THE FOURTH EDITION OF THE INTERNATIONAL CONFERENCE

"NEW TRENDS IN ENVIRONMENTAL AND MATERIALS ENGINEERING"

TEME 2017

25th-27th of October 2017

Galați, Romania

BOOK OF ABSTRACTS

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania

Academy of Technical Sciences of Romania

CONTENTS

Plenary lectures

Oral presentations

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

Poster presentations

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

PLENARY LECTURES

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

EXPERIMENTAL RESEARCH ON INCREASING THE DURABILITY OF CAST ATCSI 5 CU 1 ALLOYS FOR SEA SHIPS THROUGH HEAT TREATMENT

Adrian DIMA[1], Iulia-Margareta Dima[2]

[1]Universitatea Tehnica "Gh.Asachi" Iasi, [2]Scoala Gimnazială „I. Simionescu" Iași

Abstract: This paper presents an experimental research on utilization of complex heat treating on aluminum alloys in order to increase their durability. The studied aluminum alloys (more specific, silumin type) practical usage is envisaged to be in marine industry, where fatigue is very important, especially in corrosive medium. The applied complex heat treating is of tremendous importance and the results can be very good.

Actually, durability means a combination of different characteristics that determine the time period in which a cast part can be used in safe conditions. For a seagoing ship condition, the durability of ATCSi 5Cu 1 cast parts depends especially on mechanical resistance and corrosive resistance in marine water.

The present work investigates the possibilities offered by different heat-treating techniques in order to increase the overall durability of the seagoing ships parts by increasing the mechanical resistance and reducing the corrosion in sea water.

This, we conceived an original methodology of experimental research comprising of an optimum combination of adequate heat treating, static and dynamic tests as well as corrosion tests under pressure in similar conditions with sea water.

Keywords: aluminum alloys, heat treating, durability, intercrystalline corrosion

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

AUTENTIFICATION OF AN ANCIENT VIOLIN USING DENDROCHRONOLOGY ASSISTED BY OTHER INSTRUMENTAL METHODS FOR DETERMINATION OF ARCHAEROMETRIC CHARACTERISTICS

Ion SANDU, Petru Ovidiu TANASA, Marius PADURARU, Daniel POTOLINCA,

Viorica VASILACHE,

[1]Alexandru Ioan Cuza University of Iasi, ARHEOINVEST Interdisciplinary Platform, 22 Carol I Blvd., 700506 Iasi, Romania

[2]Romanian Inventors Forum, 3 Sf. Petru Movila St., Bl. L11, III/3, 700089 Iasi, Romania

Abstract: The paper presents the authentication examination of ancient violin by means of the dendrochronological method. By measuring the annual rings from four extensive series from the lower bout, as well as specific archaeometric characteristics of other materials, such as the label holder (leachometric whiteness and viscosity index glycolysis rate), preparation binder (egg white from thin gypsum films) and varnish (identification of flax oil and rosin components, alongside impurities, by OM, SEM-EDX and μ-FTIR), the artefact conservation state is highlighted, as well as the restoration and counterfeiting interventions.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

ORAL PRESENTATIONS

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

GREEN CORROSION INHIBITORS FOR ALUMINUM ALLOYS USED IN THE AEROSPACE INDUSTRY

Alina Maciuca[1], Raluca-Ioana Tampu[1], Oana-Irina Patriciu[1], Nicolae Catalin Tampu[2], Lucian Gavrila[1], Adriana Finaru[1]

[1]"Vasile Alecsandri" University of Bacau, Department of Chemical and Food Engineering

[2]"Vasile Alecsandri" University of Bacau, Department of Industrial Engineering

Corrosion is a natural phenomenon defined as the deterioration of a material or its properties due to the reactions with different compounds present in the environment.

A major concern of the aircraft industries is the aging of the aircraft before of their designed life. Aging and corrosion induce several damages in aircraft parts, leading to lack of structural stability and decreasing performances.

Corrosion inhibitors are substances which added in small concentrations to corrosive media decrease or prevent the reaction of the metal with the aggressive media. It has been recognized that the use of organic inhibitors containing polar functions with nitrogen, sulphur and/or oxygen atoms in the conjugated system, particularly the naturally occurring organic inhibitors of plant origin, are viable and highly beneficial since they are essentially non-toxic, environmentally benign, readily available, renewable and inexpensive.

The aim of or study is to evaluate the inhibitive performances of different plant extracts on the corrosion of aluminum alloys (series 2000 and 7000) in acidic (HCl, HNO_3, H_3PO_4), basic (NaOH) and saline media. For this study we selected two plants: spinach (*Spinacia Oleracea*) and radish (*Raphanus Sativus*) leaves and the residues from the grape (*Vitis vinifera*) and seabuckthorn (*Hippophae*) juice (manly fruit skin and seeds).

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

ANALYSIS OF THE FLOODS EFFECTS IN JUNE 2016 IN THE VORONET RIVER HYDROGRAPHIC BASIN

Luca Mihail[1] Avram Mihaela[2], Marcoie Nicolae[3]

[1]Corresponding Author: PhD eng. Professor, e-mail mluca2004@yahoo.com*, Technical University, „Gh. Asachi", Mangeron Dumitru Str. 63, 770800, Iasi, Romania, Tel./Fax +040 232 270804, [2] PhD Student, Technical University "Gheorghe Asachi" of Iasi, Romania, [3]PhD eng. Associate Professor, Technical University „Gh. Asachi"of Iasi, Romania*

Abstract: The paper presents an analysis of the hydrological risk parameters registered in the Voroneţ river basin. The studies and researches took place on the Voroneţ River after the June 2016 floods. The research has taken into account the hydrological risk parameters of the last 20 years recorded in the Siret River Basin. The river basin of the Siret River has been affected by multiple floods in recent years. The floods have morphologically modified the minor and the major river Voroneţ, a situation that influenced the floodplain areas in the urban and outside. The research analyzed the precipitation, the liquid flows (minimum, average and maximum), the way of formation and evolution of the floods, the volume of the damages produced, etc. The precipitation volume processing indicated a number of factors that have prevailed over the last 20 years. The precipitation value was 71.6 l/m^2 in two days. The flow recorded in the downstream section of the river was 118.12 m^3/s (the probability of calculation is 1%). Processing of liquid flow data revealed more flood flows in the same year. The effects of the floods have materialized through the excessive degradation of shore defence works (about 2600 m) on the Voroneţ River located in the town of Gura Humorului, Voronet neighbourhood and out of the city. The county road DJ 177D was degraded on 1600 m and two bridges were destroyed. Floods have resulted in the destruction of some economic and social objectives in the coastal area. Parameters of hydroclimatic risk highlighted by research impose special conditions for the design of works in the riverbed and the riverine.

Keywords: river, precipitation, flow, flood, settlement, riverine

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

STUDIES AND RESEARCH ON PIPE NETWORKS WATER LOSSES

Ştefania CHIRICA[2], Mihail LUCA[1]

[1] PhD eng. Professor, Technical University „Gh. Asachi", Mangeron Dumitru Str. 63, 770800, Iasi, Romania, Tel./Fax +040 232 270804, e-mail: mluca2015@yahoo.com

[2] PhD Student, Technical University "Gheorghe Asachi" of Iasi, Romania, e-mail: stefania.chirica@gmail.com

ABSTRACT: The issue of water losses in pipe networks (transmission mains, conveyance and distribution pipelines) is one of the major problems encountered in water supply systems management. The losses have reached very high values, in some cases up to 60% of the water volumes entering the networks, and therefore they require urgent measures to reduce them. In Romania, the average non revenue water percentage amounts to 48.3%, ranging from minimum values of 22% and maximum values of about 68%. The significance of addressing this issue properly is reflected in the concern of national and international bodies, such as ARA (Romanian Water Association) and IWA (International Water Association), which analyse the systems' status and establish appropriate directions of action to be followed. The powerful development of industry and intensive agriculture in the last decades, in conjunction with global warming, have had a major impact on water resources. In the international context of quantitative and qualitative water sources reduction, adequate water loss management must become one of the water - sewerage agencies' top priority. Solving this issue requires a long term approach, which involves rehabilitation and modernisation measures, appropriate metering for the supply system's conveying water flows, the implementation of hydraulic modeling software and leakage detection equipment. Water losses can be found under commercial and physical aspects. Amongst these, the physical ones have the highest share, as they affect all the water supply system components: transmission mains and distribution networks, storage tanks etc. Water loss management must

contribute to the efficient resource usage through prevention and intervention measures, adjusted to the particularities of the situation being addressed.

KEYWORDS: water scarcity, physical and apparent water losses, non revenue water, pipe degradation.

USE OF NANOMATERIALS IN PRESERVATION AND RESTORATION OF CULTURAL HERITAGE OBJECTS

Cosmin-Tudor IURCOVSCHI[1], Viorica VASILACHE[2], Ion SANDU[3,4], Ovidiu TĂNASĂ[1], Marius PĂDURARU[1], Daniel POTOLINCĂ[1], Ioan Cristinel NEGRU[1], Dumitru Eugen COLBU[1]

[1]Alexandru Ioan Cuza University of Iasi, Faculty of Geography and Geology, 22 Carol I Blvd., 700506 Iasi, Romania, [2]Alexandru Ioan Cuza University of Iasi, Department of Interdisciplinary Research – Science Field, 54 Lascar Catargi St., 700107 Iasi, Romania, [3]Alexandru Ioan Cuza University of Iasi, ARHEOINVEST Interdisciplinary Platform, 22 Carol I Blvd, 700605 Iasi, Romania, [4]Romanian Inventors Forum, 3 Sf. Petru Movila St., Bl. L11, III/3, 700089 Iasi, Romania

Abstract: Cultural heritage objects, unconcerned of the material they are made of (wood, stone, textiles, etc.), are constantly subject to various types of degradation and damage, which can be reversible or irreversible. For this reason, in order to extend the life of an artifact, both preservation and restoration actions are required. More and more current research focuses on the development and testing of nanomaterials and treatment processes with multiple effects on support. Treatments made with these types of materials do not have side effects on the environment and provide support for increased resistance to water, fire, radiation and to biological attack. Thus, a new research direction has been developed in preserving and restoring cultural heritage by using nanomaterials.

Keywords: nanomaterials, preservation, restoration, cultural heritage

METHODS OF STEEL MANUFACTURING - THE ELECTRIC ARC FURNACE

E. C. Dragna[1*], A. Ioana[1], N. Constantin[1]

[1]University Politehnica of Bucharest, Engineering and Management of Metallic Materials Obtaining Department, Bucharest, Romania

*Corresponding author e-mail: claudiadragna90@gmail.com

Abstract: During the period of a grueling competition, rapid changes and new technologies the production and, above all, the production's planning and supervision can't be implemented without respecting the developments within the market. The production's planning and control area is one of the key areas of the production's management, which must continuously evolve by searching for new methods and tools of increasing the efficiency of the decision-making process. The optimization of the steelmaking process can have radically different approaches, depending on the specific conditions of a steel plant during a specific period of time. When the main object is the cutting down of costs, the optimization can be focused on the decrease of the consumption of electricity, oxygen, carbon, natural gas, etc., with minimal effects on the production.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

COMPARATIVE CORROSION EVALUATION OF GALVANIZED STEEL PASSIVATED WITH TRIVALENT AND HEXAVALENT CHROMIUM SOLUTIONS

Marius SOCOLA[1,2], Valentin Marian DUMITRASCU[1], Sorina PICIORUŞ[2], Lidia BENEA[1,*]

[1]Competences Center: Interfaces-Tribocorrosion-Electrochemical Systems (CC-ITES), Faculty of Marius Socola1,2Engineering, Dunarea de Jos University of Galati, 47 Domnească Street, RO-800008, Galați Romania, [2]ArcelorMittal Galati, 800698, Calea Smârdan, Galați, Romania

*Corresponding author: Phone Number: +40 744216277, e-mail: Lidia.Benea@ugal.ro

Abstract: Galvanized steels are structural materials very commonly used in the automotive industry, construction, bridges, towers, electrical frames, road signs, air conditioning systems, thermal insulation of various pipelines and ship equipment, high strength cables, household equipment and many other uses. They are an excellent choice when low production costs and relatively high corrosion resistance are required.

Hot galvanized sheets have a slight tendency to corrode in contact with mortar, plaster, putty or fresh cement. The waters of the seas and oceans contain significant amounts of chloride ions and are more aggressive than fresh water. The zinc corrosion rate in these salty waters is according to literature data ranging from 10-15 μm / year in the case of continuous dipping. In case of discontinuous dipping (tides, waves, vapors, periodic water spraying), the corrosion rate is higher. At the same time, due to the externally loaded working environment with saline aerosols resulting from the evaporation of sea water, the galvanized sheets used in the construction of various pipes and equipment of the ships are subjected to the corrosion processes.

The research work aims to investigate the corrosion behavior of the hot galvanized steel plates produced on Arcelor Mittal Galati platform in natural seawater harvested in the port area of Mangalia, Romania.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

From the measurements made on the wetting properties for the analyzed surfaces it can be seen that the contact angle for the carbon steel decreases significantly, which demonstrates the formation of a layer of iron oxide on the corrosion surface and its affinity for water. For zinc coated galvanized steel surfaces with trivalent or hexavalent chromium, the contact angle drop was much lower. Galvanized steel with hexavalent chromium showed the smallest decrease in wetting properties after corrosion tests, which confirms the low interaction with electrolyte and also increased corrosion resistance.

Following the analysis of the results obtained in the experimental research activity, we can say that a passivation of the Cr^{3+} and Cr^{6+} galvanized steel leads to an increase in the lifetime of galvanized steel and the corrosion resistance in specific saline acidic media compared to carbon steel.

Keywords: zinc plate, galvanized steel, corrosion, passive, electrochemical impedance spectroscopy, contact angle

NANOSTRUCTURATION AND FUNCTIONALIZATION OF MATERIALS AND BIOMATERIALS BY ELECTROCHEMICAL METHODS - A PROMISING ROUTE

Lidia BENEA, Valentin DUMITRAȘCU

Competences Center: Interfaces-Tribocorrosion-Electrochemical Systems (CC-ITES), Faculty of Engineering, Dunarea de Jos University of Galati, 47 Domnească Street, RO-800008, Galați Romania

e-mail: Lidia Benea@ugal.ro

Abstract: Electrochemical methods for the preparation of high-quality nanostructured surfaces and functionalization through active biomolecules electrodeposition are highlighted in this work.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

There are two applied electrochemical methods in our laboratories in order to obtain hybrid, nanocomposite or nanostructured layers: (i) direct electrochemical synthesis by electro-codeposition process and (ii) electrochemical top-down formation of oxide films. The controlled growth of nanoporous oxide films could be followed by the electrodeposition of hydroxyapatite or organic compounds into porous films. The main goal of the present paper is to make a summary on results obtained from applying electrochemical surface modification techniques in obtaining advanced functional surfaces and their properties characterization in terms of surface morphology and structure (SEM-EDX, XRD), the roughness and thickness, corrosion, tribocorrosion as well as the mechanical properties as nanohardness or wear resistance. Electrodeposition and the combination of electrodeposition with other electrochemical processes as controlled oxide growth by anodization can lead to a large class of nanostructured surfaces as hybrid layers, nano or micro-composite coatings or nanostructured films on different support materials and structures necessary for a future based on nanotechnology and nanomaterials. The electrochemical methods could improve the surface properties of materials face of aggressive environments and degradation processes in specific environments. Therefore, more valuable industrial and biomedical applications could be obtained by increasing the materials life cycle in specific applications.

Keywords: electrochemical methods, nanocomposite layers, hybrid layers, nanoporous oxide films, bioactive polymers.

DEGRADATION OF MARINE STRUCTURES BY CORROSION AND PREVENTION METHODS

Laurentiu MARDARE1, Lidia BENEA[1,*]

[1]Competences Center: Interfaces-Tribocorrosion-Electrochemical Systems, Faculty of Engineering, Dunarea de Jos University of Galati, Domnească Street, 47, RO-800008, Galați Romania

*Corresponding author: e-mail: Lidia.Benea@ugal.ro

Abstract: There is an increasing attention being given to deterioration of infrastructure exposed to actual hostile marine environments. As a result, structural engineers and naval architects are increasingly interested in the rate of loss of strength of steel and hence in the loss of material in the infrastructure systems. The loss of material even for short-term exposures is important in part because protective measures are not always wholly effective.

The steel is the most versatile, least expensive and widely used engineering material which has found extensive application in various industries. It is used in large tonnages in marine applications, nuclear power and fossil fuel power plant, transportation, chemical processing, petroleum production and refining, pipelines, mining, construction as well as metal-processing equipment. However, the corrosion resistance of steel is relatively limited. This causes many corrosion problems to be arising in the related industries.

Corrosion degradation, crack growth and collisions are the most frequent damage scenarios in marine structures. Corrosion leads to increase of surface roughness, reduction of the plate thickness and strength, and eventually plate perforation and leakage.

The corrosion of metals is a natural process with economic, environmental, and technical consequences. Utilizing organic coatings serve as a key method to protect metal structures against corrosion. The most effective way to protect a metallic structure against corrosion is by applying

a physical layer, such as an organic, inorganic or conversion coating. The selection of a coating is dependent on the end use and the environment to which it will be exposed. Organic coatings provide barrier protection, inhibiting the action of aggressive species, whereas inorganic coatings provide corrosion resistance.

Nanocomposites constitute a class of materials that exhibit advanced properties at low nanoparticle (NP) concentrations in comparison with conventional filler contents in coatings. Selected NPs in coating formulations can enhance various properties of organic coatings, including antifouling, mechanical and optical characteristics, permeability as well as the wettability.

In this research paper there have been evaluated to corrosion resistance of several samples as: (i) low alloy steel E32 without protective coating, (ii) E32 steel coated with polymeric primer, (iii) E32 steel coated with polymeric primer which was further coated with epoxy paint, (iv) E32 coated steel with polymeric primer and epoxy paint blended with TiO2 nanoparticles.

All samples have been subjected to corrosion in seawater collected from Black Sea, Constanta harbor basin. The corrosion properties were studied using electrochemical methods such as: open circuit potential (OCP), polarization resistance (RP), and electrochemical impedance spectroscopy (EIS). The results show an improved corrosion resistance of polymeric coatings in marine environment compared with uncoated steel.

ELECTROCHEMICAL IN-VITRO PROPERTIES OF 316L STAINLESS STEEL FOR ORTHODONTIC APPLICATIONS

Nicoleta SIMIONESCU[1], Anca RĂVOIU1, Lidia BENEA[1,*]

[1]Competences Center: Interfaces-Tribocorrosion-Electrochemical Systems (CC-ITES), Faculty of Engineering, Dunarea de Jos, University of Galati,47 Domneasca Street, RO-800008, Galati Romania. e-mail: Lidia.Benea@ugal.ro

Abstract: 316L Stainless steels are widely used in biomedical applications with respect to their excellent corrosion resistance, nonmagnetic properties, high ductility and acceptable biocompatibility. There have been made electrochemical studies in-vitro in order to determine the corrosion reactions, which are necessary for foreseeing the behavior of the materials used in orthodontic applications. The degradation of metals and alloys in the human body is a combination of effects due to corrosion and mechanical activities. In dentistry, 316L stainless steel are used in a variety of applications: sterilized instruments, endodontic files in root canal therapy, metal posts in root canal treated teeth, temporary crowns, arch wires and brackets in orthodontics, a necessary condition for these applications must to resist to pitting corrosion. The pitting corrosion can be observed only in the case of passivable steels and in the presence of halogen or sulphur ions, in saline or acidic media like the human body. This type of corrosion propagates under the form of small pits, which give off to a significant quantity of metal ions, being very dangerous to the body. The metal ions resulted from the corrosive processes have allergic, carcinogenic and cytotoxic effects.

The aim of this work was to evaluate the corrosion behaviour of 316L stainless steel immersed in two artificial saliva. The electrochemical measurements such as: Open circuit potential (OCP),

Linear polarization resistance (Rp), Electroochemical Impedance Spectroscopy (EIS), and Cyclic Voltammetry (CV) methods were used to fulfill the corrosion evaluation.

The obtained results conclude that the 316L stainless steel is much more affected by pitting corrosion surface in the saliva medium with higher concentration of chloride content.

Keywords: Corrosion reactions, orthodontic, stainless steel 316L, electrochemical studies

NANOSTRUCTURATION OF MATERIAL SURFACES BY TOP-DOWN ELECTROCHEMICAL TECHINIQUES

Valentin Marian Dumitrascu[1], Lidia Benea[1,*]

[1]Competences Center: Interfaces-Tribocorrosion-Electrochemical Systems (CC-ITES), Faculty of Engineering, Dunarea de Jos University of Galati, 47 Domnească Street, RO-800008, Galați Romania

*Corresponding author: Phone Number: +40 744216277, e-mail: Lidia.Benea@ugal.ro

Abstract: Aluminium and its alloys have excellent durability and corrosion resistance, but their behaviour can be influenced by the environment in which they are used. Aluminium is an active metal and its resistance to corrosion depends by the formation of the protective oxide film. There are several methods to protect the aluminium and its alloys such as: chromating, painting or anodizing. During the anodic oxidation process, the specimens are anodically polarized in an acid electrolyte and on their surfaces are growth nanoporous aluminium oxide layers. The anodic oxidation is the most used method to improve the anti-corrosive properties of the aluminium surface.

The aim of this research work is to use the controlled anodic oxidation method as top-down electrochemical technique to grow a nanoporous aluminum oxide film on aluminium alloy substrate. The obtained nanoporous oxide films are characterized for structural and morphological aspects using ex-situ SEM-EDX analysis. The corrosion resistance performances are also evaluated by in-situ electrochemical methods such as electrochemical impedance spectroscopy (EIS), open circuit potential (OCP) and potentiodynamic polarization (PD). The results are compared with those obtained for untreated aluminim alloy surfaces. By optimizing the parameters of anodic oxidation process, the nanoporous aluminium oxide film becomes more resistant against the corrosive environment.

Keywords: Aluminum alloy, anodic oxidation, corrosion, electrochemical impedance spectroscopy.

SINERGETIC EFFECT OF METABOLIC ALBUMINE AND HYDROGEN PEROXIDE ON ELECTROCHEMICAL BEHAVIOR OF TITANIUM IMPLANT ALLOY

Anca Răvoiu[1], Nicoleta Simionescu[1], Lidia Benea[1,*]

[1]Competences Center: Interfaces-Tribocorrosion-Electrochemical Systems (CC-ITES), Faculty of Engineering, Dunarea de Jos, University of Galati,47 Domneasca Street, RO-800008, Galati Romania.

*Phone number: +40 744216277, e-mail: Lidia.Benea@ugal.ro

Abstract: Synergistic effect is the effect when chemical substances or biological structures interact resulting in an overall effect that is greater than the sum of individual effects of any of them.

Human albumin is the most abundant circulating protein. It accounts for 50-60% of total plasma protein and has important oncotic and non-nociceptive properties. Albumin belongs to a superfamily of globular proteins (albumin) that also includes alpha-fetoprotein, afamin and vitamin D binding protein (DBP) (1). The interest of the medical community for this versatile molecule has increased exponentially in the last decade. This is due to the ligand property of the molecule, which is a true "carrier" for various endogenous and exogenous substances.

Titanium and Titanium alloys are widely used due to good mechanical properties and low density, as well as to its high degree of biocompatibility. The latter is due to the formation of a layer of adherent oxide. The unique properties of these Titanium alloys make them ideal for orthopedic implants without adding too much weight to the limbs or joints.

The use of titanium alloys as biomaterials is increasing due to superior biocompatibility and good corrosion resistance and the applications include dental implants and parts for orthodontic surgery; replacement parts for hip, knee, shoulder, spine, elbow and wrist joints; bone fixation devices such as nails, screws and nuts; housing parts for pacemakers and artificial heart valves; surgical instruments and components in high-speed blood centrifuges.

In situ electrochemical measurements as: open circuit potential (OCP), polarization resistance (Rp), potentiodynamic polarization (PD) and cyclic voltammetry polarization (CV) were performed to monitor the corrosion process. The optical images of the tested samples have been observed before and after corrosion experiments using an optical microscope (Optika) in order to understand the nature of corrosion and the damages produced by this process.

Keywords: Titanium alloy, human albumin, synergetic effect, hydrogen peroxide, implant, electrochemical methods.

ENERGY CONSUMPTION ASSESSMENT IN THE WATER TREATMENT PROCESS, BACĂU CITY CASE STUDY

Florina Fabian[1*], Valentin Nedeff[1], Narcis Bârsan[1], Emilian Mosneguțu[1]

[1]"Vasile Alecsandri" University of Bacau, Romania, 600115, Bacau, Romania

e-mail: florina.fabian@yahoo.com

Abstract: In the national and international context, two general concerns revolve around water treatment processes. First of all, we are talking about energy efficiency and environmental compatibility in the water treatment plants should be continuously improved for rational energy use and renewable energy sources implementing. Thus, the environmental objectives as reducing CO2 emissions and improve energy efficiency are major concerns today. The purpose of this paper is to conduct a study on a water treatment plant and to develop solutions that will lead to the water treatment process efficiency improvements in energy consumption terms.

By applying the carbon footprint methodology, we can find out the environmental impact of the water treatment process. Carbon footprint is the cumulative effect of different human activities on the environment. The total energy demand of water treatment plant Barati (WTP Barati, which treats the water of the city of Bacau) was evaluated at 239.94 MW h/y and the highest energy consumption is registered by the technical building, which represent 40% from total energy consumption. Another important aspect in case of Bacau water treatment plant it is the raw water turbidity, which influence energy quantity used for treatment process.

The results analysis has highlighted two main conclusions of water treatment plant. The weakest point of the WTP Barati is the water distribution system. These are outdated and affects the treated water quality until it reaches to the consumer. The biggest strong point is the raw water quality, which during the winter period reaches a very high level of quality, requiring only a simple chlorination in the treatment system.

Keywords: water treatment, energy consumption, carbon footprint, energy efficiency

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

THE IMPORTANCE OF USING MEMBRANES IN SEAWATER DESALINATION AS A RESULT OF EXCESSIVE EXPLOITATION OF WATER SOURCES

Laurențiu Tătaru[1], Valentin Nedeff[1], Narcis Bârsan[1], Mirela-Panainte Lehăduș[1], Dana-Alexandra Chițimuș[1]

[1]Department of Environmental Engineering and Mechanical Engineering, „Vasile Alecsandri" University of Bacău, Calea Mărășești 157-Bacău, România

Abstract: This paper is a detailed study of the need to find and implement new solutions for water filtration and the promotion of modern techniques that are more effective than traditional methods. As a result of extension waste water pollution as well as low efficiency through classical filtration means, more and more research is being discussed and researched worldwide, focusing on the use of hybrid membranes for seawater desalination. Hybrid membrane filtration processes present a number of advantages including superior water quality but also reduced energy consumption that was needed in previous purification processes. This review describes the water desalination process in detail by looking at the relationship between membrane module operating parameters and energy efficiency. The methodology and the experimental installation of the desalination process will be presented in part. The results of the study clearly showed that the combined use of membrane processes is efficient due to the flexibility of exploitation, the low acquisition costs and the high degree of water filtration through low energy consumption. A major advantage in the use of membranes is that the energy required to conduct filtering processes can be obtained from solar, wind energy, which means significant environmental benefits by promoting "green energy". The worldwide implementation of the use of membrane water desalination methods also involves increasing the percentage of fresh water, so this is a solution to be considered in present and future research.

Keywords: desalination, reverse osmosis, hibryd membranes, salt wastewater

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

HEAVY METALS AND PHYSICO-CHEMICAL PARAMETERS ANALYSIS FROM THE WELLS IN THE BUHOCI AREA, BACAU

Cochiorca Alina[1*], Valentin Nedeff[1], Fiorucci Adriano[2], Mirela Panainte-Lehăduș[1], NarcisBârsan[1], Irimia Oana[1]

[1]Department of Environmental Engineering and Mechanical Engineering, „Vasile Alecsandri" University of Bacău, StreetMărăşeşti 157- Bacău, România

[2]DIATI, Politecnico di Torino, corso Duca degli Abruzzi 24 – 10129 Torino, Italy

Abstract: The study purpose is to analyze the heavy metals concentrations in the water from the Buhoci area wells and to evaluate the physico-chemical parameters of this water. Measurement of physico-chemical parameters were performed on site in five locality points using portable equipment. Heavy metals from these samples were analyzed in the laboratory of Hydrogeology, Politecnico di Torino, Italy. The analyzed water sources are used for domestic consumption. The results of the physico-chemical parameters comparative analysis fall within the limits admitted according to the requirements of Romanian Law no. 458 of July 8, 2002 with values in the range of: pH ≥6.5 - ≤9.5; turbidity (˚C) ≤5; conductivity (µS / cm^2) ≤ 2.500.

Keywords: heavy metals, physico-chemical analyzes, drinking water

RESEARCH ON MEMBRANES WITH DIFFERENT THICKNESSES AND CONCENTRATIONS OF POLYSULFONE WITH APPLICATION ON WASTEWATER TREATMENT

Laurenția Geanina Tiron, Ștefan Cătălin Pintilie, Ștefan Baltă, Maria Vlad

”Dunarea de Jos” University of Galati

e-mail: geanina.tiron@ugal.ro

PERFORMANCE OF [PAC/PSF]-MIXED MATRIX MEMBRANE USED IN DYE WASTEWATER TREATMENT

Ștefan Cătălin Pintilie[a,*], Laurenția Geanina Tiron[b], Andreea Liliana Lazăr[b], Ștefan Baltă[b], Iulian Gabriel Bîrsan[a]

[a]“Dunărea de Jos” University of Galati, Cross-Border Faculty of Humanities, Economics and Engineering, 47th Domnească Street, RO-800008, Galati, Romania

[b]“Dunărea de Jos” University of Galati, Faculty of Engineering, 47th Domnească Street, RO-800008, Galati, Romania

*Corresponding author: stefan.pintilie@ugal.ro

Abstract: The polysulfone used in membrane manufacturing show low performances in wastewater treatment. Researchers worldwide are trying to improve the membrane performance through different techniques: blending, grafting, surface chemical reaction, and nanoparticle incorporation. Blending is an efficient technique with great performance and relative low cost

comparing with other means of membrane enhancement. For this study the composite membranes were synthesized by an immersion-precipitation method using polysulfone (PSf) as polymer precursor and powdered activated carbon (PAC) as additive, all added in n- methylpyrrolidone (NMP) as casting solution. The activated carbon (AC) is used in large scale in conventional wastewater treatment systems, having good antibacterial properties and high absorption of contaminants. The membranes were characterized as follows: flux, permeability, retention of Naphthol Green B dye, contact angle and permeation performances. The permeability results shows better performance than the neat membranes, an important improvement for the composite membranes blended with activate carbon particles.

Keywords: Polysulfone, Activated Carbon, Membrane, Retention, Flux, Permeability.

ANALYSIS OF THE COLLECTED WATER IN TREATMENT PLANTS FROM URBAN LOCALITIES IN SITUATION OF LARGE RAIN AMOUNT

Victorita Radulescu

University Politehnica of Bucharest

Abstract: A major problem in the urban areas consists in the rainwater collection. Sometimes they are captured in the sewage systems and discharged directly into the environment, usually into the river passing through or near the locality concerned. However, they are more than just water runoff loaded with suspensions. From the streets they are loaded with oil and oil residues, collects fuel particles abraded from the tires and brake discs of automobiles and so are sufficiently polluted that actually require a treatment in the municipal waste-water treatment plant as well as other waste waters.

In other cases, they are collected together with the domestic's waste-water or with similar heavily polluted waters, and they reach together in the waste-water treatment plants. In cases of heavy rains generating of flow rates which no treatment plant can not cope, it reaches at large volumes of waste water which are discharged directly into the near rivers. By short-circuiting the treatment plant, it is obtained thus an effect even worse than if only rainwater were discharged untreated into the environment. This paper presents the situation of discharged water into the treatment plant Glina, during some heavy rainfall recorded in Bucharest in 2016.

Some regulations regarding the permissible concentrations of substances in the waste-water treatment compared to the situation analyzed are mentioned. Also, some conclusions and a bibliography is finally presented.

EFFECT OF NUTRIENTS DISCHARGED INTO THE HYDRO-POWER LAKES OVER THE DEVELOPMENT OF AQUATIC MACROPHYTES

Victorita Radulescu

University Politehnica of Bucharest

Abstract: In the last decades on the shores of hydropower lakes appeared small businesses, developers woodworking, of leather, paper making or meat processing (venison or combined meat). The discharging waste water from technological processes, after a shortly remediation and decontamination, into the water of the lakes or into the natural course of water from where the water was diverted. This processed water is often charged with organic or inorganic waste substances that can disturb the ecological balance of the area.

In a short time, due to excessive intake of nutrients appeared a huge development of the aquatic vegetation of type algae and macrophytes. This paper intends to present an analysis of the Pangarati Lake, situated on the Bistrita River.

In the lake they were made measurements of water quality and was examined how it influences the developing of excessive aquatic vegetation in 2012-2016. There are analyzed different types of present aquatic vegetation developed in excess. This plant mass decreased the useful volume of the hydropower, capable of being used to produce electricity. Finally, are presented some conclusions and references.

POSTER PRESENTATIONS

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

CHROMITE. PROCESSING AND APPLICATIONS

Marius VASILESCU, Mircea DOBRESCU

University Politehnica of Bucharest

Abstract: In the paper are shown the history, processing and applications of chromite.

Chromite is an oxide of iron and chromium having chemical composition $FeO.Cr_2O_3$ and belonging to the spinel group.

Theoretically it contains 46.5%Cr and 25.8%Fe and their oxides.

The technology of obtaining chromite is based on the principle of gravity separation and agglomeration.

Between the applications we mentioned:

- Ferrochrome;
- Stainless steel;
- Nickel chromium alloys;
- Nonferrous alloys;
- Foundry.

Keywords: chromite, processing, applications.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania

Academy of Technical Sciences of Romania

HEMATITE. PROCESSING AND APPLICATIONS

Mircea DOBRESCU, Marius VASILESCU

University Politehnica of Bucharest

Abstract: In the paper are shown the history, processing and applications of hematite.

Hematite is an oxide of iron having the composition Fe2O3. Pure hematite, also called “red ore” contains 70%Fe.

Manufacturing processes, for steel as example are made in furnaces (open hearth, Bessemer processes, oxygen furnace, electric arc furnaces).

Hematite is used both as an ore of iron and as an industrial mineral in order to produce intermediate products like:

- Sinter;
- Pellets;
- Pig iron;
- Malleable cast iron;
- High duty cast iron;
- Wrought iron;
- Directly reduced iron;
- Iron carbide;
- Steel.

Keywords: hematite, processing, applications.

STUDY OF THE CORROSION WHICH OCCURS IN THE STEAM PIPES OF BOILERS

Alaa ABOU HARB[1], Ion CIUCA[2], BILEL RAHALI[3], Roxana-Alexandra GHEŢA[4]

[1]PhD Student, Doctoral School faculty of Material Science and Engineering, University Polytechnic of Bucharest, Romania, e-mail: alaaabouhareb84@hotmail.com

[2]Prof.univ.dr.ing. Faculty of Material Science and Engineering, University Polytechnic of Bucharest, Romania, e-mail: ion.ciuca@medu.edu.ro

[3]PhD Student, Doctoral School of Engineering and Management of Technological Systems, University Polytechnic of Bucharest, Romania, e-mail: bilel.rahalii@gmail.com

[4]PhD Student, Doctoral School of Engineering and Management of Technological Systems, Industrial Engineering Department, University Polytechnic of Bucharest, Romania,

e-mail: roxana_gheta@yahoo.com

Abstract: Corrosion was verified using the experiment of weight loss of specimens from steam boiler pipes which made of 1010 carbon steel with a thickness of 4 mm. These specimens were compared with a non-service specimen to determine the effect of corrosion environment to characteristics of the specimens studied. We compared the results that have been obtained through tensile curves and hardness properties for both specimens. We concluded that there was an increase in the properties of tensile and hardness for both specimens by comparing them with a sample that is not in service. Due to overheating which caused by deposition of layers of lime on the pipes. The corrosion was verified by weight loss on all the specimens in the environment of corrosion which contains one of solution (NaOH, $BaCl_2$, NaCl-H_2O_2) at normal temperature to mimic the defect of the corrosive environment.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

REMOVAL OF SALICYLIC ACID FROM AQUEOUS SOLUTION BY ADSORPTION ONTO NANOHYDROXYAPATITE

Gabriela CIOBANU*, Maria HARJA

"Gheorghe Asachi" Technical University of Iasi, Faculty of Chemical Engineering and Environmental Protection, Prof. dr. docent Dimitrie Mangeron Rd., no. 63, zip 700050, Iaşi, Romania; *Corresponding author: gciobanu03@yahoo.co.uk

Abstract: The purpose of the present study is to investigate the adsorption of salicylic acid from the industrial effluents discharged from the pharmaceutical industry. The adsorbent used is nanocrystalline hydroxyapatite that was prepared by a wet precipitation method by using $Ca(NO_3)_2 \cdot 4H_2O$ and $(NH_4)_2HPO_4$ as main materials. Hydroxyapatite, $Ca_{10}(PO_4)_6(OH)_2$, due to the specific structure have an adsorption affinity towards many pollutants. The structure of the nanohydroxyapatite adsorbent was investigated by applying XRD, BET and SEM-EDX methods. The size of hydroxyapatite crystals was smaller than 100 nm. The nanohydroxyapatite samples have a high specific surface area of 325 m^2/g and 69 m^2/g for the uncalcined and calcined hydroxyapatite samples, respectively. The batch adsorption experiments were carried out to investigate the influence of different parameters, such as average adsorbent dosage, contact time, solution pH and temperature. The kinetic studies indicated that the salicylic acid adsorption on the uncalcined hydroxyapatite is more productive than calcined nanohydroxyapatites samples.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

DECONTAMINATION OF NITROPHENOLIC POLLUTANTS AND METABOLIC INHIBITORS BY YEAST *SACHAROMYCES CEREVISIAE*

Marius Zaharia[1*], Olga Pintilie[2], Gabi Drochioiu[1], Aurel Pui[1], Robert Gradinaru[1],

Lucia Carmen Trinca[3], Viorica Vasilache[2], Ion Sandu[2,4*]

[1]Department of Chemistry, Al. I. Cuza University of Iasi, 11 Carol I, Iasi 700506, Romania,

[2]Department of Geography and Geology, Al. I. Cuza University of Iaşi, 11 Carol I, Iasi, 700506, Romania

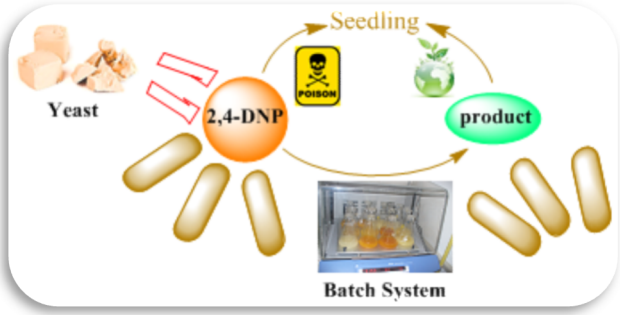
[3] Ion Ionescu de la Brad University of Agricultural Sciences and Veterinary Medicine, Exact Sciences Department, 3 Mihail Sadoveanu Alley, 700490, Iasi, Romania

[4]ARHEOINVEST Interdisciplinary Platform, Laboratory of Scientific Investigation and Conservation of Cultural Heritage, Al. I. Cuza University of Iasi, 22 Carol I, 700506, Iasi, Romania

Corresponding author: e-mail*:* zaharia.marius2011@yahoo.com*;* ion.sandu@uaic.ro

Abstract: Dinitrophenol derivatives have recently received a great deal of attention along the time both from point of view of their applications and impact on the environment [1]. They have multiple biological effects, being used in agriculture as fungicides, herbicides and insecticides, or in medicine and biology as metabolic inhibitors [2]. Despite the valuable contributions associated with the use of nitroaromatic compounds, many of these biologically active chemicals represent a potential hazard to humans and environment. They also enter the environment as accidental transportation spills and as leaks coming from storage containers [3]. These compounds cannot be easily removed from contaminated waters and soils by chemical reactions.

However, actions of some microorganisms in water might be the most important processes of nitrophenolic compounds removal from water [4]. Since the bioremediation, which involves microorganisms in the removal of various pollutants, is a promising, relatively efficient, and cost-effective technology, we propose here the use of Saccharomyces cerevisiae as a nitrophenolic compounds biodegradating and bioaccumulating material, due to easy availability and low cost of yeast suspensions [5]



References

1. X. Q. Chi, J. J. Zhang, S. Zhao, N. Y. Zhou, Environ. Pollut., 172, 33-41 (2013).
2. E. Colman, Regul. Toxicol. Pharm., 48, 115–117 (2007).
3. E. Miranda, I.M. Mcintyre, D.R. Parker, R.D. Gary, B.K. Logan, J. Anal. Toxicol., 30, 219-222 (2006).
4. M. Megharaj, B. Ramakrishnan, K. Venkateswarlu, N. Sethunathan, R. Naidu, Environ. Int., 37, 1362–1375 (2011).
5. M. Zaharia, D. Maftei, C.A. Dumitras-Hutanu, A. Pui, Z.C. Lagobo, O. Pintilie, R. Gradinaru, Rev. Chim. (Bucharest) 64, 388-392, (2013).

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

POLY VINYL CHLORIDE WASTES RECYCLING TECHNOLOGIES. A REVIEW

Zosin Sergiu PETRI[1,2], Mihail Simion BELDEAN-GALEA[1], Dumitru RISTOIU[1]

[1]Babeș-Bolyai University, Faculty of Environmental Science and Engineering, 30 Fantanele street, Cluj-Napoca, Romania

[2]SC Teraplast Bistrita, Industrial Park, DN15A (Reghin-Bistrita) Km 45+500, 427298, Romania

Abstract: Polymeric materials have become an essential part of our modern lifestyle, and their production has considerable increased during the last decades. One of the most used polymers is Poly Vinyl Chloride (PVC). It can be processed into a wide variety of short-life or long-life products and can be used in different industrial sectors. As a result of increasing consumption of PVC a large amount of wastes are generated, creating serious problems on their deposal and treatment. Thus, in the last time there is a considerable public concern regarding the treatment of these wastes and the results of the research in this direction were not delayed.

Reuse of waste and recycled of PVC plastic materials has drawn attention of researchers in last times, and many technologies or processes were proposed.

This paper summarizes the current published literature until 2016 referred to the most used technologies of PVC wastes treatment putting accent of mechanical and chemical recycling as well as of energy-recovery techniques.

Different aspects related to the environmental impact generated by the proposed PVC treatment technologies as well as the special problems raised of some proposed processes are discussed.

Finally, some recommendations resulted from the studied bibliography are underlined.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

OBJECT ORIENTED ARCHITECTURE FOR PRODUCT INFORMATION SYSTEM ENGINEERING

BILEL RAHALI[1], CORNELIU NEAGU[2], ALAA ABOU HARB[3]

[1]PhD Student, Doctoral School Engineering and Management of Technological Systems, University Polytechnic of Bucharest, Romania, e-mail: bilel.rahalii@gmail.com
[2]Prof.univ.dr.ing, Faculty Engineering and Management of Technological Systems, University Polytechnic of Bucharest, Romania, e-mail: necupb@gmail.com
[3]PhD Student, Doctoral School of material science and engineering, University Polytechnic of Bucharest, Romania, e-mail: alaaabouhareb84@hotmail.com

Abstract: Product information systems have become a critical element for the enterprises to support their product offer definition process. Indeed, with the complexity of the product offer and in a concurrent engineering context, mastery of technical information has become a crucial and difficult subject: crucial because any failure in the management of information is translated immediately by non-qualities but also difficult due to the dynamics of the system.

The product information system is an organizational device for regulating the creation, circulation, use and evolution of the information assets of the product definitions product, it means, all the information that defines how the product is designed, manufactured and used.

The company SOTACIB (Tunisian Cement Manufacturing Company) itself assembles these production elements (from the basic composition phase to the final phase).Our application provides a computerized management system for the technical data to the product manufacturing profession, its objective is to support the development activities of the cement product by preparing atomized powder such as grinding, controlling the parameters of the slip, sieving and finally atomization, a UML modeling of the system is developed in the context of a driven approach by the use cases centered on a proposed architecture.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

DETERMINATION OF THE OPTIMAL FREE SPACE FOR THE 180 T LIQUID STEEL CONTAINER, BASED ON THE THERMAL BALANCE

Adrian VASILIU

”Dunarea de Jos” University of Galati

e-mail: avasiliu@ugal.ro

Abstract: The objective of the work is to optimize the free space of the 180 t liquid steel container from OLD 1 from the ArcelorMittal Galaţi plant on the basis of the thermal balance when the refractory wear layer is made of magnesia bricks, case and refractory concrete BR 94 in the second case.

OXYGEN-ENRICHMENT OF THE AIR NEEDED FOR COMBUSTION IN THE IGNITION OVEN FROM THE AGLOMERATION PROCESS

Adrian VASILIU
”Dunarea de Jos” University of Galati
e-mail: avasiliu@ugal.ro

Abstract: Comparative study on the use of oxygen-enriched combustion air at the homogenization coal ignition coil from Dwight-Lloyd agglomeration No 5 from the ArcelorMittal Galati metallurgic plant to reduce fuel consumption, increase machine productivity Agglomeration and agglomerate quality.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

A "PATTERN" APPROACH FOR THE SPECIFICATION AND DEVELOPMENT OF INFORMATION SYSTEMS

BILEL RAHALI[1], CORNELIU NEAGU[2], ALAA ABOU HARB[3]

[1]PhD Student, Doctoral School of Engineering and Management of Technological Systems, University Polytechnic of Bucharest, Romania, e-mail: bilel.rahalii@gmail.com

[2]Prof.univ.dr.ing, Faculty of Engineering and Management of Technological Systems, University Polytechnic of Bucharest, Romania, e-mail: necupb@gmail.com

[3]PhD Student, Doctoral School of Material science and Engineering, University Polytechnic of Bucharest, Romania, e-mail: alaaabouhareb84@hotmail.com

Abstract: Patterns such as problem frames and architectural styles are used here as support for formal specification and development of information systems. New schemes of speci fi c problems for information systems are proposed to describe the identified sub-problems and to assist formal specification. The recomposition is done using a component-based approach and an architectural style that makes it possible to bring together the different components. An original method is proposed to accompany this process, with the use of certain UML inputs for the first level of decomposition and then the use of the "patterns". These ideas are illustrated on a case study.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

EXMINING THE EVOLUTION OF MICROSTRUCTURE AND ITS EFFECT ON THE MECHANICAL AND TRIBOLOGICAL PROTERTIES

Stela CONSTANTINESCU

"Dunarea de Jos" University of Galati

e-mail: constantinescu_stela@yahoo.com

Abstract: This paper investigates the superior frictional performance of Ti-DLC films, by examining the evolution of microstructure and its effect on the mechanical and tribological properties. The superior frictional performance of Ti-DLC films can be attributed to the special microstructure related to the development of embedded fullerenelike microostructures as a result of incorporation of TiO2 clusters. The factors contributing to the ultralow friction include high hardness and cohesion, excellent toughness, and high loadbearing capacity (brought by the increased crosslinking and elastic energy storage ability), the friction-induced structural transformation rendering an ultralow shear resistance and the excellent resistance to oxidation-induced mechanical property degradation (due to the doped TiO_2).

The Raman, high resolution transmission electron microscopy, atomic force microscope and microindentation measurements consistently reveal or indicate the formation of curved graphene sheets or fullerenelike microostructures with increasing CH_4/Ar ratio.

Keywords: microstructure, mechanical, tribological properties, diamondlike carbon (DLC) films

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

RESEARCHES ON EPUARE STATION AND THE SEWAGE NETWORK IN THE VILLAGE GHIDIGENI, GALAȚI

Stela CONSTANTINESCU

"Dunarea de Jos" University of Galati

e-mail: constantinescu_stela@yahoo.com

Abstract: The population of the commune are entitled to use the water supply, either through direct connections to the system, with drinking fountains in the courts or through network drinking fountains located at the street.

The commune has its own water supply, has water source through deep drilling and storage tanks. Household waste water through their contents are not dangerous and their flow is 5 l/s. The activity will have a positive impact in that they will collect household waste water from households, while preventing groundwater pollution.

Sewage network will be made from PVC pipes ready for SN2 main collectors having DN 315/400 mm. Sewage Pipes will be buried on a bed of sand, about 10 cm thick. Pipes and fittings that make up the network of sewers to most chemical resistance presents aqueous.

For waste water treatment there are disagreements from becoming larger. Even in the case of legal amendments or conditions caused by exploitation, technical concepts and procedures that will ensure the greatest possible flexibility of the sewage treatment plant.

Keywords: wastewater, groundwater, sewage network, broadband, wastewater treatment

STUDIES OF VIBRATIONS INDUCED AND THEIR EFFECT ON THE RIVER SHIP CREW FATIGUE

Laurentiu Picu, Eugen Victor Cristian RUSU
"Dunarea de Jos" University of Galati

Abstract: This paper explores the vibrations of a river ship and its effects on crew fatigue. The crew of a ship is subject to WBV; this stress is continued after the working program, because the crew does not leave the ship. These vibrations can impair well-being, efficiency and the health of people on board; this leads to the muscle and bone system disorder of the hand, arm, neck and back and also can cause damage to the ship and its cargo, and can compromise the safety of the vessel. The vibrations transmitted to the crew in different positions on the ship were measured and the degree of fatigue was analyzed. The results were worrying and it emphasizes the need to maintain a good technical state of the equipment to reduce the effects of vibrations on the crew.

TENSILE PROPERTIES OF POLYMER CONCRETE WITH WASTES

Gavril SOSOI[a], Catalina GRADINARU[a*], Gabriel BEJAN[a], Andrei BURLACU[b], Adrian A. SERBANOIU[b], Marinela BARBUTA[a*]
[a]"Gheorghe Asachi" Technical University of Iaşi Faculty of Civil Engineering and Services, 45 D. Mangeron Blvd., Iaşi, 700050, Romania
*corresponding author: e-mail: barbuta31bmc@yahoo.com

Abstract: The wastes represent today an important problem for the environment because they pollute, they occupy big spaces, they cannot be easily destroyed, etc. Scientists try many ways to

consume the wastes. One way is to use them in building material industry as components of different materials. In the paper are analyzed the tensile properties (flexural strength and split tensile strength) of polymer concrete prepared with epoxy resin, two sorts of aggregate and different types of wastes. Fly ash was used as filler and PET waste was used as replacement of sand in dosages between 25% and 100%. The effects of wastes on the tensile properties of concrete are discussed. The Pet waste presented for the mix with 25% replacement of sand a higher value of flexural strength than the control mix without PET waste. In the case of split tensile strength, all mixes with PET waste as substitution of sand presented higher values than that of the control mix.

INVESTIGATION OF ILLICIT TRAFFICKING IN CULTURAL GOODS AT THE BORDER CROSSINGS FROM ROMANIA

Marius PĂDURARU[1], Ion SANDU[2], Ovidiu TĂNASĂ[1], Daniel POTOLINCĂ[1], Ioan Cristinel NEGRU[1],Cosmin Tudor IURCOVSCHI[1]
[1]Alexandru Ioan Cuza University of Iasi, Faculty of Geography and Geology, 22 Blvd Carol I, Corp G-Demisol, 700506, Iasi, Romania, padurarumrs@yahoo.com
[2]Alexandru Ioan Cuza University of Iasi, Arheoinvest Interdisciplinary Platform, 22 Blvd Carol I, Corp G-Demisol, 700506, Iasi, Romania;

Abstract: Most often trafficked cultural heritage goods are often sold illicitly on the territory of another state than the one of origin, because in this way the good is sold more easily, the people involved are harder to identify and in some cases the amount obtained from the sale is increased.

The terrorist attacks committed lately on the territory of some european states have led to the adoption of measures to strengthen the border control of persons and goods crossing the borders of the European Union. In this context, the fight against illicit trafficking in cultural goods at border

crossings has been intensified, given that any information regarding persons and goods involved in this phenomenon can be exploited in the framework of systematic checks carried out and cooperation with the authorities with attributions from other European countries.

Taking into account the fact that the persons involved in the criminal phenomenon usually adapt to the countermeasures this article aims to highlight the evolution of the illicit trafficking in cultural goods from the intensification of the border control, the new methods used in order to establish appropriate ways to combat and mitigate this phenomenon.

To illustrate the characteristics of this phenomenon in the article are presented cases of goods that could be part of the cultural heritage discovered at the border crossings from Romania. The paper continues other studies in this area and it can be useful to law enforcement authorities, academics and anyone who wants to improve their knowledge.

Keywords: cultural goods, systematic checks, strengthen, illicit trafficking, evolution, methods, combat

SECURITY PRINTING USING INKS WITH NANOPARTICLES AS ANTI-CONTERFEITING APPLICATION

Ovidiu TĂNASĂ[1], Ion SANDU[2], Cosmin Tudor IURCOVSCHI[1], Marius PĂDURARU[1],

Daniel POTOLINCĂ[1], Ioan Cristinel NEGRU[1]

[1]Universitatea „Al. I. Cuza”, Facultatea de Geografie – Geologie, Școala Doctorală de Chimie și Științe ale Vieţii și Pământului, Blvd. Carol I, Nr. 20A, 700505, Iași, România

[2]Universitatea „Al. I. Cuza”, Platforma Interdisciplinară ARHEOINVEST, Blvd. Carol I, Nr. 11, 700506, Iași, România

ENVIRONMENTAL MONITORING FROM AN SPACE CORRESPONDING TO A HIGHER EDUCATION INSTITUTION

Carmen Duma, Viorel Dragan, Vasile Basliu
”Dunarea de Jos” University of Galati
e-mail: vbasliu@ugal.ro

ELECTROCHEMICAL CORROSION BEHAVIOR OF AISI 304 AND 316L AUSTENITIC STAINLESS STEEL SHEETS WHICH WELDED BY TIG

Alaa ABOU HARB[1], Ion CIUCA[2], BILEL RAHALI[3]
[1]PhD Student, Doctoral School faculty Material Science and Engineering, University Polytechnic of Bucharest, Romania, e-mail: alaaabouhareb84@hotmail.com
[2]Prof.univ.dr.ing. Faculty Material Science and Engineering, University Polytechnic of Bucharest, Romania, e-mail: ion.ciuca@medu.edu.ro
[3]PhD Student, Doctoral School Engineering and Management of Technological Systems, University Polytechnic of Bucharest, Romania, e-mail: bilel.rahalii@gmail.com

Abstract: The welding technique used for ASIS 304 and 316L austenitic stainless steel sheets both with Dimensions (20×20×3 mm3) is gas tungsten arc welding (TIG). Specimens of two types were compared in the following manner: between specimen of 304 with welding and without it, and the same for specimens 316L. To study the corrosion behavior, electrochemical technique was used to determine the resistance of these types to different solutions. Corrosion was verified through SEM photographs of three main areas: base metal (BM), welding metal (WM) and heat affected zone (HAZ) in order to determine the effect of the type of TIG welding on the corrosion behavior of both types.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

RESEARCHES ON WATER QUALITY AND HEAVY METALS DETERMINATION FROM DANUBE RIVER NEAR GALATI

Papadatu Carmen Penelopi, Bordei Marian
”Dunarea de Jos” University of Galati
e-mail: mbordei@ugal.ro

Abstract: This paper presents a monitoring study accomplished on water samples collected from some points of Danube River situated in Galati County, from Romania. The heavy metals concentrations were determined using the Atomic Absorbtion Spectroscopy (AAS) Technique, together with some physical parameters. This paper can be a review of the researches realized in 2016.

Keywords: heavy metal determination; water; quality

THERMAL ANALYSIS OF INOCULATED GREY CAST IRONS

Elena Loredana NEACSU, Anamaria N. COJOCARU

POLITEHNICA University of Bucharest, 313 Spl. Independentei, RO-060042, Bucharest, Romania; neacsuelenaloredana@gmail.com

Abstract: Thermal analysis can be used to determine inoculants performance, apart from the traditional usage of thermal analysis to determine the percentage of carbon equivalent liquidus, carbon and silicon levels, it can also be used to monitor metallurgical processes and identify

potential problems areas such as low nodule count, under-cooled graphite and carbide/chill propensity [1-2-3].

Today, TA can be used to predict alloy composition, grain refining in steel, aluminum, magnesium and other alloys, eutectic morphology (e.g., graphite morphology in cast irons or degree of modification in Al alloys) and shrinkage propensity. Computer analysis of the cooling curve can provide quantitative information on solidification, such as latent heat of solidification, evolution of fraction solid, amounts of phases, dendrite coherency and dendrite arm spacing.

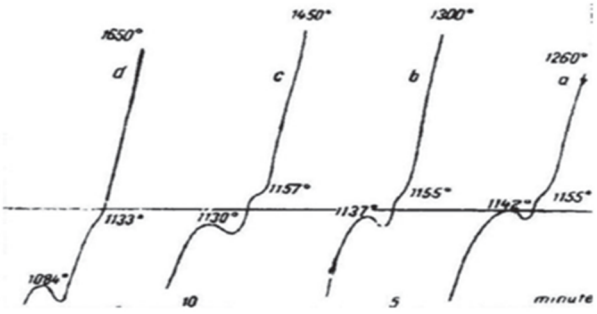


Figure 1. Effect of superheating on the eutectic temperature of gray iron (after Esser and Lautenbusch).

Two types of cups are currently widely used in casting practice: sand cups and metal cups. Sand cups are cheaper, but a metal cup allows for a more precise positioning of the thermocouple and more consistent filling.

Keywords: Thermal Analysis, Cooling Curve Analysis Differential Thermal Analysis, Cast Iron

Selective references:

[1] A. Udroiu, (2002), The use of Thermal Analysis for Process Control of Ductile Iron, Seminarium Nova cast, Italy.

[2] J. corneli, V.Ettinger, W. Baumgart, (2004), Thermal analysis ,an Unique Fingerprint of a melt ,66th World Foundry Congress 6-9 , pp. 743-756.

[3] Seidu, S.O (2008). Influence of Inoculant's type on thermal analysis parameters of ductile irons, 4th internaltion conference, Galati, Romania, pp. 237-241.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

ANALYSIS AND RECOVERY OF SLUDGE FROM THE WASTEWATER TREATMENT PLANT FROM GALAȚI, FOR THE USE OF IN AGRICULTURE

Beatrice Tudor
”Dunarea de Jos” University of Galati
e-mail: btudor@ugal.ro

Abstract: Use of the sludge in agriculture, is considered the most sustainable option of sewage-sludge management. The purpose of the use of sludge in agriculture, is the recovery of content of nutrients and organic matter to mud, to improve the fertility of the land and reduce dependence on chemical fertilizers to farmers. Damaging effects, of soil, water, vegetation, animals and humans, due to this, pollutants can be reduced by using mud. Application of sewage-sludge on agricultural land, is generally the most economical solution, though, because it is seasonal shows opportunity for recycling nutrients, organic matter, and plants for agricultural crops. Nitrogen and potassium contained in mud, Supplement consistently demand for fertilizers. Soil fertility can also increases by improving physical properties of the soil, through the application and incorporation of organic matter contained in the mud.

STUDY ON THE CHEMICAL POLLUTION OF THE SOIL, FROM THE RESIDUAL LAKE OF THE BAUXITE "MINERI"-TULCEA

Anisoara Ciocan, Beatrice Tudor
”Dunarea de Jos” University of Galati
e-mail: btudor@ugal.ro

Abstract: The paper presents a study on the impact of chemical pollution of the soil, from residual Lake with bauxite, "Mineri", in the areal of Tulcea. Soil samples were taken from the immediate

vicinity of the lake and analyzed to determine the chemical elements, pH and soil moisture, and the bioremediation methods that could be applied to diminish the effects of chemical soil pollution.

BIOCORROSION BEHAVIOR OF A DENTAL SHAPE MEMORY ALLOY

C. Gurau, G. Gurau

”Dunarea de Jos” University of Galati, Faculty of Engineering, Domnească Street, 47, RO-800008, Galati, Romania

e-mail: ggurau@ugal.ro

Abstract: Designing shape memory alloys (SMAs) with suitable mechanical properties, playing a predominant role as functional biomaterials and targeted degradation behavior is a goal in recent time. Biocompatibility within the human body environment, is the essential requirement of metals and their alloys used in reconstructive surgery, such as dental implants. In this research, a cooper based SMA was proposed to replace the most common dental bronze, benefit of unique property of pseudoelasticity. Therefore, alloys that performs well in the air being inert or passive, may suffer a severe corrosion in the body. Biocorrosion is accelerated by aqueous ions inside the complex biomechanical system figurate by the various part of human body. The microstructure and bio-corrosion behaviors of the SMA alloy in NaCl aqueous solution, were systematically investigated for the nine years. The surface morphology of the resulted specimens was investigated using scanning electron microscopy (SEM) equipped with an energy dispersive spectrometry (EDX). Electrochemical tests were conducted using simulated body fluid (SBF) solution.

Keywords: Metallic biomaterials, Biocompatibility, Corrosion, Shape Memory Alloy and Cooper based SMA

METHODS OF STEEL MANUFACTURING - THE ELECTRIC ARC FURNACE

E. C. Dragna[1*], A. Ioana[1], N. Constantin[1]

[1]University Politehnica of Bucharest, Engineering and Management of Metallic Materials Obtaining Department, Bucharest, Romania

[*]CORRESPONDING AUTHOR e-mail: claudiadragna90@gmail.com

Abstract: During the period of a grueling competition, rapid changes and new technologies the production and, above all, the production's planning and supervision can't be implemented without respecting the developments within the market. The production's planning and control area is one of the key areas of the production's management, which must continuously evolve by searching for new methods and tools of increasing the efficiency of the decision-making process. The optimization of the steelmaking process can have radically different approaches, depending on the specific conditions of a steel plant during a specific period of time. When the main object is the cutting down of costs, the optimization can be focused on the decrease of the consumption of electricity, oxygen, carbon, natural gas, etc., with minimal effects on the production.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

COMPARATIVE STUDY REGARDING RETENTION OF ZINC IONS BY DIFFERENT ION EXCHANGE RESINS

Maria Harja[1], Gabriela Ciobanu[1], Olga Kotova[2]

[1]"Gheorghe Asachi" Technical University of Iaşi, Faculty of Chemical Engineering and Environmental Protection, Romania, mharja@tuiasi.ro

[2]Laboratory of Mineral Raw Materials Technology, Institute of Geology, Komi Science Center, Ural Branch of RAS, Syktyvkar, Komi Republic, Russia

Abstract: This work is a study concerning the treatment of industrial wastewater, containing heavy metals. The industrial wastewater is an important source of pollution, but the wastewaters from the electroplating plant are especially important.

The experimental studies have been divided into two categories:

1. Estimating the concentration of zinc ions in the wastewater by monitoring the quality indicators;
2. Estimating the possibility of zinc ions removal, onto three different ion exchange resin.

Experimental tests have been made for the retention of the zinc ions, concerning their retention by using different ion exchange resin: Purolite C 100, Lewatit S 100 and Vionit CS 3. The batch equilibrium system, under isothermal conditions at 298 K, was used for establishing s/L ratio, pH, initial concentration and type of resin influence.

For a study of the influence of reactant ratio were used three different volumes of dry ion exchange resin: 1.5, 2.5 and 4 cm^3, other parameters were constant. The obtained data shows that the increasing of the resin volume determines increasing of removal degree of zinc ions. For Purolite C 100 at 34/100 ratio, removal degree was 94 %, after 15 minutes contact time.

The amount of Zn(II) adsorbed increased as the solid concentration and pH increased, and gradually reached a 99% removal degree at a specific pH value, then it remained constant over a wide pH region.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

In the case of the Lewatit S 100, a higher degree of retention of Zn^{2+} was achieved at pH 6, reaching a value of 91% in the first 20 minutes. In the case of the Vionit CS 3 removal of Zn^{2+} from the solution is carried out at a pH 4, 97% retention degree was recorded after 20 minutes.
The marked Zn^{2+} removal was observed in the neutral to alkaline region, which can be attributed to chemical precipitation of $Zn(OH)_2$. The data obtained at different experimental conditions were fitted with Langmuir, Freundlich, and Toth models. The equilibrium could be described by Langmuir isotherm. The kinetic data for zinc ion retention process follows the pseudo second-order.
The experimental results indicate that the ion exchange is favorable at the lower ionic strength of the solution, and higher pH and temperature. Experimental data demonstrated that the Purolite C 100 resin exhibits increased efficiency compared to the other studied resins and leads to an increase in the Zn^{2+} ion retention rate, proportional to the amount of resin added into the system.
KEYWORDS: ion exchange, isotherm, kinetic, zinc

THE QUALITY OF METAL PRODUCTS MADE ON CNC MACHINES

Neta PUŞCAŞ (POPESCU)

Technical College of Architecture and Public Works ”I. N. Socolescu”, Bucharest, Romania,

Str. Occidentului nr. 12, sector 1

e-mail: netapops@yahoo.com

Abstract: Contemporary market must provide products that adapt to customer needs, which requires large investments and long-term employment. Producers have to take care of the buyers' different way of thinking. The quality of products and services is an important economic indicator. The paper presents studies and researches in the field of bending of metal parts (thickness between

1 and 3 mm) on CNC machines. This paper tries to provide answers to the many problems arising in the companies due to the quality of the economic goods. In the technological flow of achievement of a metal product, bending is very important, the quality and conformity of the product depending on this operation. The paper proposes laborious research and studies on determining the drawings of metal parts with the thickness between 1 and 3 mm, considering that other variables such: the temperature variation during the processes of punching and bending, tool usage, the tolerance between the surfaces of the bending tools, the vibrations of the machines, their usage and the roughness of the sheet metals may influence the quality and precision of the products. The calculation of the drawing (the geometry in plane of the piece) becomes important because it must include the deformation caused by the bending operation. Bending coefficients Kî must compensate for deviations from the final dimensions of the metal parts, because of the many variables that can adversely affect their execution. The bending coefficient Kî is determined by experimental tests and measurements.

Keywords: bend metallic component; quality, conformity, other variables, CNC machines

Ni-P COATING ON STEEL SUPPORT BY ELECTROLESS METHOD

Radu Tamara

”Dunarea de Jos” University of Galati, Romania

e-mail: tradu@ugal.ro

Abstract: To obtain the Ni-P layers with different P contentss, the autocatalytic reduction method was applied (electroless method). Nickel sulfate was used as the nickel ion source and as reducing agent the sodium hypophosphite. Was analyzed: surface morphology, microstructure, layers thickness and corrosion resistance in acidic and basic environment. The research results show a

strong connection between layer characteristics and process parameters: pH and temperature. The analyzed layers show a high stability in 10% NaOH solution and different corrosion rates in HCl solutions (1N and 0.5N) depending on the phosphorus content in the layer.

Keywords: Ni-P alloys,macrostructure, microstructure,corrosion resistance.Keywords: Ni-P alloys,macrostructure, microstructure, corrosion resistance.

DOSE-RESPONSE ANALYSIS APPLIED IN ENVIRONMENTAL RISK ASSESSMENT

Radu Tamara

”Dunarea de Jos” University of Galati, Romania

e-mail: tradu@ugal.ro

Abstract: The environmental risk assessment of pollution with various noxis and toxic substances can be made by establishing the likelihood of the harmful effect occurrence due to exposure to specific doses of that pollutant. Risk identification in this case is done through the dose-response method, namely the determination of the relationship between exposure to a hazard and the likelihood of negative effects occurring. The paper presents the risks of exposure to accidental pollution of the atmosphere with chlorine. All available information on the toxic effects of chlorine was collected and assessed to determine the possible risks associated with exposure to this toxic gas. The dose-response method was applied qualitatively and the effect level (response) was established on different classes from the no visible effect at adverse effects.

Keywords: chlorine, toxic effects, exposure assessment, risk characterization.

MANAGEMENT OF THE ENVIRONMENTAL RISKS IDENTIFIED IN AN ORGANIZATION

Radu Tamara
Dunărea de Jos University of Galați, Romania
e-mail: tradu@ugal.ro

Abstract: Response to risk is a process that is directly involved in risk management and is governed by the organization's security strategy, environmental characteristics and security mechanisms. The management identifies the options available to respond to the risk and analyzes the effects of these options on the likelihood and impact of a risk, in close connection with the availability for the risk and cost-benefit ratio, and then conceives and implements actions of response to risk. These steps are integral parts of risk management and contribute to bringing the level of risk within agreed tolerance limits. The paper presents the evaluation of risk management options and the way of environmental risk management decision making. The multi-criteria analysis of risk management options and the use of the precautionary principle are also presented

Keywords: risk management, options, decision making, multi-criteria analysis

THE INFLUENCE OF MOISTURE ON THERMAL CONDUCTIVITY FOR BUILDING MATERIALS

Gelu COMAN, Krisztina UZUNEANU, Simona PARASCHIV

Thermal Systems and Environmental Engineering Department,

Faculty of Engineering, "Dunărea de Jos" University of Galaţi, Romania,

Gelu.Coman@ugal.ro, Krisztina.Uzuneanu@ugal.ro, Simona.Paraschiv@ugal.ro

Abstract: The purpose of the study is to determine the influence of moisture on thermal conductivity for a range of building materials. A series of building materials and insulation materials have a porous, fibrous or granular structure, in which blanks are filled with air. If these areas are filled with moisture or water, the thermal conductivity of the material increases, and decrease the insulation capacity. The thermal conductivity of the analyzed materials was measured in accordance with ISO 8301 protocols.

Keywords: water absorption; moisture; thermal conductivity

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

STUDY ABOUT THE PERCEPTION OF PRODUCERS FROM ROMANIA REGARDING THE ECOLABEL

Antonina Temea[1], Valentin Nedeff[1], Mirela Panainte-Lehăduş[1], Narcis Bârsan[1],

Claudia Tomozei[1]

[1]Department of Environmental Engineering and Mechanical Engineering, „Vasile Alecsandri" University of Bacău, Calea Mărăşeşti 157 - Bacău, România

Abstract: The purpose of this paper is to obtain information about the Romanian producers perspective on some key elements regarding the environmental aspects of their company, data on the certification SR EN ISO 14001: 2015 and the ecolabel in Romania. A questionnaire of 25 questions was developed and used for data collection, which was sent between February - April 2017 by email to approximately 531 companies representing the five active sectors in Romania. We received 189 responses that will help us to identify the main issues related to the certification SR EN ISO 14001: 2015, the ecolabel and the environmental aspects of different industries. There is, a relatively low interest of companies in assessing environmental performance using independent tools. However, the low percentage of participating companies responding to the questions is relatively small, which shows that companies that really wanted to make a comprehensive environmental management assessment have been looking to answer as many as possible of questions.

Keywords: ecolabel, certification, environmental aspects, producers

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

STUDY ON TRIBOLOGICAL PROPERTIES OF EPOXY MATRIX COMPOSITES MODIFIED WITH DIFFERENT MIXTURE OF GLUCOSE, GELATINE AND GLUTEN

Iulia Graur, Vasile Bria, Adrian Cîrciumaru, Maria Pascal, Cristian Munteniţă
”Dunarea de Jos” University of Galati
e-mail: iulia.graur@ugal.ro

MECHANICAL PROPERTIES OF EPOXY MATRIX COMPOSITES MODIFIED WITH DIFFERENT MIXTURE OF ORGANIC AGENTS

Cristian Munteniţă, Cristina Munteanu, Adrian Cîrciumaru, Vasile Bria, Iulia Graur
”Dunarea de Jos” University of Galati
e-mail: iulia.graur@ugal.ro

FUEL CONSUMPTION STUDY FOR AUXILIARY ENGINES THAT EQUIP AN OIL TANKER

Mariana LUPCHIAN
“Dunărea de Jos” University of Galaţi, Romania
Mariana.Lupchian@ugal.ro

Abstract: In the paper is studied an oil tanker, which was investigated the propulsion system with internal combustion engine during navigation. For a power plant with internal combustion engines we distinguish the subsystems: the internal combustion engine; consumer (s); mechanisms and

auxiliary installations of the internal combustion engine power plant. The energy required for the proper functioning of the energy system is provided by engines with which it is equipped. During the voyage the ship has several conditions for navigation, and the main engine and auxiliary machinery does not work all the time on the same charge.

KEYWORDS: auxiliary machinery, fuel consumption, internal combustion engine, voyage, oil tanker

EVALUATION OF THE ENVIRONMENTAL IMPACT OF THE ACTIVITIES CARRIED OUT IN THE AREA OF MURIGHIOL CHANNEL TULCEA COUNTY

Ana Maria ARCUȘ, Mircea Viorel DRĂGAN, Vasile BAȘLIU, Laurenția Geanina Tiron

Universitatea „Dunărea de Jos” din Galați

e-mail: arcus.anamaria@yahoo.com

Abstract: The Murighiol Channel area is a part of the Danube Delta Biosphere Reserve, a protected area in which economic activities of the type of tourism can have a negative significant impact if they are not carefully monitored. Thus, knowing the level of pollution in the area, and especially near the boarding house Blue Lagoon, helps us to pay a special attention to the fauna and flora by protecting the environment and giving nature enthusiasts a special area. For this, a series of measures have been taken in the preparation of samples taken from important places near the boarding house. Specific analysis for water, soil and noise were performed.

Keywords: Danube Delta Biosphere Reserve, Murighiol Channel, impact assessment, environmental factors

INFLUENCE OF RATIO OF OVERLAPPING BLADES ON THE OPERATION OF VERTICAL AXIS WIND TURBINES WITH HEMISPHERICAL CUPS

Nelu CAZACU
Faculty of Enginering, Dunărea de Jos University of Galati, Romania
e-mail: nelu.cazacu@ugal.ro

Abstract: This work is based on an experimental model of vertical axis wind turbine, which used a pair of hemispherical blades (cups) with variable overlap. Maintaining the rotation speed to a constant value and in order to meet an important criterion for a current generator fitted to the shaft via a speed multiplier, is made with a centrifugal mechanism. The experiments conducted in laboratory conditions using experimental model wind tunnel at speeds below 4.5 m / s confirm the validity of the concept.

Keywords: VAWT, Savonius, airfoil, cupa sferica, overlap

INFLUENCE OF GRANULAR SOLID MATERIAL CHARACTERISTICS AND FLUIDIZATION PROPERTIES ON THE GAS-DYNAMICS OF ADJACENT FLUIDIZED BEDS

Nelu CAZACU
Faculty of Enginering, Dunărea de Jos University of Galati, Romania
e-mail: nelu.cazacu@ugal.ro

Abstract: The paper is developed around the adjacent fluidized bed concept (AFB) as an alternative to an open furnace for heat treatment of parts with a high length / diameter ratio. An

experimental fluid bed model was developed from adjacent modules and for which laboratory behavior under stationary and transient conditions for a system with 5 adjacent modules was studied under laboratory conditions. Various sorts of crushed shredder sorted granulometry, and air as fluid for fluidization were used. The behavior of different modes of each module and ensemble has been studied. Also, the behavior of crossing zones and of modules with different regimes. Investigations were investigated: height of the hi layer, pressure drop in the bed Δp, for different granulations and for different fluidization conditions (inlet flow rates). Experiment results confirm the operation of adjacent fluid layers, the ability to independently control each module, and mutual influence within certain boundaries of modules when setting differences exist.

Keywords: Fluidized bed, adiacent fluidized bed, gasdynamic

CONTROL OF THE FLUIDIZED BED SYSTEM BY THE INTENSITY OF MICROWAYS REFLECTED ON THE SUPERIOR SURFACE

Nelu CAZACU[1], Nicuşor NISTOR[2]

[1]Faculty of Enginering, [2]Faculty of Automation, Computers, Electrical Engineering and Electronics, Dunărea de Jos University of Galati, Romania

e-mail: nelu.cazacu@ugal.ro, nicusor.nistor@ugal.ro

Abstract: The importance of the correlation between the flow of the inlet gas mixture, the fluidization velocity and the technological properties of the fluidization is known. The difficulty in measuring the fluid velocity makes it to be only estimated and to use the gas flow at the inlet and the appearance of the layer surface. The paper is based on laboratory experiments performed on a fluidized bed at ambient temperatures and pressures around atmospheric pressure, correlating the state of fluidization with the intensity of the microwave flux reflected from an external source.

Experiments performed confirm the possibility of using microwave reflection on the surface of the fluidized bed for an easy control of fluidization

Keywords: fluidized bed, microwave

CONTROL OF FLUIDIZED BED EXPANDING BY RADIO FREQUENCY DOPLER EFFECT

Nelu CAZACU[1], Nicuşor NISTOR[2]

[1]Faculty of Enginering, [2]Faculty of Automation, Computers, Electrical Engineering and Electronics, Dunărea de Jos University of Galati, Romania

Abstract: "Surface of the fluidized bed is dependent on the intrinsic properties of the medium, and it is possible to correlate the expansion of the layer with the intensity of the fluidization process. The paper is based on experiments conducted under laboratory conditions on a layer of chamotte granulated at 0.10 ... 0.16mm and fluidized with dry air. A data acquisition system measures contactless fluid height by doppler effect in radiofrequency. The experiments confirm the possibility to control the fluidized bed operation by external height measurement and correlation with the internal fluidisation

Keywords: fluidized bed, radio frequency, Doppler effect

CORRELATION OF THE FLUIDIZATION VELOCITY WITH THE FLUID-SPECIFIC FREQUENCY SPECTRUM

Nelu Cazacu, Vasile Bașliu

Universitatea „Dunărea de Jos” din Galați

e-mail: vbasliu@ugal.ro

Abstract: Fluidization represent an attractive process in technological applications due to properties of mass and energy transfer. Fluidization speed influences the transfer processes so that knowledge with high precision allows efficient control of Fluidized Bed Transfer (FBT). The paper aims to find an efficient method of controlling the reproducible fluidization velocity by analyzing the vibration spectrum specific to the fluidized bed in different states. Experimentele de laborator au fost realizate pe un model experimental cu pat fluidizat având următoarele caracteristici: grosimea stratului de 150 mm și grosimea înălțimii 80 mm, șamotul solid granulat cu o granulație de 0,16-0,10 mm și debitele agentului de fluidizare. Investigations have used a data acquisition system SAD with an accelerometer number 4315 and equipment Bruel & Kjaer. Experiments confirm the possibility of controlling FBT by correlating the flow of fluidizing agent using the vibration spectrum.

Keywords: fluidized bed, gas dynamics, minimum fluidization speed, turbulent fluidisation, bubbles, vibrations

FLUIDIZED BED CARBURIZING OF STEEL WITH METHANE IN EXCESS AND LOCAL HEATING OF THE SURFACE OF PARTS BY INDUCTION

Nelu CAZACU[1], Vasile BAŞLIU[1]
[1]Faculty of Enginering, Dunărea de Jos University of Galati, Romania
e-mail: nelu.cazacu@ugal.ro

Abstract: Fluidized bed carburizing is an unconventional method characterized by high carburization speeds, external control of the process through the flow and concentration of the inlet gas mixture. Tthe efficiency of the carburizing process can be increased by using an external surface heating system by induction. Experiments performed confirm the possibility of using the related advantages of fluidization and induction heating to increase the efficiency of the carburizing process"

Keywords: fluidized bed, inductions, heating, carburizing

SYNERGISTIC INTERACTIONS AMONG PLANTS AND BACTERIA IN THE BIOREMEDIATION OF HEAVY METALS CONTAMINATED SOILS

Mihaela Roșca[1*], Raluca Maria Hlihor[1,2], Petronela Cozma[1],
Diana Elena Comăniță[1], Maria Gavrilescu[1,3*]
[1]"Gheorghe Asachi" Technical University of Iasi, Faculty of Chemical Engineering and Environmental Protection, Department of Environmental Engineering and Management, 73 Prof. Dr. Docent D. Mangeron Str., 700050 Iasi, Romania
[2]"Ion Ionescu de la Brad" University of Agricultural Sciences and Veterinary Medicine of Iasi, Faculty of Horticulture, Department of Horticultural Technologies, 3 Mihail Sadoveanu Alley,

700490 Iasi, Romania
[3]Academy of Romanian Scientists, 54 Splaiul Independentei, RO-050094 Bucharest, Romania
*Corresponding authors: m.rosca@ch.tuiasi.ro; mgav@tuiasi.ro

Abstract: Nowadays numerous sites worldwide are contaminated with various organic and inorganic pollutants with different toxic and persistence characteristics. The presence of inorganic toxic pollutants in soils is especially given by heavy metals ions. The removal of these pollutants implies different ex-situ and in-situ conventional technologies (e.g. vitrification, incineration, soil washing, soil vapour extraction, electrokinetic process). However, these methods are complicated, expensive and environmentally destructive due to the steps involved in the cleaning-up of contaminated sites.

Recent studies have shown that biological methods based on phytoremediation (where pollutants are removed by plants) and bioaccumulation (where pollutants are removed by microorganisms) are two in-situ eco-friendly and economically feasible methods used for an efficient remediation of soils. In rhizosphere, some types of bacteria are living on the plant roots which positively influences the plant growth (Plant Growth Promoting Rhizobacteria - PGPR). PGPR can further contribute in the removal of heavy metals ions. Based on this synergic relation between plants and bacteria, a simultaneously removal of the metals through both phytoremediation and bioaccumulation processes is expected.

In this context, the aim of the present work is to highlight the possible relationships between plants and microorganisms and the species forming these types of connections, as well as the possible mechanisms involved in the removal of heavy metal ions from contaminated sites.

Keywords: bioaccumulation, eco-friendly methods, inorganic pollutants, phytoremediation, removal mechanisms.

Acknowledgements: This work was supported by a grant of the Romanian National Authority for Scientific Research, CNCS – UEFISCDI, project number PN-III-P4-ID-PCE-2016-0683, Contract no. 65/2017.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

ANALYSIS OF THE PERFORMANCE COEFFICIENT OF THE ENERGETICAL RECOVERY OF THE DOMESTIC WASTE

Emanuel IACOB, Mariana-Florentina STEFANESCU, Alexandru DOBROVICESCU

Faculty of Mechanical Engineering and Mechatronics, University POLITEHNICA of Bucharest

e-mail: adobrovicescu@yahoo.com

Abstract: The paper critically analyses the way of defining the coefficient of performance of the systems used for the recovery of the energy of the domestic waste in cogeneration plants. The R1 criterion of performance of the European Waste Framework Directive (2008/98/EC) is taken as a base for the discussion.

The philosophy of establishing the form of the coefficient of performance depending on the definition of the system “Product” and “Fuel” is discussed.

It is pointed out the fact that the performance criterion R1 is established on an energetic base that makes it insensitive to the climacteric changes.

To take into account the interaction of the system with the environment in which it operates, the paper proposes to define a coefficient of performance based on the exergy concept that would make evidence of both the quantity and quality of the processed energies.

Keywords: energetic recovery, municipal waste, coefficient of performance

SUSTAINABILITY ANALYSIS OF BIOREMEDIATION AND PHYTOREMEDIATION OF PERSISTENT INORGANIC AND ORGANIC COMPOUNDS IN THE ENVIRONMENT

Cristina Ghinea[1,2], Diana Elena Comanita[1], Laura Carmen Apostol[1,2], Petronela Cozma[1], Maria Gavrilescu[1,3]

[1]"Gheorghe Asachi" Technical University of Iasi, Faculty of Chemical Engineering and Environmental Protection, Department of Environmental Engineering and Management, 73 Prof.dr.docent D. Mangeron Str., 700050 Iasi, Romania

[2]"Stefan cel Mare" University of Suceava, Faculty of Food Engineering, 13 Universitatii Str., 720229 Suceava, Romania

[3]Academy of Romanian Scientists, 54 Splaiul Independentei, RO-050094 Bucharest, Romania

Abstract: Bioremediation and phytoremediation are two bioremediation processes which can be successfully used for the removal of heavy metals and organic compounds from contaminated sites. The aim of this review is to investigate the state of knowledge on bioremediation and phytoremediation, compare and highlight the limitations and challenges associated with these two methods by applying specific methodologies for sustainability assessment. This paper describes the principles and strategies of bioremediation and phytoremediation and the factors that affect them in order to recommend the best ways for application. The mechanisms and some case studies related with these tools are also discussed. Likewise, there are investigated the abilities of microorganisms and plants to tolerate and degrade organic and inorganic pollutants. In the end of the paper there are indicated some suggestions for future bioremediation and phytoremediation based on some specific sustainability indicators.

Keywords: environment, microorganisms, plants, remediation, sustainability

Acknowledgements: This work was supported by a grant of the Romanian National Authority for Scientific Research, CNCS – UEFISCDI, project number PN-III-P4-ID-PCE-2016-0683, contract 65/2017.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

EVALUATION OF BIOREMEDIATION PERFORMANCE FOR THE REMOVAL OF HEAVY METALS FROM SOILS

Elena-Diana Comăniță[1*], Isabela Maria Simion[1,2], Cristina Ghinea[1,3], Petronela Cozma[1], Camelia Smaranda[1], Mihaela Roșca[1], Raluca Maria Hlihor[1,2], Maria Gavrilescu[1,4*]
[1]"Gheorghe Asachi" Technical University of Iasi, Faculty of Chemical Engineering and Environmental Protection, Department of Environmental Engineering and Management, 73 Prof. Dr. Docent D. Mangeron Street, 700050, Iasi, Romania;
[2]"Ion Ionescu de la Brad" University of Agricultural Sciences and Veterinary Medicine, Faculty of Horticulture, Department of Horticultural Technologies, 3 Mihail Sadoveanu Alley, 7004907.Iasi, Romania
[3]Stefan cel Mare University of Suceava, Faculty of Food Engineering, 13 Universitatii Street, 720229 Suceava, Romania
[4]Academy of Romanian Scientists, 54 Splaiul Independentei, RO-050094 Bucharest, Romania
Corresponding authors: e-mails: ed.comanita@tuiasi.ro; mgav@tuiasi.ro

Abstract: Water and soil pollution with a multitude of pollutants, such as nutrients and pesticides, heavy metals and petroleum products, from industrial and agricultural sources, continues to affect people's health and destroys ecosystems. According to the The Sixth Environment Action Programme of the European Community soil is identified as a non-renewable resource, subjected to anthropogenic pressures. Contamination of soils with heavy metals is considered a fairly serious environmental problem at international level. Heavy metals accumulated in soil can affect flora, fauna, and human health near the contaminated site. Considering the acute toxicity of these contaminants, there is an urgent need to develop cost-effective and sustainable methods for the accumulation and degradation of these pollutants using for example bioremediation techniques.
In this context, one of the objectives of the present work is to highlight the main environmental, technical, economic and social performances of bioremediation techniques applied for the removal of heavy metals ions from contaminated sites, based on a review of the available literature. For the evaluation of the bioremediation processes performances a Multicriteria Decision Analysis

(MCDA) methodology can be applied. The most used specific methods of MCDA are: (i) the classical one - Analytical Hierarchy Process (AHP) method; (ii) the outranking approach – Elimination et Choix Traduisant la Realité (ELECTRE) method. All steps of ELECTRE and AHP methods have to be completed so as to achieve the main objective of the study. Therefore, another objective of this analysis is to provide a consistent framework in the decision of the best choices of bioremediation processes. It can effectively reduce subjectivity, one-sidedness of the traditional methods along with providing of scientific reference for effective decision-making in bioremediation processes for removal of heavy metals.

Key words: bioremediation, heavy metals, Multicriteria Decision Analysis (MCDA)
Acknowledgements: This work was supported by a grant of the Romanian National Authority for Scientific Research, CNCS – UEFISCDI, project number PN-III-P4-ID-PCE-2016-0683, Contract no. 65/2017

PHYSICAL RECYCLING SOLUTIONS FOR NON-METALLIC MATERIALS FROM MOBILE PHONE WASTE

A. Ciocan, B. Tudor
"DunArea de Jos" University of Galati
e-mail: aciocan@ugal.ro

Abstract: Achieving of recovery targets for information and communication technology equipments, defined by the EU directives regarding WEEE, requires that from a mobile phone, in addition to all metals, also plastic and ceramic materials must be recycled. Plastics come together with glass as the main components of a cell phone with a ~ 43%. Recycling of organics fractions, separated in the first stage of waste recycling flow-sheet can be make by mechanical and chemical processes or by combustion with energy recovery. The solutions for physical recycling relatively are simple and less pollutant. Practically, investments in equipments and energy costs are reduced.

The resulted recyclables (composites, mixtures, pellets etc.) can be further used to make products usable in many fields. The work presents a brief overview of the sollutions regarding the physical recycling of non-metallic fraction separated from end-of-life cell phones as: reinforcing fillers for polymeric composites; aggregates in molded or shaped concrete; substitute for plastics or other materials in decorative products and as modifier components in asphalts. A major challenge to succes of this recycling operations is solving the difficulties arising primarily from the diverse, complex and toxic compositions of the non-metallic materials separated in this fraction.

ANALYZE OF FACTORS WITH CONSIDERABLE ACTION ON RECYCLING WEEE FOCUSSED ON METALS RECOVERY

A.Ciocan
"Dunarea de Jos" University of Galati
e-mail: aciocan@ugal.ro

Abstract: From an economic point of view, the driving force of rapid technological development of WEEE recycling solutions is the recovery of valuable metals, until not long ago just on copper and gold. Today many other metals have become the target of WEEE recycling. From this point of view the importance of WEEE recycling results from analysis of factors with considerable action on this process. This paper highlights the necessity of WEEE recycling by analyzing the following key issues regarding recovery of valuable metals. The study was mainly focused on following aspects: electronic waste are significant source of base and precious metals, and also of scarce metals; many of the metals wich are essential in the manufacture of EEE; the availability of metals necessary in the production of EEE constantly decreases; supply shortages for many elements obtained from natural resources; worldwide ores reserves are limited and unequal distributed; in the world, the production of essential metals in the construction of a mobile phone

is dominated by a few companies; the extraction of many metals in a ore deposit is co-dependent on others.

ANALYSIS TOOLS FOR SUSTAINABLE MANAGEMENT OF CELL PHONE WASTE IN ORDER TO METALS RECOVERY

A. Ciocan
"Dunarea de Jos" University of Galati
e-mail: aciocan@ugal.ro

Abstract: A modern cell phone contains over 60 metals, combined physically or chemically and in some cases covered with various types of plastics, ceramics, etc. For recycling, each metal from device needs to be analyzed individually. Some of these metals (copper, gold, silver, platinum, tin, yttrium etc.) are valuable and their recovery is effective from point of view of the ecomonic benefits. Others (lead, cadmium, arsenic, mercury etc.) are toxic and environmentally important. Certain metals are valuable but also toxic at the same time. In this study were identified and discussed a series of analysis tools specific to sustainable management of WEEE. Those applicable to recycling of mobile phones waste, operation which has as main objective the recovery of valuable metals, are the following: quantitative evaluation; potential income from the sale of recovered metals; eco-efficiency of recycling; recovery yield of metal; impact on the environment.

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

RECYCLING OF HEMATITE FINE WASTE BY PELLETISATION

Anișoara Ciocan, Beatrice Tudor

"Dunărea de Jos" University of Galati

e-mail: aciocan@ugal.ro

Abstract: A large volume of by-products and residues is generated during iron and steel production. Much of these are valuable materials and can be recovered and recycled inside the flow of integrated steel plants. The fine-grained residues which are rich in iron are usually recycled through sinter plants. This study aims at investigating the potential of pelletisation of two types of hematite fine waste resulted from process of chemical pickling of steel strip. The pelletizing tests were performed in an experimental disc pelletizer. The hematite was mixed with different fluxing and binding agents. The green pellets were then dried, sintered and cooled. The effect of materials mixtures on the physical and chemical characteristics of pellets was determined and analysed in relation with nature of pelletized components.

EFFICIENCY ANALYSIS OF AN ELECTROSTATIC PRECIPITATOR

Spiru Paraschiv, Lizica Simona Paraschiv

"Dunarea de Jos" University of Galati

e-mail: spiru.paraschiv@ugal.ro

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

ASSESSMENT OF ACOUSTIC PARAMETERS DURING OPERATION OF AN INSTALLATION INTENDED FOR OBTAINING OF VEGETAL BIO-STIMULANTS FROM AFTER-CROPPING AGRICULTURAL WASTE AND HERBAL MEDICINAL PRODUCTS

Anghelache Diana, Leopa Adrian

Faculty of Engineering and Agronomic Sciences from Brăila

”Dunarea de Jos“ University of Galati

Abstract: Staff exposure to acoustic sources in industrial environment my cause occurrence of some disturbances to the hearing system but also some short term or long term organic modifications. By this reason, to determine the acoustic parameters in occupational environment cannot be optional, this becoming mandatory related to those previously mentioned. The main goal for determining the level of acoustic parameters during operation of an installation intended for obtaining of vegetal bio-stimulants was their reporting to the allowed values provided by standards regulating this field.

ASSESSMENT OF CONCENTRATION OF SUSPENDED PARTICLES DURING OPERATION OF AN INSTALLATION INTENDED FOR OBTAINING OF VEGETAL BIO-STIMULANTS FROM AFTER-CROPPING AGRICULTURAL WASTE AND HERBAL MEDICINAL PRODUCTS

Leopa Adrian, Anghelache Diana
Faculty of Engineering and Agronomic Sciences from Brăila
”Dunarea de Jos“ University of Galati

Abstract: By its specific, installation intended for obtaining of vegetal bio-stimulants is processing by chopping after-cropping agricultural waste and herbal medicinal products. Avoiding release of suspended and sedimentable particles inside the closure is realized by use of a de-dusting installation that operated according to centrifugal separation principle. The core aim of the paperwork is to measure in situ the concentration of small sized particles which can cause breathing diseases to operators in the occupational environment.

MOLECULAR STRUCTURE OPTIMISATION OF NEW HALLUCINOGENIC AMPHETAMINES

Adelina Ion, Steluta Gosav, Mirela Praisler*
”Dunarea de Jos” University of Galati, Faculty of Science and Environment,
Domnească Street, 47, RO-800008, Galati, Romania
*Corresponding author: Mirela.Praisler@ugal.ro

Abstract: This paper presents the results obtained in optimizing the molecular structure of a series of new hallucinogenic amphetamines. The information technology that has been used generates

the 3D conformation of these molecules based on distance geometry and their energy minimization. The optimized structures allow a more accurate determination of the physico-chemical descriptors and to derive better structure-activity relationships. This approach is especially important in the analysis of drugs of abuse such as hallucinogenic amphetamines, as they are known to have an extremely high toxicity and thus clinical studies are not recommended.

Keywords: hallucinogenic amphetamines, molecular structure optimization, information technology

PHYSICO-CHEMICAL CHARACTERISATION OF NEW HALLUCINOGENIC AMPHETAMINES BASED ON MOLECULAR DESCRIPTORS

Adelina Ion, Steluta Gosav, Mirela Praisler*
"Dunarea de Jos" University of Galati, Faculty of Science and Environment, Domnească Street, 47, RO-800008, Galati, Romania
*Corresponding author: Mirela.Praisler@ugal.ro

Abstract: This paper presents the physico-chemical characterization of the molecular structure of a series of new hallucinogenic amphetamines. The information technology that has been used in order to determine the molecular descriptors characterizing the optimized molecular structures of these Schedule I drugs of abuse is presented in detail. Based on the assumption that similar molecular structures have similar molecular and pharmacological properties, as well as similar spectral properties, a concatenated database including the molecular descriptors and the ATR-FTIR spectra of the targeted compounds has been built. The database allows the chemometrical assessment of the structural similarity of unknown compounds with the class of hallucinogenic amphetamines, based on their ATR-FTIR spectra.

Keywords: hallucinogenic amphetamines, molecular descriptors, ATR-FTIR spectra

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

CHARACTERIZATION OF POROUS PERMEABLE PRODUCTS OBTAINED FROM METALLIC POWDERS WITH PROPERTIES CONTROLLED BY THE CONDITIONS OF OBTAINING

Elisabeta Vasilescu[1], Vlad Gabriel Vasilescu[2]

[1]"Dunarea de Jos" University of Galati, Faculty of Engineering

[2]"Carol Davila" University of Bucharest, Faculty of Dental Medicine

e-mail: evasilescu@ugal.ro

Abstract: This paper work shows experimental results regarding the making of the high porosity materials starting from the nickel powders. The behaviour of the nickel powders obtained by different methods (thermal decompositions of the nickel tetra carbonyl, the gaseous reduction of the nickel oxides) is determined by its physical-chemical characteristics (grain size, shape and morphology, apparent density, specific surface). The researches illustrate once more that even though the technological and physical-chemical characteristics are different, high porosity could be obtained for the same utility of the powder but there are necessary some technical rigorous established conditions.

Keywords: powder metallurgy, characteristics of the permeable and porous materials, porosity, the particle size and morphology, physical and technological characteristics of metal powder

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

STUDIES AND RESEARCH ON OPTIMIZATION OF THE THERMAL / THERMOMECANIC TREATMENT TECHNOLOGY APPLIED TO MICROALLOYED STEEL PRODUCTS

Elisabeta Vasilescu

"Dunarea de Jos" University of Galati, Faculty of Engineering

e-mail: evasilescu@ugal.ro

Abstract: The quality of a product is determined by the set of properties (useful characteristics) that can be observed, tested, measured or at least compared to a standard. The quality of a metal product is determined, first of all, by the properties of the material, which in turn depend on its nature (its type) characterized by the chemical composition and especially by its structure. The structure of a metal material can be modified by thermal and / or thermomechanical processing, so that the quality of products is directly and to the greatest extent influenced by the change of properties. The experimental results regarding the structural changes and the properties obtained by the application of thermal and thermomechanical variants of the samples taken from the microalloyed steel thick sheet. The preliminary results show that physico-mechanical characteristics can be obtained within the limits prescribed by the norms of thermally and / or thermomechanically processed laminated products at minimal costs, under the conditions of rigorous knowledge and observation of the technology, correlated with the quality of the steel (chemical composition). Research experiments have shown that flat products used in the naval field, with thicknesses less than 30 mm, can be delivered in the "thermomechanical normalization" or "top-down" thermomechanical intercritical normalization. These have proved to be thermomechanical processing variants that can guarantee the ensemble of property values regulated by norm and under economic technological conditions.

Keywords: microalloyed steels, chemical composition, mechanical properties, structural state, thermally processed, thermomechanically processed, technological conditions

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

EFFECT OF THE CHEMICAL COMPOSITION ON THE STRUCTURE, MORPHOLOGY AND MECHANICAL PROPERTIES FOR NAVAL STEEL PLATES

Adrian ERCUŢ[a], Mariana BUȘILĂ[a*]
[a]Centre of Nanostructures and Functional Materials - CNMF, Faculty of Engineering, "Dunarea de Jos" University of Galaţi, 111 Domnească Street, 800201, Galaţi, Romania
*Corresponding author: mariana.ibanescu@ugal.ro

INFLUENCE OF THE HEAT TREATMENT PARAMETERS ON THE MORPHOLOGY AND MECHANICAL PROPERTIES FOR HSLA STEELS

Aurel COȘERU[a], Mariana BUȘILĂ[a*]
[a]Centre of Nanostructures and Functional Materials - CNMF, Faculty of Engineering, "Dunarea de Jos" University of Galaţi, 111 Domnească Street, 800201, Galaţi, Romania
*Corresponding author: mariana.ibanescu@ugal.ro

THE INFLUENCE OF THE TEMPERATURE REGIME ON THE MECHANICAL PROPERTIES OF THE THICK STEEL SHEETS FROM THE CARBON AND LOW-ALLOY STEELS, LAMINATED TO THICKNESSES MORE THAN 40 MM

Marian Bordei, Carmen Penelopi Papadatu
"Dunarea de Jos" University of Galaţi
e-mail: Marian.Bordei@ugal.ro

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

THE INFLUENCE OF WASTE WATER COMPOSITION ON THE PUMPING SYSTEM CORROSION

Manuela-Cristina PERJU[1,a], Cristian SAVIN[1], Costică BEJINARIU[1], Carmen NEJNERU[1], Dragoş-Cristian ACHIŢEI[1]

[1]Technical University "Gheorghe Asachi" of Iasi-Romania, Department of Technologies and Equipments for Materials Processing, Blvd. Mangeron, No. 51, 700050, Iasi, Romania

e-mail: acryss_ela@yahoo.com

Abstract: Wastewater piping systems in urban agglomerations or industrial areas have problems with the wear and tear of equipment and water transport pipelines used. The problems are related to hydromecanic wear and corrosion due to the presence of solid particles transported with water and due to the residual chemical compounds resulting from industrial technological processes, as well as the presence of biological waste from domestic consumers.

In the paper are presented the corrosive characteristics of the waste waters and a review of the effects of wear and corrosion in the case of submersible pumps is made.

THE ANALYSIS OF METALLIC BIOMATERIALS AND PROSTHETIC COMPONENTS

Achiței Dragoș Cristian, Cimpoeșu Ramona, Perju Manuela Cristina, Cimpoeșu Nicanor, Țugui Cătălin Andrei
Technical University "Gheorghe Asachi" of Iasi
e-mail: dragos_adc@yahoo.com

Abstract: The paper presents a bibliographic study about the metallic biomaterials, synthesizing the aspects related by properties, applicability, obtaining methods. Biomaterials can be used as medical devices, implants and prostheses. The metallic biomaterials are classified, by chemical composition and structure, in: pure technical metals, metallic alloys and composites with metallic matrix. The material quality of an implant must respect the following criteria: biochemical criteria and biomechanical criteria. According the biochemical criterion, the applicability of a material is determined by his biocompatibility, and from the biochemical criteria, is determined by the fatigue resistance, the most important parameter, but not the only one.

STUDIES REGARDING THE PROPERTIES MODIFICATION OF AISI 310S STEEL

Achiței Dragoș Cristian, Cimpoeșu Ramona, Perju Manuela Cristina, Cimpoeșu Nicanor, Țugui Cătălin Andrei
Technical University "Gheorghe Asachi" of Iasi
e-mail: dragos_adc@yahoo.com

Abstract: The paper presents an analysis of classical heat treatments, which can be applied to AISI310S steel samples. The influence of these heat treatments was highlighted by micro-hardness measurements – Vickers method, and also the structural analysis made on electronic microscope,

at different magnitudes. The AISI 310S steel is part of chrome-nickel stainless steels and presents good resistance properties. These properties are due to principal alloying elements (nickel, chrome) and recommends it being used in corrosive medium and high temperatures.

STRUCTURAL ANALYSIS OF FRAGMENTS OF THE BROKEN COAT OF A CYLINDER WHICH LED TO THE DISMANTLING OF A COMBUSTION ENGINE

Potecasu Florentina, Bordei Marian

"Dunarea de Jos" University of Galaţi
e-mail: Marian.Bordei@ugal.ro

DESTRUCTION OF THE INSIDE PART OF A COAT OF A HARD CHROME CYLINDER USED FOR COMBUSTION ENGINES

Bordei Marian, Potecasu Florentina

"Dunarea de Jos" University of Galaţi
e-mail: Marian.Bordei@ugal.ro

THE EVOLUTION OF CONSERVATION OF OLD DOCUMENTS FROM ARCHIVES. CASE-STUDIES

Maria BOUTIUC (HAULICA), Petru Ovidiu TANASA, Marius PADURARU,

Daniel POTOLINCA, Viorica VASILACHE, Ion SANDU

[1]Alexandru Ioan Cuza University of Iasi, ARHEOINVEST Interdisciplinary Platform, 22 Carol I Blvd., 700506 Iasi, Romania

[2]Romanian Inventors Forum, 3 Sf. Petru Movila St., Bl. L11, III/3, 700089 Iasi, Romania

e-mail: sandu_i03@yahoo.com

A CASE-STUDY REGARDING THE EVOLUTION OF CONSERVATION STATE OF SOME ARTEFACTS MADE OF ORGANIC MATTER FROM THE PONI-CERNATESCU MUSEUM

Oana FLORESCU, Maria BOUTIUC (HAULICA), Viorica VASILACHE, Ion SANDU

[1]Alexandru Ioan Cuza University of Iasi, ARHEOINVEST Interdisciplinary Platform, 22 Carol I Blvd., 700506 Iasi, Romania

[2]Romanian Inventors Forum, 3 Sf. Petru Movila St., Bl. L11, III/3, 700089 Iasi, Romania

e-mail: sandu_i03@yahoo.com

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

THE ARCHAEOMETRIC AND CHEMOMETRIC CHARACTERISTICS ACQUIRED OVER TIME OF WOOD ARTIFACTS BY CHANGING THE NORMAL RANGE VARIATION OF HYGROSCOPIC BALANCE

Amir GHAVIDELESFAHLAN[1], Viorica VASILACHE[1], Andrei Victor SANDU[2,3], Ion SANDU[1,3]

[1]Alexandru Ioan Cuza University of Iasi, ARHEOINVEST Interdisciplinary Platform, 22 Carol I Blvd., 700506 Iasi, Romania

[2]Gheorghe Asachi Technical University of Iasi, Faculty of Materials Science and Engineering, 64 Dumitru Mangeron St., 700050 Iasi, Romania

[3]Romanian Inventors Forum, 3 Sf. Petru Movila St., Bl. L11, III/3, 700089 Iasi, Romania

Abstract: The paper present archaeometric and chemometric characteristics acquired in along the historical contexts by the artefacts wood by modifying the normal range of hygroscopic balance under the influence of environmental and anthropic factors. Also, presented changes microscopic anatomical and macroscopic features (dilation and shrinkage, specific weight, porosity, color on the three sections R, T and L etc.).

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

DETERIORATION AND DEGRADATION OF ANCIENT TEXTILES UNDER THE INFLUENCE OF ENVIRONMENTAL AND ANTHROPOGENIC FACTORS

Nidal Al-SHARAIRI[1], Viorica VASILACHE[1], Maria BOUTIUC[1], Kamel EARAR[2], Ion SANDU[1,3]

[1]Alexandru Ioan Cuza University of Iasi, ARHEOINVEST Interdisciplinary Platform, 22 Carol I Blvd., 700506 Iasi, Romania

[2]Dunarea de Jos University of Galati, Faculty of Medicine and Pharmacy, 47 Domneasca St., Galati, Romania

[3]Romanian Inventors Forum, 3 Sf. Petru Movila St., Bl. L11, III/3, 700089 Iasi, Romania

Abstract: The paper presents a series of cases concerning the effects of deterioration of the physical state and the degradation of the chemical nature of the constituent materials of ancient textiles under the influence of the environment and of the anthropic factors along the historical contexts.

CONTRIBUTIONS TO INCREASING THE QUALITY OF URBAN LIFE THROUGH THE USE OF AN INTELLIGENT ROAD TRAFFIC MANAGEMENT SYSTEM

Gabriel Bogdan CARP, Narcisa Cela PÎNZARIU, Serghei PALAȘ, Mihai GINGĂRAȘU, Daniela Laura BURUIANĂ

[1]A. I. Cuza Police Academy, Bucharest, Romania,

[2]Faculty of Engineering, ”Dunarea de Jos” University of Galati, Romania

[3]University of Sheffield, England

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

SINTERING STUDY OF THE CHIPS RESULTING FROM THE MECHANICAL PROCESSING OF BRONZE

Potecasu Octavian, Marin Mihaela
”Dunarea de Jos” University of Galati
e-mail: Florentina.Potecasu@ugal.ro

COGENERATION POWER PLANTS USING BIOMASS FOR SUSTAINABLE DEVELOPMENT AND REDUCING POLLUTION

Krisztina Uzuneanu

Thermal Systems and Environmental Engineering Department

“Dunarea de Jos” University of Galati

e-mail: kristina.uzuneanu@ugal.ro

Abstract: The co-generation principle is well known and basically consists in the simultaneous production of power and heat. One of the most significant ways of achieving the concept of sustainable development may be the use of biomass in co-generation plants. Biomass needs to undergo several processes so that it can be widely used as a source of energy. These processes will transform its accumulated energy (carbon and hydrogen) into solid, liquid and gaseous fuels. Thus, biomass is a promising alternative in using in micro cogeneration plants, especially in residential areas.

CALCULATION OF THE DEPOSITED LAYER THICKNESS THROUGH SIDE INJECTION OF POWDER USING CO_2 LASER

Petrică Alexandru, Simona Boiciuc
"Dunarea de Jos" University of Galati
e-mail: simonaboiciuc@yahoo.com

Abstract: The paper presents a simplified theoretical model for estimating the operating parameters of the laser deposition by injecting the powder into the metal bath. It was considered the influence of the powder particles on the transfer of energy from the laser beam to the surface of the substrate to be deposited. It has been determined: the metal bath depth, the diameter of the metal bath, the mass of the powder deposited, the average temperature of the metal bath, the thickness of the deposited layer.

Keyword: laser deposition by powder injection into the molten bath, determination of coat characteristics, influence of injected particles

NANOMATERIALS FOR WASTE WATER TREATMENT

Herbei Elena Emanuela
"Dunarea de Jos" University of Galati, Center of Nanostructures and Functional Materials-CNMF, Faculty of Engineering, 111 Domneasca Street, 800201, Galati, Romania
e-mail: Elena.Valcu@ugal.ro

Abstract: The utilization of nanoparticles has opened new ways for environmental remediation. The exceptional characteristics resulted from nanoscale size, as absorption, catalysis and high

reactivity of nanoparticles and nanomaterials shows the efficiency of removing various pollutants from wastewater. In this paper is presented an overview of recent advances in nanotechnologies for water and wastewater treatment processes, based on the most studied materials as: nanoparticles (Ag, Fe and Zn), oxide nanoparticles as TiO_2, ZnO, Fe_3O_4 and hybrid materials based on hybrid nanoparticles-polymers compounds.

ENHANCING THE CORROSION RESISTANCE IN SOME IRON-BASED P/M MATERIALS BY APPLYING A HEAT TREATMENT

Mihaela Marin, Octavian Potecașu, Florin Bogdan Marin

”Dunarea de Jos” University of Galati

e-mail: opotec@ugal.ro

COPPER RECOVERY FROM USED ELECTRIC MOTORS

Simion - Ioan Balint

”Dunarea de Jos” University of Galati

e-mail: sbalint@ugal.ro

ORGANIC WASTE TREATMENT BY ANAEROBIC DIGESTION - CASE STUDY

Lucica Balint

”Dunarea de Jos” University of Galati

e-mail: lbalint@ugal.ro

PURIFICATION OF WASTEWATER WITH ACTIVE SLUDGE COMPARED TO BIOFILTRATION IN THE ULTRASOUND FIELD

Lucica Balint

”Dunarea de Jos” University of Galati

e-mail: lbalint@ugal.ro

DECREASING THE CONCENTRATION OF NITRITES AND NITRATES IN WASTEWATER

Lucica Balint

”Dunarea de Jos” University of Galati

e-mail: lbalint@ugal.ro

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania

Academy of Technical Sciences of Romania

RECYCLING OF TEXTILE WASTE

Lucica Balint

”Dunarea de Jos” University of Galati

e-mail: lbalint@ugal.ro

RECYCLING PAPER WASTE

Lucica Balint

”Dunarea de Jos” University of Galati

e-mail: lbalint@ugal.ro

IRON RECOVERY FROM USED CARS

Lucica Balint

”Dunarea de Jos” University of Galati

e-mail: lbalint@ugal.ro

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania

Academy of Technical Sciences of Romania

DOMESTIC WATER TREATMENT - CASE STUDY

Lucica Balint

”Dunarea de Jos” University of Galati

e-mail: lbalint@ugal.ro

WATER POLLUTION SURVEYS AND ENVIRONMENTAL RISK - CASE STUDY

Simion - Ioan Balint

”Dunarea de Jos” University of Galati

e-mail: sbalint@ugal.ro

STUDIES ON ENVIRONMENTAL PROBLEMS IN PAPER PRODUCTION

Simion - Ioan Balint

”Dunarea de Jos” University of Galati

e-mail: sbalint@ugal.ro

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania

Academy of Technical Sciences of Romania

DECONTAMINATION OF SOILS POLLUTED WITH OIL WITH SURFACTANTS

Simion - Ioan Balint

”Dunarea de Jos” University of Galati

e-mail: sbalint@ugal.ro

RESEARCH OF NOISE POLLUTION IN URBAN AREAS

Simion - Ioan Balint

”Dunarea de Jos” University of Galati

e-mail: sbalint@ugal.ro

BIOMASS AS A RENEWABLE RESOURCE

Lucica Balint

”Dunarea de Jos” University of Galati

e-mail: lbalint@ugal.ro

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania

Academy of Technical Sciences of Romania

THE WATER QUALITY IN THE PRUT RIVER BASIN

Lucica Balint

”Dunarea de Jos” University of Galati

e-mail: lbalint@ugal.ro

RECYCLING METAL AND PLASTIC - CASE STUDY

Lucica Balint

”Dunarea de Jos” University of Galati

e-mail: lbalint@ugal.ro

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania

Academy of Technical Sciences of Romania

STUDIES REGARDING THE SEAWAGE SLUDGE PROPERTIES FOR USE IT IN SAFE WAYS IN ORDER TO AVOID THE POLLUTION OF ENVIRONMENT

Mihaela Timofti[1*], Cătălina Iticescu[1], Lucian. P. Georgescu[1], Gabriel Murariu[1], Cătălina Țopa[1], Dumitru Dima[1]
[1]Department of Chemistry, Phisycs and Environment, Faculty of Science and Environment, ECEE Center, Dunarea de Jos University of Galati, Romania
*E-mail address: mttimofti@ugal.ro

Abstract: Urban, industrial or agro-technical waste water treatment is the result of the application of legislation on the protection of water resources imposed by the alignment of Romanian legislation with that of the European Union. The operation of these stations results in large amounts of sludge, which, depending on the purification technology, can be primary, secondary, fermented, dehydrated, heat treated etc.
It is well known that sludge must meet certain standards imposed by law, and their capitalization involves costs in terms of quality research and because of it, in Romania, the reintroduction of these sludge into nature, in safe conditions regardind the pollution, is solved only sporadically, punctually. It is therefore imperative necesar to determine the physicochemical and chemical properties of all types of sludge that appear on the technological line of a wastewater treatment plant.
Our study refers to a six-month period monitoring of the physico-chemical and chemical properties of sludge in the Galati City, Romania. Thus, every week, between November 2016 and April 2017, 16 physico-chemical and chemical parameters were analyzed for sludge samples taken from water treatement plant of Galati City. We used different types of methods such us electrochemical, gravimetric and spectrophotometric methods of analysis and we obtained a set of approximately 2300 data. This data was analyzed and interpreted by various statistical methods. The results that we obtained support the ideea of usage of these sludge under safe environmental conditions.
Keywords: seawage sludge, environment, pollution, physico-chemical properties

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

RESEARCHES REGARDING THE UTILIZATION OF LIDONIT AS PARTIAL REPLACEMENT OF THE AGGREGATE IN CONSTRUCTION MATERIALS

Liliana ANDONE, Andrada Gabriela ALEXANDRU, Marius BODOR
”Dunarea de Jos” University of Galati
e-mail: marius.bodor@ugal.ro

RESEARCHES REGARDING THE EVOLUTION OF AMBIENT RADIATION VALUE IN A CITY, COMPARED WITH ITS SURROUNDINGS

Silviu ARON, Daniela Laura BURUIANĂ, Marius BODOR
”Dunarea de Jos” University of Galati
e-mail: marius.bodor@ugal.ro

THE INTEGRATION OF COMPUTER AIDED DESIGN WITH ENTREPRISE RESOURCES PLANING SYSTEMS

Ionel PETREA, Laurentiu MARDARE
”Dunarea de Jos” University of Galati
e-mail: Ionel.Petrea@ugal.ro

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania

SURFACE TREATMENT, MICROSTRUCTURE AND MECHANICAL PROPERTIES OF SOME POWDER METALLURGY ALLOYS

Mihaela Marin, Octavian Potecașu, Florin Bogdan Marin

”Dunarea de Jos” University of Galati

e-mail: opotecasu@ugal.ro

Partners:

"Gheorghe Asachi" Technical University of Iaşi, Romania

Academia de Stiinte Tehnice din Romania
Academy of Technical Sciences of Romania