method has numerous advantages and disadvantages, however with the technique of storing hydrogen in the solid phase, large and real application perspectives are associated, mainly in the automotive industry. Hydrogen in this method adsorbs, absorbs or as a result of chemical reactions it is incorporated into solids - thus changing the chemical composition of the material used. Thanks to this technology, we are able to store much more hydrogens in a smaller volume. The materials used for hydrogen storage are really a lot, but the promising group are magnesium hydrides, characterized by very good hydrogen sorption and desorption properties. Therefore, this work aims to present and describe precisely this material group.

Keywords:

magnesium hydride, hydrogen storage, hydrogen, ecology



SELECTION OF COMPOSITE FOR USE IN THE PRODUCTION OF SPECIAL VEHICLES SUPERSTRUCTURES EXPOSED TO DIRECT CONTACT WITH FIRE

Rafał Strzelczyk, Robert Kluczny*, Adrianna Gołuch

*„WAWRZASZEK ISS Spółka z ograniczoną odpowiedzialnością” spółka komandytowa,
ul. Leszczyńska 22, 43-300 Bielsko-Biała, Polska*

*r.kluczny@wiss.com.pl

A few words about the author:

Mechanical design engineer in Wawrzaszek Special Vehicles Engineering. Commenced third degree (PhD) studies in the field of technical sciences at Faculty of Mechanical Engineering and Computer Science at the University of Bielsko-Biała.

Abstract:

This document presents research carried out for the purpose of choosing a composite structure intended for the production of special vehicle bodies exposed to direct contact with fire. Work covers the issues of assessment of fire resistant material used in the production of railway vehicles and their application for fire fighting vehicles. The article describes tests carried out for compliance check with the requirements of R1 of the standard PN EN 45545 2:2013. The results obtained experimentally allowed to determine at what hazard level individual composite structures meet the requirements of the standard. The test provided that composites used in production of special vehicle structures generate very small amounts of toxic gases. Experiment also compared laminate structures made using fire retardant vinyl ester resin and fire retardant polyester resin.

Keywords:

special vehicle, fire resistance, composite, laminate, truck body



NEW, UNCONVENTIONAL ELASTOMERIC BLENDS

Piotr Kobedza*, Anna Olejnik, Aleksandra Smejda-Krzewicka, Krzysztof Strzelec

*Lodz, University of Technology, Institute of Polymer and Dye Technology,
Stefanowskiego 12/16, 90-924 Łódź*

*piotr.kobedza@edu.p.lodz.pl

A few words about the author:

A student of the 3rd year of PhD studies at the Lodz University of Technology. Scientific interests include chemistry and technology of elastomers, with particular emphasis on elastomeric blends and occurring interelastomer reactions.

Abstract:

Elastomers are a particular group among polymeric materials. They are characterized by the ability to undergo significant reversible deformation at the small modulus of elasticity in a wide temperature range. Thanks to these properties, elastomers have found application in the production of tires, gaskets or other products that require significant flexibility. However, individual rubbers can differ in properties, what limits their use for specific requirements applications. One of the methods to solve this problem is to create an elastomeric blend containing two different rubbers. Mixed rubbers are subjected to an interelastomer reaction, which results in results in creation of bond between the macromolecules of both elastomers during crosslinking. Despite the widespread use of elastomeric blends in the industry, researches are still ongoing to obtain new compositions. New elastomeric blends can be obtained by mixing previously unused rubbers, but also by using unconventional curing agents.

Keywords:

elastomeric blends, crosslinking, curing agents



EXPERIENCE OF EXISTENTIAL ANXIETY. ADULT STUDY

Dominika Kołodziejska

*Katolicki Uniwersytet Lubelski Jana Pawła II
Mazowiecki Szpital Specjalistyczny w Radomiu*

d-kolodziejska@wp.pl

A few words about the author:

I'm working in Hospital in Radom in the Hematology Unit. I conduct research in the field of psychology. I have finished neuropsychology specialization.

Abstract:

Existential anxiety qualitatively different than from fear and anxiety. It is not a direct reaction to a threat connected with escape or fight with danger (fear). It is proportional to external stimuli and devoid of vegetative and behavioral symptoms (anxiety). The problem raised in the research concerns the structure and function of existential anxiety. The method used in the conducted study is the Qualitative Personalist Analysis test of the Uchnast. Its topic is personal experience presented in the form of written reports presenting specific life events. The analysis of 124 life events for people aged 18-76 is the basis for drawing the following conclusions: existential anxiety is a positive and complex personal experience in a difficult, often unexpected, life situation that questions the ways in which the world works.

Keywords:

existential anxiety, personal experience, life event



THE PHENOMENON OF PROCRASTINATION AMONG THE STUDENTS OF DIETETICS

Aleksandra Kulik*, Sylwia Duda

*Department of Toxicology and Health Protection, School of Public Health in Bytom,
Medical University of Silesia, Poland*

*akulik@sum.edu.pl

A few words about the author:

I graduated in the field of public health. I work as a research assistant at the Department of Toxicology and Health Protection of the Medical University of Silesia in Katowice. In 2018 I obtained a Ph.D. in Health Sciences.

Abstract:

Procrastination is deliberate postponement of intended action, despite predicting negative consequences and potentially inferior results. The aim of the study was to assess the prevalence of academic procrastination among the students of dietetics. 304 dietetics students were recruited for research (between 18 and 28 years of age). Standardised Procrastination Questionnaire and the author's original data sheet were used for the study. The Procrastination Questionnaire is a two-factor scale which includes a complex factor of behavioural procrastination and the factor of lack of punctuality. High scores in subscales 1-4, indicate a tendency to procrastinate, and high scores in subscale 5 indicate lack of punctuality. Students of dietetics show an average level of procrastination. The highest values were obtained in the subscale representing time management and systematic work capacity (the average level was represented by as much as 80.3% of respondents, and a high one by 19.7% of them). More than half of the respondents (53.3%) showing a low level of being unpunctual. The obtained results indicate that the students of dietetics display a moderate level of procrastination and a low level of lack of punctuality. The difficulties they experience are mainly related to managing their time effectively. The respondents are aware of the problem and try to control it. These features are important, given the considerable social responsibility which rests on the shoulders of dietitians.

Keywords:

procrastination, students, dietetics students



MORPHOMETRICS IN MOVEMENT BIOMECHANICS OF EGYPTIAN FRUIT BAT (ROUSETTUS AEGYPTIACUS)

Monika Lik*, Tamara Samsonowicz, Ewelina Zielińska

*Rada Naukowo-Dydaktyczna, Leśny Park Kultury i Wypoczynku, Myślęcinek, spółka z.o.o.,
ul. Gdańska 173-175, 85-674 Bydgoszcz*

*lik.m@tlen.pl

A few words about the author:

The authors are members & friends of the Scientific & Didactic Council which is a non-profit organization that was established at the Bydgoszcz ZOO. We deal with nanoscience research for the diversity of species and maintaining animal welfare in zoo

Abstract:

The aim of this paper is the attempt to assess the influence of the morphological structure on the movement efficiency in Egyptian fruit bat. This paper presents the results of morphometrics of a flock of 30 adult individuals of Egyptian fruit bat kept in Bydgoszcz zoo. The animals were kept in a caged enclosure inside the building, isolated from weather conditions. In the flock there was a majority of females, 24 individuals, and only 6 males. Quite significant diversity was observed among male and female individuals in terms of described morphometric parameters (bodyweight, body length and body width or wingspan) which was further reflected in pyrometry results and flight quality. The results presented in this paper are to be regarded as preliminary research, the systematic continuation of which will enable us to create a database of standard values for morphometric parameters of Egyptian fruit bat kept in captivity breeding (in the zoo). Quite significant diversity was observed among male and female individuals in terms of described morphometric parameters (bodyweight, body length and body width or wingspan) which was further reflected in pyrometry results and flight quality. Stress connected with forced motionlessness (grip) and limiting the possibility of movement was comparable for both genders and the average values of surface thermal range remained on the same level regardless of gender.

Keywords:

motphometrics, Egyptian fruit bat, movement efficiency



USAGE CATALYTIC ACTIVITY OF FUNGI IN SYNTHESIS OF USEFUL CHEMICAL COMPOUNDS

**Katarzyna Lubiak*, Ewa Żymańczyk-Duda, Małgorzata Brzezińska-Rodak,
Magdalena Klimek-Ochab**

*Wrocław University of Technology,
Wybrzeże Stanisława Wyspiańskiego 27, 50-370 Wrocław, Poland*

*katarzyna.lubiak@pwr.edu.pl

A few words about the author:

I have master of science degree in biotechnology at University of Technology in Wrocław. I was starting PhD in 2018. I am working with microorganisms, the aim of my study is obtain catalytic activity.

Abstract:

Chemical industry is one of the biggest economic sectors worldwide and using new technologies such as biocatalysis is providing an opportunity to improve productivity. Biocatalytic processes have many advantages over chemocatalysis like mild conditions of transformation, much less energy consumption, stability of process and quality of product. These factors often translate into a reduction of production costs. Using of microorganisms is promising alternative for chemical methods, due to enzyme-based reactions, which the biggest advantage is very high enantioselectivity and regioselectivity.

The aim of the presented studies was to use catalytic activity of *Phanerochaete chrysosporium* and *Rhodotorula mucilaginosa* in order to obtain useful chemical compounds. The aim of the study was biotransformation resveratrol by *Phanerochaete chrysosporium* which produce methyltransferases and biocatalytic obtained enantiomerically pure compounds with racemic mixture of amino phosphonates – in this process was using D-amino acid oxidase produced by *Rhodotorula mucilaginosa*.

Keywords:

Biotransformations, *Phanerochaete chrysosporium*, resveratrol, *Rhodotorula mucilaginosa*, amino phosphonates



THE USE OF Ti6Al4V TITANIUM ALLOY AND LENS TECHNIQUE IN BIOMEDICAL ENGINEERING

Justyna Łukasiewicz

Military University of Technology, Warsaw, Poland

justyna.lukasiewicz@wat.edu.pl

A few words about the author:

Justyna Łukasiewicz - PhD student of material engineering at the Military University of Technology. Interests: biomaterials – in particular titanium alloys and LENS technique.

Abstract:

The Ti6Al4V alloy is one of the most intensively developed and most widely used alloys on the basis of titanium. He found a wide application as a biomaterial in dentistry for dental implants and orthopedics for hip and knee endoprostheses, as well as in traumatology on tiles, nails and screws.

Ti-based materials, including Ti6Al4V, due to their specific physical and mechanical properties, are very difficult to plastic and cavity processing, which is why more and more often attempts are based on the technology of their production with new advanced methods, including those belonging to the group of laser techniques incremental.

Incremental development of laser LENS (Laser Engineered Net Shaping) is one of the techniques of rapid manufacturing. The essence of the LENS process is the production of a fully functional, ready-made element that is built layer by layer from the 3D model previously designed in the CAD system.

Analyzing literature data supported by numerous experiments, it should be considered that the LENS technique is a prospective method to modify the surface of implants. The selection of the appropriate technological parameters of the laser process of incremental shaping and granulation of the powder feed will enable the shaping of the surface layer of implants characterized by increased biofunctionality, which will significantly accelerate osteoconduction and improve the cellular response in the area of bone-implant connection.

Keywords:

titanium alloys, additive manufacturing, LENS technology



DETERMINATION OF A SELECTED ORGANOPHOSPHORUS PESTICIDE USING PLANAR CHROMATOGRAPHY COMBINED WITH AN IMAGE ANALYSIS TECHNIQUE

Arkadiusz Nowicki*, Monika Skowron-Jaskólska, Robert Zakrzewski, Witold Ciesielski

University of Lodz, Faculty of Chemistry, Tamka 12, 91-403 Lodz, Poland

**a.nowi@o2.pl*

A few words about the author:

I have been a PhD student at the Department of Environmental Chemistry at the University of Łódź since October 2017. My scientific interest is focused on chromatographic techniques for the determination of biologically active substances.

Abstract:

According to the World Health Organisation, plant protection products cause poisoning in about 1.5 million people worldwide. In the European Union, 20 000 people die every year when they consume products containing pesticide residues. Plant protection products can cause long-term and chronic diseases, poisoning and death.

This poster presents the method of determination of a selected organophosphorus pesticide, i.e. ethion. Thin layer chromatography and TLSee image analysis technique were used. Induced iodine-azide reaction was used to visualize chromatograms, because the analyzed compound is colorless.

The optimal conditions of the analysis were chosen and the method was validated ($r^2 = 0.999$; LOD = 2.653 μg per spot). Finally, this insecticide was determined in juice samples.

The developed method is quick, easy and simple because it does not require complicated apparatus and cheap because it does not require a large amount of reagents.

Keywords:

organophosphorus pesticides, thin layer chromatography, image analysis technique, iodine-azide reaction



NEW ELASTOMERIC MATERIALS WITH INCREASED RESISTANCE TO FLAME

Anna Olejnik*, Aleksandra Smejda-Krzewicka, Piotr Kobędza, Krzysztof Strzelec

*Institute of Polymer and Dye Technology, Faculty of Chemistry, Lodz University of Technology
ul. Stefanowskiego 12/16, 90-924 Łódź*

*anna_olejnik91@o2.pl

A few words about the author:

I'm PhD student at Łódź University of Technology at faculty of chemistry. I'm handle polymers especially elastomeric blends.

Abstract:

Blending of different rubbers to combine desirable properties of each component is a very common practice in the rubber industry. Rubber blending enables producing new materials, obtaining the best processability and reducing the cost of rubber product manufacturing process.

The aim of our work was to obtain new unconventional elastomeric blends containing chloroprene and butadiene rubbers. In the first step of our study the effect of the blend ratio and the type of cross-linking agent (metal oxide) on the cross-linking degree and mechanical properties of CR/BR blends was investigated. It was found that the chloroprene and butadiene rubbers blends could be cross-linked with metal oxide and that curing degree depended largely on the composition of the blends. The cross-linking degree increased with increasing amount of chloroprene rubber in the blends. Additionally, it has been found that vulcanizates containing chloroprene and butadiene rubbers are characterized by a high flame resistance. The undoubtable advantages of the proposed technology are its simplicity, low cost and incombustibility. Such vulcanizates can be used in the manufacture of different technical rubber products, such as conveyor belts, wire and cable jacketing, wet suit application, coated fabrics, inflatables, extrusions and many other articles.

Keywords:

elastomeric blends, chloroprene rubber, butadiene rubber, mechanical properties,



SOLID STATE HYDROGEN STORAGE

Magda Peška*, Magdalena Karpowicz

Military University of Technology in Warsaw

*magda.peska@wat.edu.pl

A few words about the author:

Magda Peška – PhD Student of material engineering at Military University of Technology. My scientific interest is focused on hydrogen storage in solid state but I also interested in 3D printing technology.

Abstract:

Due to the continuous increase in energy demand, caused by population growth and increasing shortages of energy resources, scientists are looking for alternative sources of energy. Hydrogen is considered as such a source. The reason is a significant amount of energy that can be obtained in the process of hydrogen combustion, it is also important that the by-product is only water vapor, so hydrogen is an ecological energy carrier. However, it is a huge problem to store hydrogen. It is possible to store hydrogen in solid state like metal hydrides. In this case, hydrogen is absorbed directly to the material. Large amounts of hydrogen in this form they can be stored in small volumes under low pressure and at a temperature close to room temperature. Therefore, many studies are devoted to finding a compact, safe, reliable, inexpensive and energy-saving method of storage, which can be storage in a solid state.

Keywords:

Hydrogen storage, Hydrogen energy carrier, solid state storage



TRAINING OF HUMOR ABILITIES: THE IMPACT ON DEPRESSION AND DEALING WITH STRESSFUL EVENTS

Aleksandra Sobolewska

SWPS University of Social Sciences and Humanities, Warsaw, Poland

asobolewska4@st.swps.edu.pl

A few words about the author:

Student of psychology, member of Scientific Circle of Psychotherapy at the SWPS University of Social Sciences and Humanities.

Abstract:

Humor and laughter can positively influence mood, promote optimism and lead to a change perspective (Falkenberg et al., 2011). Humor training, which in large part of the studies was carried out by using McGhee's eight-step programme is based on the assumption that playful attitude is the foundation of humor (Shelley et al., 2011) and it is fixed on all components of sense of humor. Studies showed, that humor training is important intervention in depression disorder. Before and after training sessions participants made out scales and questionnaires, measuring for instance: the use of humor as a coping strategy, depression's degree, satisfaction with life, personality traits.

Among patients with major depression, in which negative emotions dominate, significant increase was found in cheerfulness (trait and state) and satisfaction with life. Humor as a coping strategy was also developed. Patients said they they felt more capable of using coping humor and that they are more aware of the usefulness of humor as a device for coping with their personal problems (Falkenberg et al., 2011). Significant decrease was noticed in seriousness and trait bad mood. Furthermore, humor skills could help to deal with difficult situations, reduce negative emotions and bad mood. By humor training, people can develop optimism, self-efficacy and they can more successfully control anxiety and stress.

Keywords:

depression, humor training, therapy



ANALYSIS OF USEFULNESS OF ADHESIVE JOINTS IN THE INNOVATIVE CONSTRUCTION OF TRUCK'S HYBRID BODY

Robert Kluczny, Rafał Strzelczyk*, Rafał Szkowron

*WAWRZASZEK ISS Spółka z ograniczoną odpowiedzialnością,
ul. Leszczyńska 22, 43-300 Bielsko-Biała, Polska*

**r.strzelczyk@wiss.com.pl*

A few words about the author:

Mechanical design engineer in Wawrzaszek Special Vehicles Engineering. Commenced third degree (PhD) studies in the field of technical sciences at Faculty of Mechanical Engineering and Computer Science at the University of Bielsko-Biała.

Abstract:

This document presents research carried out for the purpose of determining the suitability of adhesive joints in the construction of a hybrid body of a special vehicle (fire fighting truck). Work covers the selection of samples for testing, technology of their production and materials used. The article describes shear strength of adhesive joints of different materials for samples not subjected to and subjected to the laboratory ageing process. The results obtained experimentally, during shear strength tests carried according to standard, indicate that the parameters of the adhesives included in the data sheets are insufficient. Experimental tests of adhesive joints of different materials should be carried out if they are subjected to a significant load. The analysis of the results allows to conclude that it is possible to use adhesive joints in the construction of a hybrid body of a special vehicle in order to reduce its mass and production cost.

Keywords:

special vehicle, adhesive joints, hybrid, truck body, composite



THE EXPRESSION OF SELECTED ABC TRANSPORTERS AND POTENTIAL ROLE OF MICRORNAS IN DRUG TRANSPORT IN WILSON'S DISEASE

Sylvia Szelać-Pieniek

Zakład Farmakologii Doświadczalnej i Klinicznej, Pomorski Uniwersytet Medyczny w Szczecinie

sylvia.szelać@pum.edu.pl

A few words about the author:

I am a PhD student in Pharmacology Department of Pomeranian Medical University in Szczecin. Currently I am taking part in a research on the role of miRNA in expression regulation of drug transporters.

Abstract:

ABC transporters are membrane proteins involved in diverse physiological processes. They play a key role in the absorption, distribution and excretion of endogenous molecules as well as xenobiotics. Due to a lack of information about potential regulation of drug transporters expression in Wilson's disease (WD) patients, we decided to analyse the potential role of microRNAs in regulation of ABC transporters in WD patients.

Materials and methods: The study was conducted on liver tissues from patients with WD (n=7) and on healthy liver tissues (n=20). The expression of ABC transporters and microRNAs was determined using real-time PCR. The protein abundance was determined using mass spectrometry (LC-MS/MS).

Results: Gene expression and protein abundance of several ATP transporters in WD patients was significantly altered compared to control group. Moreover, microRNAs expression changes were observed in WD patients.

Conclusions: Modified gene expression and protein abundance of ABC transporters in livers from patients with Wilson's disease may affect transport of endogenous substrates and drugs. Furthermore, several microRNAs may take a part in regulation of expression of ABC transporters.

Keywords:

ABC transporters, Wilson's disease, microRNA, liver



CELL CULTURES AND ANIMAL MODELS IN RESEARCH ON WILSON'S DISEASE

**Sylwia Szelag-Pieniek* (1), Joanna Bujak (2), Patrycja Kopytko (2),
Małgorzata Łączna (2)**

*Pomorski Uniwersytet Medyczny w Szczecinie:
(1) Zakład Farmakologii Doświadczalnej i Klinicznej
(2) Katedra i Zakład Fizjologii*

*sylwia.szelag@pum.edu.pl

A few words about the author:

I am a PhD student in Pharmacology Department of Pomeranian Medical University in Szczecin. Currently I am taking part in a research on the role of miRNA in expression regulation of drug transporters.

Abstract:

In vitro and in vivo models play a crucial role in medical sciences. They allow better understanding of physiology and molecular aspects of diseases. In vitro models based on cell cultures enable to conduct a research in safe and controlled conditions that effects in obtaining repeatable results. Nevertheless, studies of disease usually require more comprehensive tools like animal models, which better mimic human physiology as well as phenotype of various diseases.

Wilson's disease (WD) is a hereditary disorder associated with an interruption in copper transport characterized by occurrence of liver failure and neurological symptoms. Although the etiology of WD is well-known, there is still limited understanding of many aspects of Wilson's disease. Hence, development of new cellular and animal models seems to be essential to achieve effective disease treatment.

Keywords:

ATP7B mutation, Wilson's disease, mouse model, HepG2



FINISHING OF WORM HELIX SURFACE WITH SLIDING BURNISHING METHOD AND INDUCTIVE ANNEALING

Kamil Wojtko*, Piotr Frąckowiak

Wydział Budowy Maszyn i Zarządzania, Politechnika Poznańska, Poznań

*kamil.wojtko@put.poznan.pl

A few words about the author:

PhD student and assistant at the Institute of Materials Technology at the Poznan University of Technology. As part of my doctoral thesis, I deal with finishing of helix surfaces by sliding burnishing.

Abstract:

The paper presents the concept of finishing of helix surfaces by sliding burnishing method with inductive annealing. The helix surfaces that form the side surfaces of the worm are exposed to variable loads and pressures in the gearboxes. Variable loads negatively affect the strength of the worm mainly considering fatigue strength. An additional problem occurring in worm gears is the fact of rapid abrasive wear, occurring with time the phenomenon of pitting and fatigue corrosion. All these elements have a negative impact on the durability of the gear transmission, create problems during operation (uneven operation, noise).

In order to extend the durability of such a gear, in which the worm is the most exposed element is the finishing of the side surfaces by sliding burnishing with inductive annealing. During the process, the side surfaces of the worm will be heated to a temperature of 450 - 550 ° C, and in place of contact the tool with the surface will be given copper powder with appropriate granulation. Slide burnishing has the effect of reducing the surface roughness and increasing its hardness and fatigue strength. Diffusion of copper to the surface layer will increase corrosion and fatigue resistance.

In further research work, it is planned to study the surface layer formed according to the method described above. Metallographic examination will be carried out - analysis of the chemical composition, size and depth of diffusion as well as microhardness.

Keywords:

finishing, burnishing, annealing, helix surfaces



DETERMINATION OF SULPHIDE IONS USING PYRIDYL SALTS IN NATURAL SULFIDE WATER USING HPLC / UV-VIS

Wiktoria Zgagacz* (1), Robert Zakrzewski (1), Ramón Martínez-Máñez (2)

(1) Katedra Chemii Środowiska, Wydział Chemii, Uniwersytet Łódzki;

(2) Katedra Chemii Organicznej, Wydział Chemii, Uniwersytet w Walencji

*wiktoria.zgagacz@vp.pl

A few words about the author:

Since 2017, I have started doctoral studies at the Department of Environmental Chemistry at the University of Lodz. My current scientific interests are focused on the determination of amines, amino acids and sulphide ions in environmental samples.

Abstract:

Sulphide ion is commonly found in nature. It is present in water, soil, air, rocks and organic matter. It is used in many branches of industry and agriculture. Compounds containing a sulphide ion are used, e.g. in tanneries, for the production of sulfuric acid (VI), dyes and cosmetics.

The aim of the study was to develop two methods for the determination of sulphide ions using pyridyl salts: chlorate (VII) 4-[p-(N,N-dimethylamino)phenyl]-2,6-diphenylpyrrole (LN1) and tetrafluoroborate 2,4,6-triphenylpyrrole (L1) in samples of sulphide water originating from the health resorts of Busko Zdrój and Uniejów. The technique, which was carried out experiments, was high performance liquid chromatography (HPLC) with a UV-VIS detector. The developed method was subjected to the validation process on the basis of which it can be stated that it is simple, sensitive, repeatable and precise.

Keywords:

pyridyl salts, sulphide ions, HPLC / UV-VIS



THE ROLE OF CALCIUM IONS IN THE COURSE OF INFLAMMATORY REACTION OF THE VASCULAR ENDOTHELIUM

**Wioletta Zielińska*, Marta Hałas-Wiśniewska, Klaudia Mikołajczyk,
Maciej Gagat, Alina Grzanka**

*Department of Histology and Embryology, Faculty of Medicine, Karłowicza 24, 85-092 Bydgoszcz
Nicolaus Copernicus University in Toruń, Collegium Medicum in Bydgoszcz, Poland*

*wzielinska94@hotmail.com

A few words about the author:

I graduated from biotechnology and since then I have been an employee of Histology and Embryology department of Collegium Medicum in Bydgoszcz.

Abstract:

The vascular endothelium has many important functions in the body. This organ controls the contraction and relaxation of blood vessels, affects the course of inflammatory processes, immune response, coagulation and regulation of permeability of the vessel walls. Due to its important role, endothelial dysfunctions are associated with the occurrence of such disease as atherosclerosis, hypertension or heart failure. They constitute a serious health threat in developed societies. The inflammatory response is associated increase in the production of reactive oxygen species contribute to damage to the endothelium layer and disturbance of cell integrity, which can lead to pathology.

Maintaining homeostasis in the circulatory system requires strict regulation of the processes occurring. One important element of this control are signaling pathways dependent on the Ca^{2+} inflow regulation. Changes in the concentration of this ion are associated with various life processes like growth, divisions or differentiation. The close relationship between the state of the circulatory system and the concentration of calcium ions was also confirmed. Under standard conditions, the concentration of Ca^{2+} ions in endothelial cells is within the range typical for other cell types. However, the process of endothelial activation leads not to the increase in the concentration of calcium ions in the cells. This suggests their important role also in the course of the inflammatory process.

Keywords:

endothelium, calcium ions, atherosclerosis, inflammation

PLENARY SESSION



PROSPECT OF USING POST-PRODUCTION ACORN EXTRACTS TO PRODUCTION BIOSTATIC AGENTS

Jakub Kowalik*, Dorota Górniak

*Department of Microbiology and Mycology, Faculty of Biology and Biotechnology,
University of Warmia and Mazury in Olsztyn*

*jakub6kowalik66@gmail.com

A few words about the author:

I am PhD student in Faculty of Biology and Biotechnology in University of Warmia and Mazury in Olsztyn, before I studied microbiology and molecular biology on MSc studies.

Abstract:

In this study determined antimicrobial activity and microbiological purity of acorns extracts from producer (standardized) and one obtained in laboratory conditions (unstandardized). In test nine different bacterial strains pathogens human and plant were used. Microbiological purity of standardized extracts was done by inoculation of extract to nutrient agar and count colony forming units in 1 ml. Biostatic properties of concentrated and unconcentrated extract obtained in laboratory and a standardized one were tested using a suspension and disc diffusion method. In case of unconcentrated unstandardized extract reduction of microbial growth was 10-25%, concentrated extract give up to 50% of reduction. Average number of microorganisms in standardized concentrated extracts was $0,6 \times 10^{-1}$ CFU/ml, while for unconcentrated extract $1,3 \times 10^{-2}$ CFU/ml. Concentrated acorns extracts showed very strong antimicrobial effect both for Gram-positive and Gram-negative bacteria.

Keywords:

acorns extracts, antimicrobial effect, biostatic properties



MODELLING DESIRED BEHAVIOUR PATTERNS IN MEERKATS (SURICATA SURICATTA) IN THE ZOO

Monika Lik*, Marcelina Dukacz, Magdalena Węglarz

*Rada Naukowo-Dydaktyczna, Leśny Park Kultury i Wypoczynku, Myślęcinek, spółka z.o.o.,
ul. Gdańska 173-175, 85-674 Bydgoszcz*

*lik.m@tlen.pl

A few words about the author:

The authors are members & friends of the Scientific & Didactic Council which is a non-profit organization that was established at the Bydgoszcz ZOO. We deal with nanoscience research for the diversity of species and maintaining animal welfare in zoo

Abstract:

The aim of this paper was to develop protocols of procedure which would result in obtaining desired reactions in animals, namely the desired behaviour of meerkats kept in Bydgoszcz Zoo. Behavioural training, which was intended to result in modelling 2 behavioural patterns was conducted in group of 4 individuals - 3 females and 1 male of meerkats making up one herd. Modelling of behavioural patterns was carried out only with the positive reinforcement technique. Behavioural pattern modelling activity was divided into 4 stages leading to the obtainment of desired behaviour: initiation of desired reactions, positive reinforcement of reaction, subduing undesired reactions in the presence of de-motivator, consolidating the desired reactions by prolonging the exposure to the stimulus in the presence of a motivator. Behavioural training conducted among meerkats proved to be difficult due to strong social structure and herd-induced behaviour of those animals. Animals in a herd play defined roles and working with a selected individual required additional provision of stimuli. Behavioural pattern modelling based on a cycle of animals' desired reactions to an indicated stimulus must be preceded by defining the motivators and de-motivators specific for a given species and a given individual while taking into consideration all the conditions in which animals are kept.

Keywords:

behaviour patterns, meerkats, positive reinforcement



USE OF POLYMER INCLUSION MEMBRANES FOR METALS RECOVERY

Daria Bożejewicz

Faculty of Mechanical Engineering University of Sciences and Technology in Bydgoszcz

dariabozejewicz@wp.pl

A few words about the author:

Daria Bożejewicz graduated Technology of Chemistry in University of Sciences and Technology in Bydgoszcz. She's interested about recovery of metals, especially polymer inclusion membranes.

Abstract:

The growth of industrial development significantly contributes to the improvement of living comfort, however, the problem of the waste generation being a result of technological processes is still a problem of the modern world. Metal-bearing waste is among the strategic raw materials due to the possibility of their reuse, in fact natural deposits of these raw materials are protected, and it reduces the amount of waste present in landfills. Now, effective methods are being sought for the recovery of non-ferrous metals from industrial waste, using, inter alia, membrane processes (e.g. PIM). In the polymer inclusion membranes use a lot of ion carriers. Methods are being sought to understand the processes that take place inside the membrane. Detailed analysis of the resulting metal ion-carrier complex, it may be useful to use high-resolution mass spectrometry methods and tandem mass spectrometry.

Keywords:

Polymer inclusion membranes (PIMs), ions carriers, high-resolution mass spectrometry, tandem mass spectrometry, recovery of metals



FORCED CONVECTION EVAPORATION FOR BULK PROTEIN CRYSTALLIZATION

**Michał Kołodziej*, Izabela Poplewska, Maksymilian Olbrycht,
Wojciech Piątkowski, Dorota Antos**

*Department of Chemical and Process Engineering, Rzeszów University of Technology,
Powstańców Warszawy Ave. 6, 35-959 Rzeszów*

*d264@stud.prz.edu.pl

A few words about the author:

Phd student at Department of Chemical and Process Engineering, scientific interests: downstream processes, protein chromatography and crystallization

Abstract:

Over last years, bulk crystallization of proteins has attracted increasing interest in the pharmaceutical, biotechnological, and food industry. Crystallization process has many advantages over other purification methods, such as: high recovery of product, low reagent costs, inexpensive process equipment, small process volumes and high purification in a single process step. Moreover, crystallization is an attractive formulation method that can be alternative to costly lyophilization procedures. Protein crystals exhibit higher stability, activity and purity of the crystalline biomolecule, reduced bulk storage costs, longer shelf life compared to conventional formulation methods that are based on aqueous solutions, amorphous lyophilizates, or spray-dried preparations.

In our work forced convection evaporation was adopted for bulk protein crystallization. As a model system ovalbumin in aqueous solutions of ammonium sulfate was used. The crystallization process was performed in a drying chamber, where the protein solution was contacted with a warm air stream. The process design was guided by crystallization phase diagram and kinetic measurements. The rate of water evaporation was adjusted by temperature and flowrate of air in such a way that supersaturation degree of the solution was kept within the crystallization operating window. A high yield of the operation was obtained in a single crystallization stage.

Keywords:

protein crystallization, downstream processes, evaporation



APPLICATION OF AQUEOUS TWO-PHASE EXTRACTION AND CENTRIFUGAL PARTITION CHROMATOGRAPHY IN PURIFICATION OF MONOCLONAL ANTIBODIES

Wojciech Kazimierz Marek*, Wojciech Piątkowski, Dorota Antos

Rzeszow University of Technology, Powstańców Warszawy 6, 35-959 Rzeszów, Poland

**wmarek@prz.edu.pl*

A few words about the author:

I am a scientist and a teacher at Rzeszow University of Technology in Poland, Faculty of Chemistry in Department of Chemical and Process Engineering. I work generally on modeling and optimization of protein purification processes.

Abstract:

The most expensive step in downstream processing of monoclonal antibodies is protein A chromatography. Therefore, to reduce the cost of the chromatographic operation an alternative pre-purification method can be used. In this work a method based on coupling aqueous two-phase extraction (ATPE) and centrifugal partition chromatography (CPC) was developed. The subject of the study was a CHO cell-culture supernatant (Harvest), which contained monoclonal antibody IgG1. ATPE was used for clarification, concentration and capture of the target product and partial separation of impurities in one or two stages.

Alternatively, CPC, which is a multistage-extraction process, comprising several hundreds of extraction stages, was applied. The bottom phase produced in the first ATPE-stage was further processed in a CPC system. Fractions collected from ATPE and CPC were analyzed in protein A chromatography for the antibody concentration and purity.

Keywords:

Antibody purification, Extraction, ATPE, Chromatography, CPC



PURIFICATION OF ANTIBODIES BY CRYSTALLIZATION

Maksymilian Olbrycht*, Michał Kołodziej, Dorota Antos, Wojciech Piątkowski

Rzeszów University of Technology, al. Powstanców Warszawy 12, 35-959 Rzeszów, Poland

*m.olbrycht@prz.edu.pl

A few words about the author:

PhD. Research assistant at Rzeszów University of Technology. Department of Chemical and Process Engineering.

Abstract:

Proteins are becoming more important in pharmaceutical industry these days. Manufacturing of pure protein is very complex process consisting of a few different steps. Protein purification process usually contains one or more chromatographic steps like: affinity, hydrophobic interaction or ion exchange chromatography. All these methods can provide protein with high purity but are also relatively expensive. Therefore, developing of alternative methods as crystallization is highly needed. Crystallization of protein is usually more economical process than chromatography. Moreover, protein in form of crystalline phase is more biologically stable than producing with other methods.

In this study crystallization of human antibodies IgG1 was investigated. Crystallization was induced by salting out with solution of kosmotropic salt.

Keywords:

proteins, crystallization, antibodies, protein purification



COMPARISON OF THE INFLUENCE OF UV RADIATION AND THE PROTECTIVE EFFECT OF NIACINAMIDE ON TWO MELANOMA CELL LINES - METASTATIC AND DERIVED FROM PRIMARY CANCER SITE

**Wioletta Zielińska*, Marta Hałas-Wiśniewska, Klaudia Mikołajczyk,
Magdalena Izdebska, Alina Grzanka**

*Department of Histology and Embryology, Faculty of Medicine, Karłowicza 24, 85-092 Bydgoszcz
Nicolaus Copernicus University in Toruń, Collegium Medicum in Bydgoszcz, Poland*

*wzielinska94@hotmail.com

A few words about the author:

I graduated from biotechnology and since then I have been an employee of Histology and Embryology department of Collegium Medicum in Bydgoszcz.

Abstract:

Introduction

It is commonly known that excessive exposure to ultraviolet radiation results in DNA damage, which may lead to cancer development. In the case of cancer cells, that have already appeared, UV radiation leads to increased invasiveness, which is the basis of metastasis process. Our previous studies showed that niacinamide is able to reduce negative changes caused by UV radiation within the normal (CHO AA8 fibroblasts) and cancer cells (A375 melanoma). The aim of this study was the comparison of limiting effect of niacinamide on damages caused by UVB radiation between two melanoma cell lines (A375 and RPMI) with different characteristics.

Materials and methods

The human melanoma cells were treated with UVB radiation, niacinamide or their combinations. The methods used include analysis of cell death and cell cycle. The levels and recombinations of the main cellular proteins were visualized using fluorescence staining or western blot analysis of the cytoskeletal proteins and those involved in cell-cell contacts. Moreover, the melanoma cells aggressiveness was evaluated by migration assay.

Results

The obtained results suggest the possibility of niacinamide usage in the aim to prevent negative impact of UV radiation. The compound used helps not only to maintain the structure of the main cytoskeletal proteins, but also prevents the caused by UV radiation increase of metastatic potential of melanoma cells. The results were confirmed in the case of both cell lines.

Keywords:

niacinamide, melanoma, A375 cell line, RPMI cell line, UVB



THE COMPARISON OF THE ENERGY EXPENDITURE WHILE PLAYING VIRTUAL VIDEO GAME USING TYPICAL CONTROLLERS AND MULTI-DIRECTIONAL TREADMILL

Jacek Polechoński

*Department of Tourism and Pro-Health Physical Activity,
The Jerzy Kukuczka Academy of Physical Education, Katowice, Poland*

j.polechonski@awf.katowice.pl

A few words about the author:

PhD in Physical Education.

Abstract:

Virtual reality is increasingly used in various fields of human life. It is entering the area of physical activity. Recently, have been invented devices for locomotion in virtual reality (VR). One of the first devices of this type is multi-directional treadmill Virtuix OMNI. The aim of the study was to compare the energy expenditure while playing virtual video game using typical controllers and OMNI treadmill. The study involved 22 intentionally selected students of the Academy of Physical Education in Katowice (7 women and 15 men). The first stage of the study included playing for 15 minutes using typical motion controllers. In the second stage of research, students participated in the same game while moving on the treadmill. Physical activity was assessed using the Polar V800 heart monitor. The energy expenditure and intensity of physical exercise of students during virtual games was estimated. It turned out that students playing on the treadmill burned three times more calories than playing with typical controllers. On the treadmill the intensity of physical effort was vigorous, and when playing without locomotion it was between low and medium level. Active virtual video games practiced on a multidirectional treadmill can stimulate to intensive physical effort, and their systematic practice can facilitate the implementation of health-relation recommendations.

Keywords:

energy expenditure, virtual video games, multi-directional treadmill



DENDROREMEDIATION – PHYTOREMEDIATION WITH THE USE OF TREES

Sylwia Budzyńska

Poznań University of Life Sciences, Wojska Polskiego 28, 60-637 Poznań, Poland

sylwia.k.budzynska@gmail.com

A few words about the author:

I am a PhD student at the Department of Chemistry at the Faculty of Wood Technology, the University of Life Sciences, Poznań. I am a chemist and my specialisation is environmental chemistry. I work in an analytical chemistry laboratory.

Abstract:

Increasing pollution of the environment as a consequence of an anthropogenic activation forces us to search for effective methods of reclamation of polluted matrices. One of the technique is phytoremediation. This biological method exploits plants as tools to clean soil, air and water. Phytoextraction is a subgroup of phytoremediation involving pollutant uptake by a root system and their transport to aboveground plant parts where they are accumulated. The described method bears a huge potential in cleaning of the environment from heavy metals and metalloids deposited mainly in soils. It is very crucial to find species able to grow on substrates extremely polluted by trace elements because they can be used in the future as pioneer species while planting polluted areas.

Phytoremediation with the use of trees, dendroremediation, as plants capable of effective uptake of heavy metal/metalloids has become a promising solution to a global problem of environmental pollution. Trees are characterised by huge biomass, expanded root system and relatively low habitat requirements, due to which they seem to be dedicated to phytoremediation purposes. A significant aspect of mechanisms occurring in phytoremediation is the influence of environmental factors changing the effectiveness of element phytoextraction by trees.

The aim of my study is to investigate the use of native tree species and their abilities to growth on substrate enriched with selected arsenic (As) forms.

Keywords:

phytoremediation, arsenite, arsenate, dimethylarsinic, environmental pollution



EVALUATION OF THE POROSITY OF THE ALSi7MG ALLOY PRODUCED BY THE SQUEEZE CASTING METHOD

Kinga Boron

Czestochowa University of Technology

boron.kinga@wip.pcz.pl

A few words about the author:

I am a PhD student at the Department of Foundry of the Czestochowa University of Technology. My technical interests are non-ferrous alloys, mainly aluminum alloys.

Abstract:

The paper presents the results of investigations of the porosity of castings of the AlSi7Mg alloy panel produced by the squeeze casting method and for comparison using the die-casting method. In order to evaluate the distribution of porosity, the tests were carried out on samples taken from the middle part of the panel and the outside part.

The hydrostatic weighing method was used to measure the porosity. The study also evaluated the effect of the pressing pressure on structural changes in silumin castings. It has been shown that the influence of pressure on the solidifying casting reduces on average twice the porosity in the middle area of the panels. In the case of external areas of the panel, the effects of squeeze casting are not clear, however, a decrease in porosity of approx. 0.3% is revealed.

Keywords:

squeeze casting, AlSi7Mg alloy, porosity



ENVIRONMENTAL PROTECTION AGAINST POLLUTANT EMISSIONS DURING PRODUCTION ELECTRICITY

Aleksandra Czajkowska

University of Science and Technology in Bydgoszcz, Faculty of Mechanical Engineering

czajkowska.aleksandra91@gmail.com

A few words about the author:

PhD Student on Mechanical Engineering Faculty at the University of Science and Technology in Bydgoszcz. Specialization in terms of the electricity generation, diagnosing and operation of the ESP. Currently she works in IT company, as Product Manager.

Abstract:

The Energy Policy is developed by the European Commission for countries belonging to the European Union, activities that accomplished the goals were included Green Paper. Goals concern the reduction of harmful greenhouse gases until to 2020 at least 20% compared to 1990. The result of production the energy into power boilers are pollutions. Into the dusting medium are included chemical compounds as: oxides (O₂), in particular carbon monoxide (CO), sulfur dioxide (SO₂), carbon dioxide (CO₂), nitrogen dioxide (NO₂), hydrogen fluoride (HF) and carbon tetrachloride (CCl₄). Phenomena enabling the purification of flue gases, which correct use allows their subsequent use during defining the mechanism of the electrostatic precipitator, included: electrostatics, mechanics of aerosols or thermodynamics. Emission standards of NO_x, SO_x and dust are included in the regulation of Environment Minister in Poland of 4th November 2014 on „The emission standards for certain types of installation, fuel combustion plants and waste incineration or co-incineration facilities” they refer to functionality. The methodology of the conducted research is changed with the tightening of EU regulations relate to environmental protection. It is extremely important to monitor the indicated parameters due to the environment and on the impact of individual chemical elements on individual components, subassemblies devices included in the composition power units.

Keywords:

the electrostatic precipitator, flue gas desulphurization and denitrogenising, Union Directives, Regulation of the Environment Minister, exhaust gas purifying



THE DEVELOPMENT OF ELECTROSTATIC PRECIPITATORS IN TERMS OF INCREASING THE EFFICIENCY OF DUST REMOVAL

Aleksandra Czajkowska

University of Science and Technology in Bydgoszcz, Faculty of Mechanical Engineering

czajkowska.aleksandra91@gmail.com

A few words about the author:

PhD Student on Mechanical Engineering Faculty at the University of Science and Technology in Bydgoszcz. Specialization in terms of the electricity generation, diagnosing and operation of the ESP. Currently she works in IT company, as Product Manager.

Abstract:

First studies and patents related to electrostatic duct collectors popularly called electrostatic precipitators come from the beginning of the 20th century. Effective equipment development has been around since the 1970s under the influence of tougher standards for air cleanliness. New construction solutions appeared and were better known the electrostatic dedusting theory. Researches in the following decades was associated not only with obtaining high efficiency of the device operation but also high reliability and availability of these devices. The development trends of this area are focused on improvement economical construction and operation of the device. The principle of electrostatic precipitators operation had not changed for decades but their construction has developed towards reduction in mass, overall dimensions while improving the dust removal efficiency. Electrostatic precipitators are among the most effective dust collectors used in the industry. Patents are being created on an ongoing basis which aim to modernize and upgrade the existing exhaust fumes dedusting methods and the device. Maintaining electrostatic precipitator efficiency is extremely important due to the role of electrostatic precipitators in the pollution purification process. Critical devices reliability has been enforced by maintaining the continuity of the production process (in this case, electricity production).

Keywords:

increase in the device's operating efficiency, trends in the electrostatic precipitators development, the exhaust fumes dedusting process



POWDER PROPERTIES MODIFICATION BY MIXING IN A PLANETARY BALL MILL

Sylvia Kozdra*, Ireneusz Opaliński, Karolina Leś, Mateusz Przywara

Rzeszów University of Technology, al. Powstańców Warszawy 6, 35-959 Rzeszów, Poland,

**s.kozdra@prz.edu.pl*

A few words about the author:

Ph.D. student in the Department of Chemical and Process Engineering. Graduated with a MA and BA degree in 2013. Current interest: mechanochemical modification of powder materials properties, solid electrolytes for Li-ion batteries.

Abstract:

Mixing techniques are considered to be the most effective, solvent free methods for powder properties modification, especially polymers, used for prepare advanced materials for example solid polymer electrolytes in portable, energy storage systems.

The high energy mixing in a planetary ball mill was used as a method of flowability and crystal structure of polyvinylidene fluoride modification. The influence of mixing speed was investigated. The polymorphism changes were analyzed using infrared spectroscopy (FTIR), and flowability was determined by Carr's indices. Particle size distribution was also determined using laser diffraction technique.

The results clearly support the view, that high energy mixing has a pronounced effect on the tested properties. Changes of powder flowability were analyzed using Carr's indices. Significant changes in particle size distribution as well as crystal structure changes caused by mechanical forces were shown.

Keywords:

high energy mixing, planetary ball mill, polyvinylidene fluoride, mechanical modification



HIGH ENERGY MIXING AS A METHOD OF COHESIVE POWDERS FLOWABILITY IMPROVEMENT

Karolina Leś*, Sylwia Kozdra, Mateusz Przywara, Ireneusz Opaliński

*Rzeszow University of Technology, Department of Chemical and Process Engineering,
Powstancow Warszawy 6, 35-959 Rzeszow*

*ichkl@prz.edu.pl

A few words about the author:

Research and teaching assistant at Rzeszow University of Technology. In 2018 she earned a Ph.D. in chemical engineering. Current research activities: investigation and mechanochemical modification of mechanical and rheological properties of powders.

Abstract:

High energy mixing in a planetary ball mill as a new method of powder flowability improvement was investigated. Silica nanoparticles were mixed with cohesive, industrially exploited fine powders to obtain dry coating phenomenon. Flowability improvement as the effect of dry particle coating was expressed by decreasing the values of flowability indices: an angle of repose and a compressibility index. Based on the experiments the optimal process conditions were determined. The morphology of the surface of the particles after high energy mixing was investigated using scanning electron microscope to validate the deposition of silica particles on the surface of bigger host particles. The results showed that high energy mixing is an efficient tool for cohesive powders flowability improvement.

Keywords:

flowability, high energy mixing, cohesive powder, dry coating, planetary ball mill



THE INFLUENCE OF SOLID PHASE PARTICLES CONTENT ON THE RHEOLOGICAL AND FORCE ABSORBING PROPERTIES OF SHEAR THICKENING FLUIDS

Paulina Nakonieczna*, Łukasz Wierzbicki, Marcin Leonowicz

*Faculty of Materials Science and Engineering, Warsaw University of Technology,
ul. Woloska 141, 02-507 Warsaw, Poland*

*Paulina.Nakonieczna.dokt@pw.edu.pl

A few words about the author:

PhD student at the Faculty of Material Science in the Warsaw University of Technology.

Abstract:

Shear thickening fluids are the materials that give the opportunities to create a great energy absorption system, which can be used in smart armours or sport protectors. A dilatant fluid is the one, viscosity of which increases abruptly with growing shear rate. If the applied shear rate is beyond the critical value, the fluid transforms from liquid-like to solid-like state. The unique properties of the STFs make them an ideal protection for human body. Good dilatant fluids have to have not only appropriate rheological properties and protecting capability, but also they cannot change the properties over time.

In the current experiment two types of shear thickening fluids were used. To produce STFs 50 and 55% volume fraction of amorphous silica were mixed with polypropylene glycol of 2000 molar mass. The rheological properties of shear thickening fluids were investigated. Rheological studies were performed using an ARES rheometer, equipped with two parallel plates with a gap between them of 0.3 mm. All the viscosity measurements were taken at the room temperature. Subsequently the STFs were placed in silicon forms for force absorbing tests, which were performed by dropping an impactor with the energy of 5 J. The results of the study have determined the influence of solid phase content on the rheological properties of shear thickening fluids.

Keywords:

Shear thickening fluid, smart material, rheology



COMPUTER SIMULATIONS OF THE INFLUENCE OF MOISTURE OF BIOMASS ON MECHANICAL PROPERTIES WITH DEM METHOD

Mateusz Przywara*, Sylwia Kozdra, Karolina Leś, Ireneusz Opaliński

Rzeszow University of Technology, Powstancow Warszawy Street 6, 35-959 Rzeszow, Poland

*m.przywara@prz.edu.pl

A few words about the author:

Ph.D. graduate from Rzeszow University of Technology in 2010. Former Ph.D. student at the Institute of Catalysis and Surface Chemistry Polish Academy of Sciences. Current research activities: mechanical properties of powders, granulation.

Abstract:

The objective of the thesis was an attempt to examine the influence of moisture content of biomass on mechanical and rheological properties of solid biomass, important for storage and process conditions. Mechanical properties were measured with two experimental methods. Investigating the flowability, based on physical properties of biomass, using HOSOKAWA Powder Tester PT-S and with Jenike shear tester. Computer simulations of shear tests with discrete element method (DEM) has been examined. Experimental method shown that mechanical properties of biomass were worsened (with its strength increasing) when moisture content increased. The influence of humidity should be considered in the context of the dynamic state of the material. The effects of humidity on the mechanical properties may be indicative of the complexity of humidification of agriculture materials, which may cause changes in the chemical structure and physical structure of the surface or the interior of the grains. Computer simulations of shear tests with DEM method are conform with experimental results. DEM method is useful for computer simulation of the influence of moisture content of the solid biomass on mechanical properties.

Keywords:

DEM metod, biomass, powders, Jenike shear tester



DEPRESSION, ANXIETY AND SUICIDAL THOUGHTS IN PEOPLE SUFFERING FROM ATOPIC DERMATITIS

Michał Murgrabia

Uniwersytet SWPS w Warszawie

mmurgrabia@st.swps.edu.pl

A few words about the author:

I am a student of psychology. I am interested in issues related to how the mental state translates into the skin and how the condition of the skin affects our emotions and behavior. Recently, I have focused on issues related to atopic dermatitis.

Abstract:

Atopic dermatitis is a chronic, recurrent dermatological disease that proceeds with pruritus, with a typical location and characteristic morphology of changes (Wanat-Krzak and Kurzawa, 2006). The disease is related to the mental state of the patient and is associated with many psychological consequences, including, among others, reduced self-esteem, sleep disorders (Kasznia-Kocot, Reichmann, Wypych-Ślusarska, 2014), tendencies to suppress emotions (Kieć-Świerczyńska, et al. , 2008), as well as problems with concentration (Albińska, 2014). Research indicates the relationship between atopic dermatitis and suicidal ideation both in adolescents (Lee and Shin, 2013) and adults (Kimata, 2006). The latest meta-analysis carried out in 2018 by Rønnstad et al. confirms the positive and significant association between AD in adulthood and depression, anxiety and suicidal thoughts, but the exact causes remain speculative.

Keywords:

Atopic dermatitis, psychosomatics, skin diseases, mental health



THE ROLE OF STRESS IN ATOPIC DERMATITIS

Michał Murgrabia

Uniwersytet SWPS w Warszawie

mmurgrabia@st.swps.edu.pl

A few words about the author:

I am a student of psychology. I am interested in issues related to how the mental state translates into the skin and how the condition of the skin affects our emotions and behavior. Recently, I have focused on issues related to atopic dermatitis.

Abstract:

The effects of stress can lead to disorders of the immune system, which, in connection with the genetic predisposition of the body, may affect the occurrence of various skin diseases, including Atopic Dermatitis (AD), in which disorders in the secretion and reactivity of neuropeptides play a significant role (Kmieć, Broniarczyk-Dyła, 2008). It seems that psychological stress is the main aggravating factor and often aggravates atopic dermatitis (Nakano-Tahara, Murot, Katayama, 2018). Stressful life events preceding the onset of pruritus were found in > 70% of patients with AD (Faulstich, Williamson, 1985). Therefore, the assessment of factors that exacerbate atopic dermatitis is helpful in treating the disease, and stress can cause the symptoms of the disease (Wollenberg et al., 2018).

Keywords:

atopic dermatitis, stress, psychosomatic,



POST-TRAUMATIC STRESS DISORDER- METHODS OF THERAPY AND TREATMENT

Szymon Peterman

Uniwersytet Opolski

szymon_peterman@yahoo.ie

A few words about the author:

I am a PhD student in humanities at the University of Opole. I am interested in psychology, pedagogy and every field of science in which the subject is a human being.

Abstract:

Post-traumatic stress disorder is classified as an anxiety disorder, an injury that can arise as a result of traumatic psychiatric and physical survival. Strong stress is associated with life experience in which life and human health have been endangered or a person has witnessed dramatic events. Situations that can cause this stress include, among others: serious communication accident, being injured as a result of crime (assault, rape) or being a victim of domestic violence. Post-traumatic stress disorder is not a disease, but what specialists call the "wound of the mind". It depends on us whether the negative symptoms will accompany us, disappear, soften or be minimized. People with post-traumatic stress disorder can not get rid of the brutal situation of the past and remain in it. The present and the thought of the future are being replaced by negative memories in which they are stuck.

Keywords:

anxiety disorder, stress, negative memories



THE POSSIBILITIES OF LOCAL ELECTROMAGNETIC FORCE MEASUREMENTS

Piotr Łukaszewicz

Poznan University of Technology

piotr.lukaszewicz@put.poznan.pl

A few words about the author:

I am an assistant at the Poznan University of Technology. In my research work I deal with the calculation of local forces in electrical machines. When I don't work on my PhD thesis I like running, cycling and play chess.

Abstract:

For calculating local magnetic force the several different methods can be used. These techniques derive from methods of the total magnetic force computation (e.g., work principle, Maxwell stress tensor, equivalent magnetization models). Each of these methods lead to the same results of global force calculation. Unfortunately, the methods equivalent for global force calculation do not guarantee the identity of the results in the case of local force calculations. The best way to evaluate which method gives the most accurate results is verification by measurements. Local force can't be measure directly in practice. However the deformation of a body under external force is totally linked to this force distribution. In TEAM Workshop Problem no. 33a authors propose to place a special cuboidal specimen (Young's modulus = 11 kPa, relative magnetic permeability = 2.5) in a magnetic circuit excited by coils. When the coils are supplied, the magnetic field deform the specimen. To measure the deformation a photograph is taken. The author of this article proposed other possibility to measure body deformation. He also built his own test stand. In this case a permanent magnet generate the magnetic field and a specimen is in the form of a piece of tape. The magnet can be moved in X and Y axes and the specimen is fixed. The deformation is measured by taking a photograph. On this test stand two materials have been investigated: transformer plate and ferromagnetic foil.

Keywords:

local force, electromagnetic force, deformation measurement



AUTISM AND MIRROR NEURONS

Dorota Prędkiewicz

University of Lower Silesia in Wrocław

stado5predki@op.pl

A few words about the author:

I am a PhD student at the University of Lower Silesia in Wrocław. I live and work in Jelenia Góra. I am a neonatal nurse and a speech therapist. My research work is focused on mirror neurons in newborns.

Abstract:

Mirror neurons are located in the cortex before the motor frontal lobe, in the posterior parts of the parietal lobe, and in the areas of the visual cortex located in the temporal lobe. They work independently of our will, i.e. on the principle of reflex (there is a reflexive reflection).

They are responsible, among others, for learning through imitation, establishing interpersonal contacts and empathy. In addition, their action is also associated with the theory of the mind.

Therefore, it is believed that mirror neurons do not work properly in children with autism, so-called hypothesis of a broken mirror (M. Dapretto, 2006). In turn, autism is a neurodevelopmental disorder with many primary causes. So, inspired by the research of American psychologist A. Meltzof, I decided to check the operation of mirror neurons in newborns. The expected testing time is two years. The first part - the examination of reflex reflexes in newborns. While in the second part of the research (at 18 months of life, children who did not reflect), I would like to answer the following questions: What is the relationship between lack of response to neural activity and potential CNS damage? How will the children who were not reflecting during the experiment develop? Will they be developing only towards Autism?

Keywords:

mirror neurons, autism, reflection reflex



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