

## ISSUE CONTENTS LIST WITH GRAPHICAL ABSTRACTS

SPECIAL ISSUE DEDICATED TO THE INTERNATIONAL CONFERENCE DEDICATED TO THE 55<sup>th</sup> ANNIVERSARY FROM THE FOUNDATION OF THE INSTITUTE OF CHEMISTRY OF THE ACADEMY OF SCIENCE OF MOLDOVA

### EDITORIAL

7

### PREFACE

### REVIEW PAPER

ORGANIC CHEMISTRY

8

#### ROLE OF CYCLODEXTRINS IN NEW ANTIMYCOBACTERIAL FORMULATIONS

Veaceslav Boldescu, Fliur Macaev, Gheorghe Duca

This paper is dedicated to the role of cyclodextrins in new formulations for the treatment of infections with *Mycobacterium tuberculosis* that are in the process of design and development. Cyclodextrins play the role of solubilizing agents and promoters of the antimycobacterial substances penetration inside the mycobacterial cell.



### REVIEW PAPER

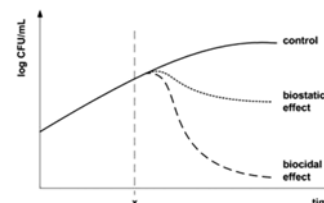
ORGANIC CHEMISTRY

14

#### ANTIMICROBIAL REAGENTS AS FUNCTIONAL FINISHING FOR TEXTILES INTENDED FOR BIOMEDICAL APPLICATIONS. I. SYNTHETIC ORGANIC COMPOUNDS

Madalina Zanoaga, Fulga Tanasa

This article offers an overview of some contemporary antimicrobial (biocides and biostatics) agents used as functional finishing for textiles intended for biomedical applications. It reviews only synthetic agents, namely quaternary ammonium compounds, halogenated phenols, polybiguanides, N-halamines, and renewable peroxides, as a part of an extensive study currently in progress.



### FULL PAPER

ECOLOGICAL CHEMISTRY

33

#### ACTIVATED CARBONS FROM VEGETAL RAW MATERIALS TO SOLVE ENVIRONMENTAL PROBLEMS

Viktor Mukhin, Tudor Lupascu, Nadejda Voropaeva, Yuriy Spiridonov, Nicolay Bogdanovich, Vasilij Gur'janov

Technologies for active carbons obtaining from vegetable by-products such as straw, nut shells, fruit stones, sawdust, hydrolysis products of corn cobs and sunflower husks have been developed. The physico-chemical characteristics, structural parameters and sorption characteristics of obtained active carbons were determined. The ability of carbonaceous adsorbents for detoxification of soil against pesticides, purification of surface waters and for removal of organic pollutants from wastewaters has been evaluated. The obtained results reveal the effectiveness of their use in a number of environmental technologies.

### FULL PAPER

ECOLOGICAL CHEMISTRY

37

#### EURASIAN MINERAL WATER: MATHEMATICAL MODELING, CLASSIFICATION AND ASSESSMENT OF THEIR IMPACT ON THE BIOCHEMICAL COMPOSITION OF HUMAN BLOOD

Nikolay Kornilov, Elena Kornilova, Elena Stepanenko

In the article the results of comparative analysis of the composition of the Eurasian hydromineral resources and the assessment of their impact on the physiological condition of a human organism according to biochemical studies of venous blood are presented. Processing of initial data on the composition and properties of mineral waters chloride-hydrocarbonate, sulphate-hydrocarbonate and chloride-sulphate types and venous blood are made using the method of mathematical modelling, developed by the authors of this article. It is shown that in the balneological impact of hydromineral resources on the body in the blood increases the haemoglobin and oxygen, decreases glucose, and acid-base pH shifted to high alkalinity.

FULL PAPER

ECOLOGICAL CHEMISTRY

42

**EVALUATION OF WATER POLLUTION STATUS IN SIRET HYDROGRAPHICAL BASIN (SUCEAVA REGION) DUE TO AGRICULTURAL ACTIVITIES**

Carmen Zaharia

The study presents data concerning the water pollution status of Siret hydrographical basin (i.e. surface and ground waters, lakes) in Suceava County area (different controlling/monitoring sections) due to agricultural productive activities, especially regarding some quality indicators (nitrogen-based nutrient concentrations) evaluated for 2008. These data are recommending the necessity of continuous monitoring of water quality in the Siret River hydrographical basin, in all existing control sections, for identification of any pollution episodes, non-reported by polluters to the local environmental regulators.

FULL PAPER

ECOLOGICAL CHEMISTRY

53

**VALORIZATION OF LOW-COST NATURAL MATERIALS IN DEPOLLUTION PROCESSES OF WASTEWATER**

Laura Bulgariu, Igor Cretescu, Dumitru Bulgariu, Matei Macoveanu

In this paper, are presented the adsorptive characteristics of a low-cost material that are abundant in our region, namely: Romanian peat moss from Poiana Stampei (Romania), for the removal of different toxic heavy metal ions (Pb(II), Hg(II), Co(II) and Ni(II)) and oil products from aqueous media. The experiments have concerned the influence of several experimental parameters (initial solution pH, adsorbent dose, initial heavy metals concentration, contact time, and temperature) on the heavy metals and oil products removal efficiency. The most important conditions for desorption of heavy metal ions from loaded-materials, required for their regeneration are also presented.

FULL PAPER

ECOLOGICAL CHEMISTRY

59

**QUANTIFICATION AND BIOREMEDIATION OF ENVIRONMENTAL SAMPLES BY DEVELOPING A NOVEL AND EFFICIENT METHOD**

Mohammad Osama, Felicia Armstrong, Peter Norris, Habiba Tahira Hussain

*Pleurotus ostreatus*, a white rot fungus, is capable of bioremediating a wide range of organic contaminants including Polycyclic Aromatic Hydrocarbons. Ergosterol is produced by living fungal biomass and used as a measure of fungal biomass. The first part of this work deals with the extraction and quantification of PAHs from contaminated sediments by Lipid Extraction Method. The second part consists of the development of a novel extraction method (Ergosterol Extraction Method), quantification and bioremediation.

FULL PAPER

INDUSTRIAL CHEMISTRY

74

**REMOVAL OF REMAZOL ROSSO RB DYE FROM AQUEOUS EFFLUENTS BY HOMOGENOUS FENTON OXIDATION PROCESSES**

Carmen Zaharia, Victoria Fedorcea, Adrian Beda, Victor Amarandei, Augustin Muresan

The paper presents some data from our laboratory-setup experiments of homogenous oxidative processes with hydrogen peroxide (i.e. advanced Fenton oxidation processes) applied for Remazol Rosso RB dye-containing aqueous systems, especially textile effluents. Therefore, some different operating parameters (including pH, concentration of dye, H<sub>2</sub>O<sub>2</sub> and ferrous ions, oxidation time, temperature, stirring regime, among its) were tested for determination of the best performance in effluent discoloration and dye removal, meaning the optimal values of each studied parameters for highest discoloration or dye removal.

FULL PAPER

INDUSTRIAL CHEMISTRY

80

**RADIATION CHEMICAL CONVERSION OF OIL DERIVED FROM OIL-BITUMEN ROCK**

Lala Jabbarova, Islam Mustafaev, Rauf Rzayev, Zarqalam Nabizade, Navoi Ibadov, Saida Akhmedbekova

The results of research in the radiation processing of synthetic oil derived from oil-bitumen rock of the Balakhany deposit in Azerbaijan are presented. The study has been conducted on a <sup>60</sup>Co gamma-source at a dose rate of P = 0.5 Gy/s and various absorbed doses of D = 43–216 kGy. Samples of synthetic oil from natural bitumen rocks have been analyzed by chromatography, gas chromatography–mass spectrometry, and IR-spectroscopy, and their radiation resistance has been evaluated. The results of the study allow for both assessment of the feasibility of manufacturing petrochemicals for various applications by radiation processing and use of these materials for isolating radioactive sources to preclude their impact on the environment.

**THE DIMINISHING OF THE CONTENT OF TEXTILE DIRECT DYES AND AUXILIARY COMPOUNDS DURING THEIR CATALYTIC OXIDATION**

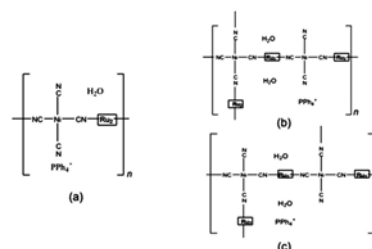
Maria Gonta, Gheorghe Duca, Vera Matveevici, Larisa Mocanu

Advanced oxidation methods of organic compounds lead to their partial mineralization and increase of the adsorption process efficiency on the surface of oxidized activated carbon. We have studied the oxidation process using model solutions containing mixture of dye direct brown, ethylene glycol and sodium lauryl sulfate under the action of Fenton reagent, in the presence and absence of UV irradiation or under the action of electric current (in the electrochemical cell). The same studies were performed by replacing the iron (II) ion with titanium dioxide.

**MIXED-METAL COMPLEXES OF MIXED-VALENT DINUCLEAR RUTHENIUM(II,III) CARBOXYLATE AND TETRACYANIDONICKELATE(II)**

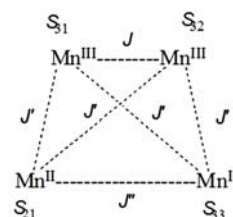
Masahiro Mikuriya, Yusuke Tanaka, Daisuke Yoshioka, Makoto Handa

Mixed-metal chain complexes constructed from lantern-type dinuclear ruthenium(II,III) carboxylate unit and tetracyanonickelate(II),  $(PPh_4)_n[Ru_2(O_2CCH_3)_4Ni(CN)_4]_n \cdot nH_2O$  (**1**) and  $(PPh_4)_n[Ru_2\{O_2CC(CH_3)_3\}_4]_{3n}[Ni(CN)_4]_{2n} \cdot 2nH_2O$  (**2**), where very weak antiferromagnetic interaction is operating, were synthesized and characterized by elemental analysis and IR and UV-vis spectroscopies and temperature dependence of magnetic susceptibilities (4.5—300K).

**MIXED-VALENT TETRANUCLEAR  $Mn^{II}Mn^{III}_3$  COMPLEX WITH 1,3-DIAMINO-2-HYDROXYPROPANE- $N,N',N'',N'''$ -TETRAACETIC ACID**

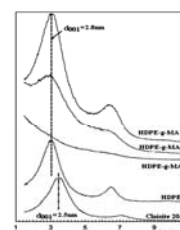
Masahiro Mikuriya, Nobuyuki Nagao, Satoshi Kurahashi, Atsushi Tabuchi, Seiki Tomohara, Motohiro Tsuboi, Daisuke Yoshioka, Hiroshi Sakiyama, Akira Fuyuhira

Mixed-valent tetranuclear  $Mn^{II}Mn^{III}_3$  complex with 1,3-diamino-2-hydroxypropane- $N,N',N'',N'''$ -tetracetic acid,  $Ca_2[Mn_4\{\mu-OHO\}(dhpta)_2(CH_3COO)_2]$ , where considerable antiferromagnetic interactions are operating, was synthesized and characterized by elemental analysis and IR and UV-vis spectroscopies, temperature dependence of magnetic susceptibilities (4.5—300K), and single-crystal X-ray crystallography.

**STUDY OF PROPERTIES OF SOME POLYETHYLENE-CLAY NANOCOMPOSITES: INFLUENCE OF PREPARATION METHOD ON THE DEGREE OF CLAY INTERCALATION/EXFOLIATION**

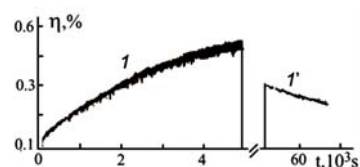
Fulga Tanasa, Madalina Zanoaga

Nanocomposites based on HDPE and HDPE-g-MA, as matrix, and nanoclay Cloisite 20A, as filler, were obtained by melt compounding and solution blending, and their properties were comparatively studied in order to establish the dependence of the clay degree of exfoliation/intercalation on the preparation procedure.

**HOLOGRAPHIC INFORMATION MEDIA BASED ON AZO-POLYMERS WITH DIFFERENT STRUCTURES**

Irina Davidenko

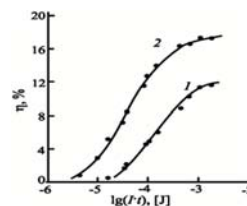
Polarization sensitive holographic recording was accomplished in new synthesized azobenzene polymer composites with Co metallic polycomplexes of different structure.



**HOLOGRAPHIC RECORDING MEDIA BASED ON ELECTRONS DONOR OLIGOMERS**

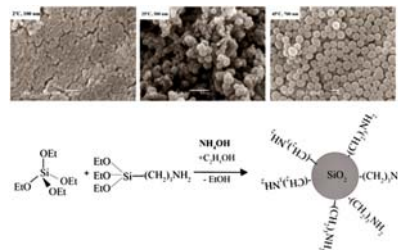
Nicolay Davidenko, Irina Davidenko, Nicolay Chuprina, Yuriy Getmanchuk, Leonid Kostenko, Elena Mokrinskaya, Valeriy Pavlov, Sergey Studzinsky, Larisa Tonkopiya

Information properties of recording media based on electrons donor oligomer of different structure for thermoplastic technique are investigated.

**AMINOSILICA NANO- AND SUBMICROSPHERES: ANALYSIS OF FACTORS INFLUENCING MORPHOLOGY, STRUCTURE AND PROPERTIES**

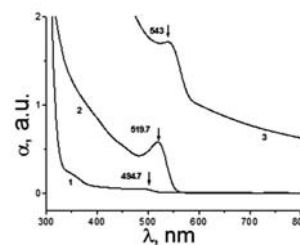
Inna Melnyk

Current paper focuses on the analysis of influence of main factors (stages of the synthesis, the ratio of the reacting components, the order of their introduction, the concentration of water and ammonia, the synthesis temperature) on the morphology, size and content of functional groups of aminosilicane- and submicrospheres. The recommendations for the synthesis of particles with predetermined properties were done. It is shown, that the ratio of the reacting components mainly affects the content of 3-aminopropyl functional groups and the temperature of the hydrolytic polycondensation reaction - the size of the particles.

**SYNTHESIS AND CHARACTERIZATION OF CdSe COLLOIDAL QUANTUM DOTS IN ORGANIC SOLVENT**

Ion Geru, Olga Bordian, Constantin Loshmansky, Ion Culeac, Constantin Turta

In this paper we present experimental results on preparation and characterization of colloidal CdSe quantum dots in organic solvent. CdSe QDs were synthesized following a modified literature method. CdSe QDs have been characterized by UV-Vis absorption and photoluminescent (PL) spectroscopy. The average CdSe particles size estimated from the UV-Vis absorption spectra was found to be in the range 2.28-2.92 nm which is in good agreement with PL measurements.

**BIOMATERIALS BASED ON NANOHYDROXYAPATITE**

Gabriela Ciobanu, Constantin Luca, Octavian Ciobanu

In this study, the porous hydroxyapatite-filled cellulose acetate scaffolds were prepared via dry-wet phase inversion method by dispersing hydroxyapatite nanoparticles in the polymeric matrix. The calcined hydroxyapatite prepared by wet precipitation method has the crystal size smaller than 50 nm. The unfilled and hydroxyapatite-filled cellulose acetate scaffolds have an asymmetric structure consisting of two layers, the dense top layer (active layer) supported by the porous sub-layer (substructure). The cross-sectional SEM images revealed that hydroxyapatite nanoparticles were well dispersed in the cellulose acetate matrix.

