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CHROMATE-FREE PRETREATMENT FOR METALLIC SURFACE
Florentina MANDEA, Ioana JITARU

Recent legislation imposes a strong limitation in future of hexavalent chromium use in industry due to health and environmental considerations. There is consequently a need to develop alternative pre-treatment processes in order to improve corrosion resistance and durability of galvanized steel and aluminum coatings.

The purpose of the present work is to study the role of a butyl titanate based solution in surface pre-treatment of galvanized steel and aluminum as a premise for development of chromate-free anticorrosion protection.

Keywords: corrosion protection, chromate-free pretreatment, butyl titanate, aluminum coatings

ASPECTS OF CORROSION AND ITS INHIBITION IN COOLING WATERS
Ioan Viorel BRÂNZOI, Ileana CAMENITA, Florina BRÂNZOI, Andreea BONDAREV

In all the cases of cooling water systems, at the metal / water interface appear frequently corrosion processes which lead to deposition of corrosion products, like scales. Due to these scales formation from the decomposition of bicarbonates and in the same time, of the corrosion products on the heat exchange surfaces, the heat exchange becomes more difficult, fact that disturbs the normal function of industrial installation.

This paper presents some attempts of analyzing the corrosion phenomena which occur in cooling water systems and relates to the protection of metallic surfaces from corrosion using an ecologically, non-toxic inhibitor. Calcium gluconate (GCa), ecologically acceptable compound, has been used as corrosion inhibitor. A good 87.81 % inhibition efficiency has been obtained with 2000 ppm GCa. Electrochemical data and corrosion kinetic parameters for OL37 steel in cooling water systems have been obtained.

Keywords: corrosion, calcium gluconate, ecological inhibitor, cooling water
TECHNOLOGICAL STUDY OF AN AEROBIC BIOPROCESS FOR A BACTERIAL PHARMACEUTICAL PREPARATION

Camelia UNGUREANU, Ovidiu MUNTEAN, Ana Aurelia CHIRVASE, Iosif NAGY, Adrian ONU, Aurora SALAGEANU

The aim of the paper is identifying a kinetic model for an immunomodulator bioproduction using Pseudomonas aeruginosa and the $O_2$ transfer characterization of the production bioreactor; volumetric Oxygen Transfer Rate coefficient have been evaluated.

**Keywords**: microbial immunomodulator, kinetic model, maximum specific growth rate

INTERPARTICULAR FORCES IN POWDERY MATERIALS BEDS

Gabriela ISOPENCU, Monica MARES, Gheorghita JINESCU,

In this paper the types of interparticular forces existing in the powdery inorganic and bio-materials beds were identified and quantified. Based on the models developed in literature, using different materials (sand, ash, corn and wheat flour) values for the main identified interparticular forces were obtained. The interparticular forces identification and quantification are useful in dynamic parameters determination in the intensive procedures of thermo-processing and chemical reaction.

**Keywords**: powdery materials, van der Waals interactions, capillary forces

INVESTIGATIONS ON THE RHEOLOGY OF WATER-IN-CRude OIL EMULSIONS

Diana BROBOANA, Corneliu BALAN

The paper is concerned with the experimental investigations and rheological modelling of water-in-oil emulsions. The probes used in experiments
are based on two Romanian crude (pure) oils: probe PA is an asphaltic crude oil with 30% water volumic concentration, and probe PB is a paraffinic crude oil with 6% water volumic concentration. Simple shear and oscillatory tests have been performed at temperature of 5°C in order to characterise the rheology of the samples (i.e. dependences of viscosity and elasticity on the shear rate, respectively on the frequency) and to evidence the differences between their flow properties. The study is focused to the paraffin based emulsion and a constitutive relation with unstable flow curve is proposed to model the sample’s complex (thixotropy and yield stress) rheological behaviour.

Keywords: Rheology; Oil-water emulsion; Paraffinic oil; Viscoelasticity; Shearing flow; Oscillatory test; Thixotropy.

STUDY ON THE IMPROVEMENT OF PHYSICAL-MECHANICAL CHARACTERISTICS IN THE EPDM-HDPE BLENDS

Maria Daniela STELESCU, Elena MANAILA, Ileana-Gabriela NICULESCU-ARON

The work presents a study on the improvement of physical-mechanical characteristics of blends containing EPDM and HDPE by introducing some compatibilizing agents or irradiating them with accelerated electrons. The characteristics of the obtained polymer blends are additive and dependent on the amounts of EPDM and HDPE involved. The use of compatibilizing agents has not led to a significant improvement of the characteristics of the blends. Irradiating the blends with accelerated electrons at 5, 10, 15 and 20 Mrad, when the irradiation dose was increased there were an increase in the elastic modulus of 100% and elongation at break and tear strength showed a maximum followed by a light decrease.

Keyword: EPDM-HDPE blends, compatibilizing agent, accelerated electrons.
RECYCLING POSSIBILITIES FOR THE WASTES RESULTED FROM THE PAINTS AND VARNISHES INDUSTRY BY PYROGENATION

Sorin RADOIU

This article presents a modern and viable solution for the protection of the environment in accordance to the requirements and standards of the European Community for the recycling of wastes obtained from the paints and varnishes industry. A classification of these wastes and a detailed examination of the pigments nature are given. Possibilities to recycle these wastes by pyrogenation and the experimental work performed to achieve this goal are presented. For specific situations total oxidation of the solid residue is recommended. According to the used types of wastes it is possible to recover solvents from the volatile products, combustible gases or a solid fuel, as well as an inorganic mass that can be used in metallurgy. An estimation of the investment cost for a paint plant has been given.

Keyword: paints and varnishes wastes, pyrogenation, recycling wastes.

POSSIBILITIES OF IMPROVEMENT OF SOIL QUALITY BY SOFT BROWN COAL DUST INTRODUCTION

Jeny CHIRIAC, Cornelia PANAITESCU, Frumuzache BARCA

The paper presents a comparative study on the properties of the Rosia (Jiu) soft brown coal and of a poor soil, in order to find out the possibilities of soil quality improvement for better plant growing conditions.

There were determined the specific values of extractible humic acids content, technical and elemental characteristics and also petrographic composition of soft brown coal with low sulphur and nitrogen and of the poor soil.

It is revealed a big difference between the organic mass values of coal and soil but a similarity between organic components types of the two samples, as determined by petrographic analysis. These findings offered one reason for mixing-up a sandy soil with the studied coal.
There was also investigated the behavior of the two types of materials, coal and soil, during the drying process as well as the possibility to grow up plants both in coal dust and improved soil.

The research conclusions recommend the introduction of soft brown coal dust into the poor soils, in order to increase the content of organic mass, humic acids and microelements in soil.

**Keywords**: soft brown coal; soil; humic acids; petrographic composition; ecological fertilizer; drying rate.

**THERMODYNAMIC CALCULATIONS IN LIQUID Al-Sn ALLOYS SYSTEMS**

Cristian Aurelian POPESCU, Dragos TALOI

The paper presents aspects regarding the computation of activities in Al-Sn alloys systems, comparing two theoretical models from the accuracy point of view. The first one, the partially-ordered sub-sub-regular solution model proposed by D. Taloi [1], and the second one a prediction model of components’ activities developed by T. Fan et al. [2]. Both models have merits and can be successfully used, the deviations from experimental data being acceptable. The partially-ordered sub-sub-regular solution model has smaller mean absolute deviations than those of prediction model, but the second model has the advantage of computing components activities independent of experimental data.

**Keywords**: Al-Sn alloys, components’ activities

**CERAMIC LAYERS AS THERMAL BARRIER**

Adriana STEFAN, Dionezie BOJIN, Victor MANOLIU

Thermal barrier coatings are used for increasing the turbo engines performance. This paper presents the performed studies on used materials to improve the thermal barrier layers properties. Because the failure of the thermal barrier coatings occur by reason of growing an oxide layer at bond coat/top coat interface, we have investigated a new solution using an intermediate layer MeCrAlY +Al_2O_3, for increasing the oxidation and thermal fatigue resistance.

**Keywords**: thermal barrier coatings, bond coat, thermal grown oxide
CARBON MOLECULAR SIEVES PRODUCTION AND PERFORMANCE ASSESSMENT IN CO₂ SEPARATION BY SELECTIVE ADSORPTION

Madalina VADUVA, Vasile STANCIU

Carbon molecular sieves (CMS) are carbonaceous adsorbants of increasing importance. This paper describes the results of the study concerning the carbon molecular sieves preparation and modification of the pore structure. Molecular sieving properties of various carbons were studied by measuring the dynamic adsorption capacity for carbon dioxide under pressure swing adsorption (PSA) conditions. Separation of carbon dioxide from N₂–CH₄–CO₂ mixture and from landfill gas on CMS prepared in a laboratory unit designed for this purpose based on PSA cycle is also reported.

Keywords: molecular sieves, adsorption, chromatography, coal.

METALLIC POWDER PROCESSING FOR OBTAINING HOLLOW ELECTRODES WITH COMPOSITE STRUCTURE

Petra MOTOIU

Thermal spraying coatings obtained by using hollow electrode with composite structure, on different metallic surfaces, lead to obtaining of layers with good behavior in abrasive resistance, and coatings with structural properties. The paper presents the experiments performed in order to produce hollow electrodes with composite structure, for protection to abrasive resistance and severe mechanical shocks.

Keywords: thermal spraying coating, hollow electrode, composite structure.

This book is addressed especially to students enrolled at technical universities, but also to specialists interested in being up-to-date with the contemporary tendencies of the current informational society. The volume took into consideration the economics of enterprises, from the moment of their emergence to present, when the markets globalization, internalization of economies and sustainable development are the key issues governing the organizational behaviour.

The first section had in view the history of the commercial and industrial activities and identified the debut moment of the firm theory. The next chapters portrayed the enterprise and emphasised its complex role into the national and global economy, the relations established with the environment, resources available to enterprises and identified the main activities of the firm. A significant part was reserved to the enterprise types, with a focus set on small and medium-sized enterprises, considered the „main engines” of the national economy.

An important section of the book was devoted to strategic behaviour of the enterprise and to the organizational culture, both being considered important for the understanding of the enterprise in the European and global contexts.

The last chapters of the book had in view the enterprise in the era of globalization and tackled important current issues: the implication of globalization on the firms’ activities, the entrepreneurship and its importance into the XXI century, as well as the social responsibility in the framework of sustainable development.