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ÉTUDE DES PROPRIÉTÉS STRUCTURALES ET D'HYDRURATION DU COMPOSÉ $\text{GD}_{0,5}\text{Y}_{0,5}\text{NI}_{3,75}\text{AL}_{0,25}\text{MG}$ DÉRIVANT DES PHASES DE LAVE

Cristina STAN, Ecaterina ANDRONESCU, Samuel COUILLAUD, Jean Louis BOBET

Hydrogen is an ideal energy carrier which is now considered for transport. A group of Mg-based alloys hydrides stands as promising candidate for competitive hydrogen storage with reversible hydrogen capacity up to 7.6 wt.% for on-board applications. The compounds have been elaborated by mechanical alloying. The lattice parameters are in good agreement with those already reported. In these substituted compounds, hydrogen can be absorbed and desorbed reversibly.

L'hydrogène est un candidat idéal en tant que vecteur énergétique non polluant pour le futur et en particulier pour le transport. Les hydrures à base de magnésium métallique présentent un réel intérêt pour le stockage de l'hydrogène, ils peuvent avoir une capacité massique de 7,6 %. Les composés obtenus ont été synthétisés par broyage mécanique. Les paramètres de mailles sont en bon accord avec ceux déjà rapportés dans la littérature. Les mesures d'absorption/désorption de l'hydrogène ont montré que les composés absorbent l'hydrogène de façon réversible.

Mots clefs : **stockage d'hydrogène, hydrures métalliques**

SHORT REMARQUE ON THE PROVENIENCE OF NANOPARTICLES IN ENVIRONMENTAL SAMPLES

Alina Catrinel ION, Ion ION

In this work, some background aerosols, which were collected during a summer field campaign in 2003 were examined. Emphasis was given to the chemical analysis of polar organic compounds, i.e., polyols, mono-, dihydroxydicarboxylic acids and saccharidic compounds. Fine size aerosols collected on quartz fibre filters were extracted with an organic solvent mixture. The derivatised extract was analysed by gas chromatography/mass spectrometry (GC/MS), according to previously developed analytical procedures. The paper presents a different interpretation of some previously results of the authors.

Keywords: natural nanoparticles, aerosols, GC/MS method

CASE STUDY CONCERNING MATHEMATICAL MODELLING OF THE EMISSIONS AND THEIR MONITORING WHEN WASTES ARE CO-INCINERATED IN CLINKER KILNS

GABRIELA Niculae

Cement industry has been involved for the last decades in the co-processing of wastes resulting from other industries, as a priority in its effort toward a responsible management of non-renewable resources.

During this process, complying with the legal requirements concerning emissions is vital and in this respect a mathematic modelling of the pollutant emissions resulting from waste co-incineration of different fuel mix combinations was developed. Also more series of tests were performed when different types of traditional and alternative fuels were used and the entire range of pollutants was monitored, including dust, SO₂, NO_x, CO, HCl, HF, heavy metals, dioxins and furans.

The modelling and the monitoring tests proved that use of alternative fuels in the rotary clinker kilns of the type existing in Carpatcement Holding does not lead to increase of air emissions and in all situation the kiln emissions stay within the limit values established by the legal regulations.

Keywords: waste co-incineration, clinker kilns, pollutant emissions

REMOVAL OF COPPER IONS FROM AQUEOUS SOLUTIONS USING CATION- AND ANION-EXCHANGE MEMBRANES BY ELECTRODIALYSIS PROCESS

Simona CĂPRARESCU, Dănuț-Ionel VĂIREANU, Anca COJOCARU, Ioana MAIOR, Violeta PURCAR, Andrei SÎRBU

In this paper one has investigated the dependence of the removal efficiency for Cu²⁺ ions on the initial concentration and applied working voltage for an electrodialysis system consisting of a three-compartment cell using ion-exchange membranes such as Purolite C104 and Purolite A400.

Keywords: electrodialysis, ion-exchange membranes, copper, electrochemical process, synthetic wastewater

EFFECTS OF QUERCETIN ON ARTIFICIAL LIPID MEMBRANES

Marcela Elisabeta BĂRBÎNȚĂ PĂTRAȘCU, Magda DRĂGUȘIN, Laura ȚUGULEA, Aurelia MEGHEA

The present paper aims to use the chlorophyll a (Chla) as a spectral marker to monitor the quercetin effects on lipid membranes. Two types of artificial membranes were investigated: Chla/DPPC (0.5 mM) - SUVs and Chla/ β -carotene/DPPC (0.5 mM) – SUVs.

The Chla degradation was more pronounced in the bilayers without β -carotene.

Keywords: quercetin, liposomes, chlorophyll a, β -carotene

A COMPARISON BETWEEN THE REVERSE-FLOW OPERATED PACKED BED AND STEADY STATE MONOLITH BED REACTORS FOR CATALYTIC COMBUSTION OF METHANE IN LEAN MIXTURES

Magdalena BOȘOMOIU, Grigore BOZGA

The aim of this study is to investigate comparatively the performances of two reactors for the catalytic combustion of lean methane –air mixtures, an unsteady-state packed bed reactor operated with periodic flow reversal and a steady – state monolith bed reactor. As catalyst, in both reactors was considered a perovskite oxide, which proved a good activity for methane combustion in our previous studies. The results are evidencing the advantages of the reverse flow operation, as a simple technique for heat recovery and its suitability for reactors including high thermal capacity beds. Due to the lower pressure drop and good catalyst use effectiveness, the monolith structures present better performances comparing to the packed beds of catalyst, but are characterized by a lower thermal capacity. On the other hand, the packed beds, having the advantage of a higher thermal capacity can insure a convenient effectiveness in the use of catalyst, only at small grain sizes, which are inducing higher pressure drop in the bed. By combining these features a rational structure for an auto-thermal combustion reactor appears to include three beds, of which two lateral packed beds of coarse inert particles and a central monolith bed containing the catalyst.

Keywords: reverse-flow reactor, monolith reactor, simulation, catalytic combustion, methane

STUDIES ON THE TEMPLATE SYNTHESIS OF SOME PHTHALOCYANINES ON FERRITES SUPPORT AND THEIR CHARACTERIZATION USING MÖSSBAUER SPECTROSCOPY

Nicoleta GRIGORIU, Gheorghe HUBCĂ, Cristian BOSCORNEA, Doina
TĂRĂBĂȘANU MIHĂILĂ, Monica ROBU

The synthesis of some original compounds based on phthalocyanines deposited on various ferrites was studied. The preparation of the compounds consisted in the template type reaction between metal free phthalocyanine or lithium phthalocyanine and various ferrites. The characterization of the synthesized compounds was made using Mössbauer spectroscopy. The synthesized compounds were submitted to a catalytic test in the cyclohexane oxidation reaction with air.

Keywords: metal free phthalocyanine, lithium phthalocyanine, ferrites, catalysts, Mössbauer spectroscopy

POLY(MALEIC-AMIC) STRUCTURES FOR POTENTIAL NONLINEAR OPTICAL APPLICATIONS

Florica Adriana NICOLESCU, Valentin Victor JERCA, Ana Maria ALBU,
Dumitru Mircea VULUGA, Dan Sorin Vasilescu

New structures were obtained from a one step condensation reaction of different derivatives of aniline with CMS-AM and MMA-AM copolymers. All samples were characterized by FT-IR spectroscopy and TGA-MS analysis.

CMS-AM and MMA-AM copolymers were also investigated by SEC and FT-NMR spectroscopy. Improved solubility of these structures make them candidates for potential NLO applications.

Keywords: maleic anhydride, functionalized copolymers, NLO.

METAL SHEET PLASTIC ANISOTROPY IDENTIFIED BY A MIXED NUMERICAL-EXPERIMENTAL METHOD

Mihaela TEACĂ, Marion MARTINY, Gérard FERRON, Marioara ABRUDEANU

The plastic behavior of anisotropic sheet metals is identified by combining the results of classical uniaxial tensile tests and of heterogeneous biaxial tensile tests on cruciform specimens. The uniaxial tests allow the identification of strain-hardening and of some parameters of the yield function relating to planar strain anisotropy and stress anisotropy. The results obtained in the biaxial tests are analyzed using an optimization technique that consists of fitting numerical strain fields with experimental ones. The material parameters describing the shape of the yield surface are obtained by this procedure. Finally, simulations of the cup drawing test are performed to check the validity of the identification.

Key words: cold worked metal sheets, strain hardening, anisotropy, numerical experimental identification

IMPROVEMENT OF THE CORROSION RESISTANCE OF EQUIATOMIC NiTi SHAPE MEMORY ALLOY FOR MEDICAL IMPLANTS BY THE ELECTROPOLISHING METHOD

Dan BATALU, He GUOQIU

The authors studied the corrosion behaviour of the NiTi shape memory alloy (50.6 at. %) using the electropolishing method for improving its corrosion resistance and the pitting test to evaluate the results. Considering the medical applications of the alloy (stents and other implants), improving the corrosion resistance is one of the main concern, especially because of the high amount of nickel content, which is allergen, toxic, and cancerous [1]. A smooth surface will improve the corrosion resistance; hence it will decrease the rate of nickel atoms that will interact with the human body. Besides improving the corrosion resistance, we pointed to a useful method for establishing the optimal conditions for electropolishing. The electropolished surfaces were analysed by AFM (atomic force microscopy), and the corrosion tested surfaces were analysed by optical microscopy.

Keywords: NiTi shape memory alloy, implant, electropolishing, corrosion