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C O N T E N T S

R E V I E W S

C H E M I S T R Y
(inorganic, organic, analytical, physical, colloid and high-molecular compounds)

C H E M I C A L T E C H N O L O G Y
(inorganic and organic substances. Theoretical fundamentals)

SHORT COMMUNICATIONS

A B S T R A C T S

E.V. STEPANOVA, A.I. STEPANOV

SYNTHESIS AND PROPERTIES OF 1,3,3-TRINITROAZETIDINE (TNAZ)

1,1,3-Trinitroazetidine (TNAZ) is perspective meltable high explosive, which is more powerful and ecological than traditionally used 2,4,6-trinitrotoluene (TNT). In review the main physicochemical properties of TNAZ and up today suggested approaches to its synthesis were considered.

Key words: 1,1,3-trinitroazetidine, azetidine, heterocyclic compounds, nitro compounds, energy intensive energy compounds

T.V. KUDAYAROVA, E.A. DANILOVA, M.K. ISLYAIKIN

SYNTHESIS AND PROPERTIES OF TERT-BUTYL-SUBSTITUTED MACROHETEROCYCLIC COMPOUND ON BASE OF BIS(5-AMINO-1,2,4-TRIAZOLE-3-IL)METHANE AND HIS COMPLEXES WITH NICKEL AND COBALT

A new tert-butil-substituted macroheterocyclic compound with expanded coordination cavity was obtained by interaction of bis(5-amino-1,2,4-triazole-3-il)methane with 4-tert-butylphthalonitrile in phenol medium. His complexes of 2:1 were synthesized by template condensation with heating of 4-tert-butylphthalonitrile and bis(5-amino-1,2,4-triazole-3-il)methane with acetate of divalent metals (Ni, Co).

Key words: macroheterocyclic compound, bis(5-amino-1,2,4-triazole-3-il)methane, 4-tert-butylphthalonitrile, expanded coordination cavity, metal complex, synthesis, properties

T.V. TIKHOMIROVA, O.M. GRUZDEVA, I.G. ABRAMOV, G.P. SHAPOSHNIKOV

SYNTHESIS AND PROPERTIES OF TETRA-4-[(Z)-(R-PYRAZOLE)DIAZENYL]-PHTHALOCYANINES

New phthalocyanines containing pyrazole groups linked through azo bridges to the macrocycle were synthesized. The influence of substituent nature on the electronic spectra and the position of the absorption bands was shown.

Key words: synthesis, spectra, phthalonitrile, pyrazole, chromophore, phthalocyanine

I.A. MANSUROVA, O.Yu. KOPALINA, A.A. BURKOV, A.A. ALALYKIN, K.E. GAVRILOV, E.A. DURNEV

STUDY OF STRUCTURE AND SURFACE CHEMISTRY OF "TAUNIT-M" CARBON NANOTUBES SUBJECTED TO PEROXIDATION TREATMENT WITH COMPLEX OF PHYSICO-CHEMICAL METHODS OF ANALYSIS

In this paper, the structure and surface chemistry of "Taunit-M" CNTs, subjected to a three-step hydrogen peroxide treatment were studied with electron microscopy, thermal analysis, GCMS. At the first step of processing impurities of synthesis catalyst and unorganized carbon were found to remove from the CNTs. The second and third steps are accompanied by oxidation of the surface and the "point" destruction of graphene planes. Appearance of oxidation surface defects leads to decreasing the nanotubes modifying effect on NBR composition.

Key words: multiwall carbon nanotubes, hydrogen peroxide, oxidation, purification, properties of the vulcanizates

G.K. SHURDUMOV, Z.Kh. UNEZHEVA, Yu.L. KARDANOVA, B.K. SHURDUMOV

SYNTHESIS OF ZINK TUNGSTATE IN MELTS OF SYSTEM (K_2WO_4 – KCl)$_{EUT.}$ – $ZnSO_4$ [K,Zn//Cl,SO_4,WO_4]

The paper presents the results of a theoretical foundation of a feasibility of the method of synthesis of zinc tungstate in the melt of system (K_2WO_4 - KCl) eut -$ZnSO_4$- one of the possible way to obtain $ZnWO_4$, conducted on the basis of thermodynamic calculations , thermochemical analysis, theory of phase equilibria and

physicochemical analysis . Along with this, it presents experimental data on the development on the base of developed in given study the conceptions of rational method of synthesis of zinc tungstate of "chemically pure" grade in the melt of production system (K_2WO_4 - KCl) eut -$ZnSO_4$,. Zinc tungstate was identified with the use of modern instruments and methods of research.

Key words: melt, synthesis, zinc tungstate, thermal analysis , melting diagram

N.G. VILKOVA, S.I. MISHINA, O.V. DORCHINA

INFLUENCE OF HYDROPHOBIZATED ALUMINUM HYDROXIDE ON FOAM PROPERTIES

In given paper the properties of the foam stabilized with hydrophobizated aluminum hydroxide are studied. The foam deformation under pressure was investigated with the developed method. The comparative characteristics of the foam stability to compression was the relative change in the foam volume, $\Delta V / V$. Stable to deformation foams were prepared from suspensions of aluminum sulfate and butyric acid at high (10%) content only of hydrophobizated particles and values of wetting angle of $\theta = 41$ °.

Key words: foam, drainage, FPDT, aluminum hydroxide, butyric acid, hydrophobisator, solid particles

A.V. AFINEEVSKIY, D.A. PROZOROV, T.Yu. OSADCHAYA, M.V. LUKIN

KINETICS OF SODIUM MALEATE HYDROGENATION ON NICKEL CATALYSTS IN AQUEOUS MEDIUM

The comparison of the kinetic parameters of the liquid phase hydrogenation reaction of sodium maleate by as ordinary skeletal nickel catalysts as catalysts based on reduced nickel in water at a pressure of 0.1 MPa and 0.8 MPa was carried out. It was illustrated the effect of a method for producing nickel catalysts to their dispersion, and it was shown the dependence of various catalyst systems activities on the size of the catalyst particles. The evaluation of the contribution of internal diffusion inhibition on parameters of the activity of the obtained catalyst systems was made.

Key words: skeletal nickel, porous nickel, supported nickel catalysts, nickel reduction, hydrogenation, hydrogenation kinetics, sodium maleate

E.V. LINOK, G.L. PASHKOV, S.V. SAIYKOVA, M.V. PANTELEEVA, A.M. ZHIZHAEV, S.A. KOZLOVA

SYNTHESIS OF HYBRID ORGANIC-INORGANIC MATERIALS BASED ON COBALT (II) HYDROXIDE OBTAINED BY USING ANION EXCHANGE RESIN

In given study two ways for synthesis of hybrid organic-inorganic materials, i.e. «one-pot» method and intercalation, are considered. The products were characterized by XRD, TGA-DSC, FTIR, and electron microscopy. As a result, conditions of the producing of organic-inorganic nanocomposites based on cobalt hydroxide, containing aminoacetate, acetate or dodecyl sulfate were choosen.

Key words: cobalt hydroxide, anion exchange resin, synthesis, intercalation

V.Yu. PROKOF'EV, Yu.N. KUL'PINA, N.E. GORDINA

PREPARATION OF ZINC-ALUMINA SORBENT USING ULTRASONIC ACTIONS

Processes in an aqueous suspension of gibbsite and zinc oxide under the action of ultrasound with the frequency of 22 kHz were investigated. It was established that the particles size of gibbsite is not changed (2–5 μm), but the size of the coherent scattering region decreases from 726 to 325–390 nm, which is accompanied by an increase in defects of microblocks. For the zinc oxide, particles aggregation is observed and its size increases from 0.2–0.3 to 0.3–0.8 μm. It was shown that the use of ultrasonic actions at preparation step allows increasing many times in mechanical strength of the granules as well as allows to increase the static capacity of sorbent upon the absorption of HCl vapor which interact with the sorbent to form a basic zinc chloride.

Key words: gibbsite, zinc oxide, ultrasound; hydrochloric acid vapors

R.F. SHEKHANOV, S.N. GRIDCHIN, A.V. BALMASOV, K.E. RUMYANTSEVA

ELECTRODEPOSITION OF ZINC-NICKEL ALLOYS FROM OXALAYE-SULPHATE ELECTROLYTES

The processes of electroplating of covers with the zinc-nickel alloys from oxalate electrolytes were studied. The influence of components ration of alloy on corrosion stable of covers, structure, chemical and phase composition and micro-hardness was shown.

Key words: electrolytic alloys, zinc-nickel, corrosion stability

O.V. POPOVA, E.A. MAR'YEVA, Z.Kh. KALAZHOKOV, Kh.Kh. KALAZHOKOV, B.S. KARAMURZOV

SYNTHESIS BY METHOD OF ANODIC POLARIZATION AND STUDY OF THIN FILMS OF TITANIUM DIOXIDE

The titanium dioxide films were synthesized by anodic polarization of titanium in aqueous organic electrolytes based on glycerol in the potential range of 10-14 V. The formations of the films were studied by cyclic voltammetry and chronoamperometry. The influence of the electrolyte composition and magnitude of the potential on the quality of the synthesized films was investigated. The structure and composition of synthesized films were studied by means of microstructure analysis and X-ray photoelectron spectroscopy.

Key words: titanium, anodic polarization; aqueous organic electrolyte; titanium dioxide; microstructure analysis; X-ray photoelectron spectrometry

A.P. FIGILYANTOV, A.V. MELNIKOVA, A.B. SHEIN

CORROSION PROTECTION OF LOW-CARBON STEEL IN ACIDIC MEDIA BY INHIBITORS OF SONKOR SERIES

Results of investigation of the influence of inhibitors of SONKOR series on the corrosion and electrochemical behavior of St 3 steel in acidic solutions by the weight-loss and polarization measurements were presented. The inhibitive effect of the investigated compositions in acidic media was shown to increase in the presence of hydrogen sulfide.

Key words: corrosion, inhibitor, protective action, hydrogen sulfide

A.G. CHEREDNICHENKO

INVESTIGATION OF STABILITY OF (1,10-PHENANTHROLINE)-TRIS-(BENZOYLPHENYL-ACETONATE) OF EUROPIUM (III) AND (1,10-PHENANTHROLINE)-TRIS-(THENOYLTRIFLUOROACETONATE) OF EUROPIUM (III) AT DIFFERENTS CONDITIONS

The studies of stability to degradation for (1,10-phenanthroline)-tris-(benzoylphenylacetonate) of europium (III) and (1,10-phenanthroline)-tris-(thenoyltrifluoroacetonate) of europium (III) in differents conditions were carried out.

Key word: europium coordination compounds, organic compounds degradation

A.A. MERKIN, A.A. KOMAROV, E.V. LOPATKIN, O.V. LEFEDOVA

HYDROGENATION OF 1,5-DINITRONAPHTHALENE OT SUPPORTED CATALYSTS IN LIQUID PHASE

Kinetics of 1,5-dinitronaphthalene hydrogenation on palladium and nickel catalysts deposited on carbon and high porous cellular materials in the individual binary organic solvents were experimentally studied. The influence of the reaction conditions - temperature, hydrogen pressure, catalyst and the hydrogenated compound amount, content of the active metal – was considered. It is found that at selected conditions of reaction carrying out the 100% conversion of initial compound is achieved as well as the high content of main substance in the target product. It was noted that the high porous cellular catalysts distinguish higher activity and less losses at their operation.

Key words: 1,5-dinitronaphthalene, supported palladium, supported nickel, 2-propanol, toluene, ethyl acetate, liquid phase hydrogenation, highly porous cellular catalysts

N.V. SAUTINA, A.O. ZAKHAROVA, E.M. MIFTAKHOVA, A.I. BIKTIMIROVA, Yu.G. GALYAMETDINOV

COLLOID – CHEMICAL REGULARITIES AT CHOISING MICROEMULSION'S NON-POLAR PHASE APPLYING AT PRODUCTION OF MAKEUP PREPARATIONS

The colloid-chemical properties of some cosmetic oils used in the production of cosmetics: viscosity, density, surface and interfacial tension at the water / oil interface, wetting, spreading were investigated. The dependence of cosmetic oils spreading on interfacial tension and wetting of polymers by oils under study on the polarity of the substrate was determined.

Key words: cosmetic oil, spreading, surface and interfacial tension, viscosity, density, wetting

A.V. SHARIPOV, E.R. MURADASILOVA, E.R. CHUKAEVA, K.Yu. PROCHUKHAN, Yu.A. PROCHUKHAN

COMPATIBILITY OF ANION SURFACTANTS WITH MODELS OF DEPOSIT WATERS

The aim of given study is test of compatibility of anion surfactants with the models of deposit waters of "Zapadnaya Sibir" (20 g/l) and "Tatarstan" (190 g/l). The anion reagents of leading producers were given as the

testing surfactants. These substances are widely used at production of cosmetic cleaning agents, means of personal hygiene, and oil field reagents relating to the type of chemical compounds of "Green chemistry".

Key words: surfactants, cleaning and washing means, compatibility, deposit water, mineralization, oil production

A.B. KAPRANOVA, I.I. VERLOKA, M.N. BAKIN

ON METHODS OF EVALUATING PRODUCTIVITY OF MIXING DRUM WITH BRUSH ELEMENTS

Methods for calculation of performance of the mixing drum with brush elements having unidirectional spiral helical winding on its cylindrical surface were proposed at production of mixture of solid dispersed mediums on movable horizontal belt.

Key words: bulk material, mixing, mixing drum, brush elements (beaters), productivity, mixing time

R. WOIYTOVICH, A.A. LIPIN, A.G. LIPIN

NUMERICAL SIMULATION OF HYDRODYNAMICS OF MIXER WITH ECCENTRICALLY POSITIONED IMPELLER

The paper presents results of mathematic simulation of hydrodynamics in a volume device without baffle with eccentrically positioned turbine impeller. The influence of the impeller's distance from the impeller axis (eccentricity) up to device axis on structure of liquid flows was analyzed. The flows structure, vortex-formation, and turbulence parameters as well as powder criterion were determined with application of Fluent CFD- software package.

Key words: mathematic simulation, volume device, mixing, volume device, turbine mixer, turbulence, mixer eccentricity

A.V. NASHCHOKIN, A.P. MALAKHO, N.V. GARADZHA, A.D. ROGOZIN

DEPENDENCE OF PROPERTIES OF CARBON-CARBON COMPOSITE ON PROPERTIES OF CARBON FIBERS USED FOR REINFORCEMENT

In the present work the influence of various carbon fiber types including heat treated fibers on properties of pitch-based carbon-carbon composites reinforced with these fibers was studied. Carbon fibers from different manufacturers were heat treated at 2400 °C and 2800 °C. Their physical and chemical properties were studied and compared with original fibers. Physical and chemical properties of carbon-carbon composites reinforced with obtained fibers were analyzed. It was found out that fiber hardness leads to improvement of their mechanical properties. The cross-sectional shape of the fibers and the thickness of the fiber tow lead to different orientation of the fibers in the composite which significantly affects composite properties.

Key words: carbon-carbon material, interphase interaction, mechanical parameters, thermo treament

Kh.A. GARAZADE, Z.E. BAYRAMOVA, A.G. LYUTFALIEV, M.N. MAGERRAMOV, A.M. MAGERRAMOV

SYNTHESIS OF 2-ALKANAMIDOETHYLALKANOATES

The reaction of carboxylic and oil acids evaporating at temperature of ≥200°C with ethanolamine was established to results in an formation of 2-alkanamidoethylalkanoates with quantitative yield.

Kew words: ethanolamine, carboxylic acids, oil acids, 2-alkanamidoethylalkanoates, thermal etherification