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А Б С Т Р А К Т С

Yu.A. MIKHEEV, L.N. GUSEVA, G.E. ZAIKOV

STRUCTURE OF AZULENE CHROMOGENIC CORPUSCLE

On the base of analysis of original and literature data it was shown that in solutions, crystal and gaseous states the azulene exists in form of irreversible transforming to each other the supra molecular dimers (I and II) absorbing the light in the same visible spectra range (Vis) differing with the mutual molecules orientation. Specific for dimers I the spectral Vis-band differs from Vis-band of dimers II with the existence of vibronic structure. The conclusion was done that a blue color of azulene connects not with the electron excitation inside of separate Az-molecules and with the optical transitions affecting the supra molecular dimers at whole as it was established before for phthalocyanine, threphenylmethane, xanthene and thiazine dyes. From the data obtained it is followed that the conventional opinion on the violation of Kashi's rule at azulene fluorescence is not valid: the light emission is carried out not from molecular level S_2 but from S_1 level.

Key words: azulene, color nature, supra molecular dimers

A.V. TIKHOMIROVA, T.G. CHERKASOVA

IODINE-MERCURATS (II) OF COMPLEXES OF LANTHANIDES (III) OF CERIUM GROUP WITH ϵ -CAPROLACTAM

New coordination compounds – iodomercurats(II) complexes of lanthanides(III) of cerium group with ϵ -caprolactam were synthesized. Complexes have a composition – $[\text{Ln}(\text{C}_6\text{H}_{11}\text{NO})_8]_2[\text{Hg}_2\text{I}_6]_3$ (Ln – La^{3+} , Ce^{3+} , Pr^{3+} , Nd^{3+} , Sm^{3+}). The received compounds were studied by chemical, IR and X-ray analyses.

Key words: iodomercurats, lanthanides, ϵ -caprolactam, IR-spectrum, X-ray analysis

O.V. GRINEVA, V.V. KOZIK, R.I. KRAIYDENKO

STUDY OF SOME PROPERTIES OF CHLORINE-CUPRATES OF AMMONIUM

In given study the synthesis method of ammonium chlorine-cuprates was developed. The products of synthesis were identified with the XPS method. The steps succession of thermal decomposition of three chlorine cuprate (II) and tetra chlorine cuprate (II) of ammonium was determined with the thermo gravimetric analysis. On the base of last data the calculation of thermal and kinetic parameters of chlorine cuprate (II) of ammonium was carried out. The limiting step of decomposition process was established to be the decomposition step of ammonium three chlorine cuprate (II). The activation energy is 13 kJ/mol.

Key words: ammonium three chlorine cuprate (II), ammonium tetra chlorine cuprate (II)

G.A. BAGIRZADE

ON SEQUENCE OF ACTIVATION OF METHYL GROUPS OF 4-PHENYL- AND 4-BROM-O-XYLENES AT HETEROGENEOUS CATALYTIC OXIDATIVE AMMONOLYSIS

The theoretical generalization of the experiments results on oxidative ammonolysis of 4-phenyl- and 4-brom-o-xylenes was carried out. It has been established, that owing to electronic factor of both phenyl group, and bromine atom, in both cases the para-methyl group is activated the first and meta-methyl group is activated the second. The electronic effect of both substituents was shown to influence only on activation of para- methyl group, and as a result, the corresponding intermediate mono nitril is formed in the first place, which in turn is converted into the target dinitril.

Key words: 4-phenyl- and 4-bromine-o-xylenes, oxidative ammonolysis

G.R. BEREZINA, S.A. ZNOIYKO, V.E. MAIYZLISH

SOLUBILITY OF BENZOTRYAZOLYL-SUBSTITUTED PHTHALOCYANINES IN ORGANIC SOLVENTS

The solubility of benzotriazolyl-substituted phthalocyanines was determined in chloroform and dymethylformamide at 298 K by the method of isothermal saturation. The dependence of solubility of these compounds on nature of substituents and central metal were revealed.

Key words: solubility, tetrapyrrolic macrocycles, benzotriazolyl-substituted phthalocyanines, isothermal saturation method

Yu.M. ATROSHCHENKO, T.B. LUBIMOVA, V.I. KHEIYFETS, I.V. SHAHKEL'DYAN, A.S. SHUMILIN, K.I. KOBRAKOV

CATALYTIC SYSTEM FOR HYDROGENATION OF MALEIC ANHYDRIDE

Results of researches of various catalytic systems on the base of palladium for hydrogenation of maleic anhydride to succinic acid in the water environment are given. On the base of experimental data and theoretical conceptions the choice of optimum composition of the catalyst was proved.

Key words: heterogeneous catalysis, hydrogenation, palladium catalyst, succinic acid

A.N. KAZAKOVA, E.K. KURBANKULIEVA, S.S. ZLOTSKIY

REACTIONS OF SUBSTITUTED *hem*-DICHLOROCYCLOPROPANES WITH PHENOLS AND ALCOHOLS

The 1,1-disubstituted (chlormethylene)cyclopropanes in a form of isomers mixture of Z and E-structures were obtained as a result of interaction of phenols and alcohols with 1,1,2-threechlorine-2-(chlormethylene)cyclopropane. In the reaction prod-

ucts of cis, trans-1,1,3-trichloro-2-(chlorinemethyl)cyclopropanes the 1,1-disubstituted 2-chloro-3-methylenecyclopropane presents together with stereo isomers of Z and E-structure.

Key words: hem- dichlorocyclopropanes, phenol, dimethyl sulfoxide

E.I. MALYSHEVA, I.K. GARKUSHIN, T.V. GUBANOVA
**UNITED STABLE LiF-KCl-KF-K₂MoO₄ TETRAHEDRON FOR FOUR-COMPONENT
MUTUAL Li, K || F, Cl, MoO₄ SYSTEM**

The phase equilibria in united stable tetrahedron LiF-KCl-KF-K₂MoO₄ of four-component mutual system Li, K || F, Cl, MoO₄ were studied by the method of differential thermal analysis. The volumes of crystallizing phase were delimited. The phase reactions were described for every element of phase diagram. The composition and temperature of fourfold eutectic point were determined.

Key words: thermal analysis, phase equilibria, eutectic, T-x diagram

Yu.S. PEREGUDOV, S.I. NIFTALIEV, V.I. KORCHAGIN, L.V. LYGINA, S.I. BOGUNOV, Yu.M. MALYAVINA
INTERACTION ENTHALPY OF HYDROPHOBIC CHALK WITH WATER

The interaction process of hydrophobic carbon fillers with water was studied with a calorimetric method. On the base of experimental results the process enthalpy was calculated. The interaction with water of a chalk modified palmitic and oleic acid is accompanied by endothermic effect whereas with the stearic acid and zinc stearate – exothermic one.

Key words: chemically precipitated chalk, hydrophobic agents, calorimetric method, interactin with water

E.A. YASHKINA, S.N. YASHKIN, D.A. SVETLOV
**MOLECULAR STATISTICAL CALCULATION OF THERMODYNAMIC CHARACTERISTICS
OF ADSORPTION OF BICYCLIC HYDROCARBONS MOLECULES ON GRAPHITE BASAL FACE**

The thermodynamic characteristics of adsorption (TCA) on the graphite basal face were calculated in terms of the adsorption molecular statistical theory (adsorption equilibrium constants (Henry constants), differential molar heats and changes in entropies of adsorption, molar changes in heat capacity of the adsorbate as a result adsorption) for molecules of bicycloalkanes, bicycloalkenes and bicycloalkadienes. In the series of the investigated compounds the comparative detail analysis of the thermodynamic characteristics of adsorption was performed. The influence of specific features of the geometric and electronic structure of compounds on their adsorption properties was shown. The correction into the values of the potential function parameters of pair intermolecular interaction of adsorbate carbon atoms with the graphite carbon atoms were determined by means of spin-spin coupling constants (¹J_{C,H}). These corrections allow obtaining minimum discrepancies between the theoretical and experimental TCA in molecular statistical calculations. The values of the Kovacs retention indices of bicyclo[n.m.0]alkanes were calculated from the theoretical Henry constants, which can be used in the development of analytical determination of these compounds in complex mixtures under the conditions of equilibrium GAC on columns with graphitized thermal carbon black.

Key words: adsorption, bicyclic hydrocarbons, graphitized thermal carbon black, molecular statistical calculations, Henry's constant, adsorption heats, adsorption entropy, atom-atomic potentials, two-dimensional ideal gas model, retention indices

S.P. SAFRONOV, E.L. KRASNYKH, A.S. MASLAKOVA, S.V. LEVANOVA
**IDENTIFICATION OF CARBOXYLIC ACIDS ESTERS OF VARIOUS STRUCTURES
WITH CHROMATOGRAPHIC-MASS SPECTROMETRY METHOD**

The paper analyzes the esters of carboxylic acids by gas chromatography / mass spectrometry. The features of fragmentation of the three types of esters: esters of polyhydric alcohols, esters of fatty acids and the esters of unsaturated fatty acids (with low molecular weight alcohols) were studied. The general regularities and differences were revealed.

Key words: GC-MS, esters, polyols, limit, unsaturated fatty acids, fragmentation, Mc Lafferty rearrangement, ions

V.I. BAKANOV, N.V. LARINA
ELECTROCHEMICAL FORMING NANOSTRUCTURES: THIN FILMS OF BISMUTH

The theoretical questions of forming thin metal films with nanocrystalline structure are considered. The results of research of surface and structure of electrochemically deposited Bi on the copper substrates by atomic-force microscopy are given. The possibility of obtaining bright bismuth films with nanocrystalline structure was shown.

Key words: electrodeposition, nanocrystalline structure, nanostructural films

A.B. SHEIN, I.L. RAKITYANSKAYA
ELECTROCHEMICAL BEHAVIOR OF MoSi₂ IN ACIDIC ELECTROLYTES

The results of investigation of anodic and cathodic behavior of MoSi₂ in sulphuric acid solution are presented. It has been shown that anodic resistance of MoSi₂ is 5-6 orders of magnitude higher than Mo and it decreases considerably in fluoride-containing solutions because of dissolution of protective film of SiO₂.

Key words: molybdenum, silicide, anodic dissolution, hydrogen evolution

A.I. MAXIMOV, A.V. KHLIUSTOVA
**INFLUENCE OF ATMOSPHERIC PRESSURE GLOW DISCHARGE ON STRUCTURAL PARAMETERS
OF HCl DALUTE SOLUTION**

The data on the action of atmospheric pressure glow discharge on structural parameters of solution using the HCl solution of pH=2.54 as an example were obtained. Changes in physical-chemical parameters of solution (conductivity, viscosity) were shown to connect not only with the temperature change or solution acidity.

Key words: discharge, solution, conductivity, viscosity

M.I. ABDULLIN, A.B. GLAZYRIN, O.S. KUKOVINETS, A.A. BASYROV, P.P. MUSLUKHOV
CHEMICAL MODIFICATION OF SYNDIOTACTIC 1,2-POLYBUTADIENE

The results of chemical modification of syndiotactic 1,2-polybutadiene under the action of reagents of various chemical nature are discussed. On the base of literature data and results of own studies the estimation of reagent nature influence on reactivity of double $>C=C<$ bonds was carried out for 1,2-polybutadiene macromolecules at its chemical modification and the structure of modified polymer products.

Key words: syndiotactic 1,2-polybutadiene, chemical modification, reactivity, functionalization degree, polymer products

R.M. KUMYKOV, A.A. BEEV, A.K. MIKITAEV, A.L. RUSANOV

NEW CHLORINATED POLYESTERPHALIMIDES BASED ON DERIVATIVES OF CHLORAL

Not described earlier chlorinated polyimides were prepared by the reaction of bis (esterphthal anhydrides) with aromatic diamines containing dichlorethylene group. The influence of dichlorethylene input, carbonyl and acetylene groups on the solubility, heat, thermo- and fire- resistance, film-forming properties of synthesized polymers was studied.

Key words: polyesterphthalimide, polycyclocondensation, thermo-resistance, solubility, destruction

V.A. SMIRNOV

METHOD OF 3N- THIAZOLONE OBTAINING

The 2-acetoxythiazole was synthesized and method of obtaining the 3N-thiazolone from it was developed.

Key words: synthesis, 2-acetoxythiazole, 3N-thiazolone-2

O.A. FEDYAEVA

**JOINT ADSORPTION OF CARBON MONOXIDE AND HYDROGEN ON SURFACE
OF SOLID SOLUTIONS $Cd_xHg_{1-x}Te$**

The joint adsorption of carbon monoxide and hydrogen on semiconductor catalysts CdTe and $Cd_{0.2}Hg_{0.8}Te$ was studied with the methods of IR-spectroscopy and volumetric one. The chemical interaction of gases was shown to accompany by the formation and destruction of complex intermediate complexes such as formyl ligands and hydrocarbons structures. Predominant shock mechanism of joint adsorption of gases was established. The most active component in a mixture of carbon monoxide and hydrogen was hydrogen. Schemes of catalytic hydrogenations of carbon monoxide on CdTe and $Cd_{0.2}Hg_{0.8}Te$ were offered.

Key words: adsorption, active center, surface complex, catalytic hydrogenation

S.V. BAIKOV, A.A. BAKANOVA, E.R. KOFANOV, G.G. KRASOVSKAYA

**INTERACTION OF N'-HYDROXYARYLAMIDINES WITH CHLOROETHYLOXALATE
IN PYRIDINE MEDIUM**

The interaction of chloroethyloxalate with N'-hydroxyarylamidines in pyridine medium was considered. The aromatic nitriles were the main reaction products. The scheme of their formation was proposed.

Key words: 5-etoxy-carbonile-1,2,4-oxadiazole, benzene nitrile, chloroethyloxalate, pyridine

E.K. SPIRIN, N.Yu. LUGOVTSOVA, L.V. MISKEVICH, E.V. LYTYAGIN

ALTERNATIVE METHOD FOR SILICON REMOVING FROM ION-EXCHANGE MATERIALS

The fluoride method for silicon removing from ion-exchange materials (partially, VP-1An anionite) was developed and tested. The specific resin consumption after silicon removing was shown to be lower by a factor $\frac{1}{4}$ as comparing with now day applying alkaline method. Increased fluorine consumption as comparing with sodium alkaline can be compensated, partially owing to the use in process of a fluorine row from various products of fluorine enrichment plants.

Key words: silicon removing, resins poisoning, sorbent, desorption, hydrofluoric acid, sorbent exchange capacity

O.I. ODINTSOVA, M.N. KROTOVA, E.Yu. KUYAEVA, Yu.A. RUKAVISHNIKOVA, V.A. FIRSOVA
RESEARCH OF CATIONIC POLYELECTROLYTES INTERACTION WITH DIRECT DYES

The problems of increasing a degree of useful application of direct dyes, growing economic and ecological efficiency of coloration processes, improvement of colouring stability to washing and sweat of the fabrics were studied. Theoretical questions of the interaction of cationic polyelectrolytes with direct dyes of various chemical structures were considered. The dependences obtained define the efficiency of using the cationic polyelectrolytes as a basis of preparations for fixation of the dyes for textile materials which are coloured by direct dyes.

Key words: cationic polyelectrolyte, direct dye, bonding efficiency, fastening the colouring

A.A. AFONIN, T.V. ANISKOVA, T.K. VETROVA, V.T. LIVENTSEV, R.I. KUZMINA

CATALYTIC CONVERSIONS OF N-HEXANE ON MODIFIED HIGH-SILICA ZEOLITE

The systematic studies of n-hexane reforming on Cu-Gd-TSVK-II-895 catalyst were carried out at various conditions of catalyst activation (in air flow and in flow of hydrogen-containing gas). As result it was established that the using this catalyst system it is possibly to obtain high octane components of car fuels under conditions unlike industrial reforming without hydrogen addition.

Key words: reforming, Cu-Gd high silica catalyst, n-hexane

S.S. NIKULIN, I.N. PUGACHEVA

OBTAINING POWDER-LIKE FILLERS FROM WASTE OF TEXTILE INDUSTRY

The way of processing a fibrous waste on the base of the cellulose forming on the textile enterprises was considered. Possibility of filling butadiene-styrene rubbers by powder-like fillers on the base of cellulose at a step of their manufacture was shown. The influence of fillers under study on the coagulation process and property of obtaining vulcanizates was studied.

Key words: textile waste, powder-like fillers, butadiene-styrene rubber, vulcanizates

A.S. KUVSHINOVA, A.G. LIPIN

INVESTIGATION OF PROCESS OF CAPSULES FORMING FROM WATER-SOLUBLE POLYMERS ON SURFACE OF DISPERSED MATERIALS

The results of studying the processes occurring at the capsules forming from water-soluble polymers on the surface of dispersed materials are presented. The method for encapsulation of dispersed materials through polymerization reactions in a plate granulator with heat treatment of particles with the help of infrared radiation was described. The mathematical model for the encapsulation process at shell formation on a single particle is considered. The method for determination of regime-technological parameters of the encapsulation was developed.

Key words: encapsulation, mathematical modeling, polymerization, plate granulator, dispersed materials

M.V. KORCHAGIN

SYNTHESIS OF FLEXIBLE CHEMICAL-ENGINEERING WASTES RECYCLING SYSTEMS ON BASE OF CONFLICT ANALYSIS OF EFFICIENCY PROCESS CRITERIA

Ecological efficiency increase ways of wastes recycling chemical-engineering systems on the base of the topological analysis of their structure in space of the criteria conflict are considered. Decomposition methods of system communications and recycling object models which allow to create invariant with respect to implementation topological model are offered.

Key words: joint waste utilization, flexible chemical-engineering system, operating efficiency criteria conflict, structurally-topological characteristics, synergetic effect

I.S. GUDANOV, P.P. YURIGIN, G.M. GONCHAROV, A.A. LOMOV

DETERMINATION OF ENERGY-POWER PARAMETERS OF CO- EXTRUSION PROCESS OF TUBULAR SHAPES FROM RUBBER MIXTURES

The comparative analysis of the energy-power characteristics of the worm machines aggregated with forming heads of different geometry of boundaries of profiling channel was carried out.

Key words: co-extrusion, multiplex heads, stratified flow, rubber mixtures, forming, inter-material deformation

E.V. PUZANOVA, FLORES ARIAS MARIA MELISSA, Yu.K. RUBANOV, A.S. POLYAKOVA

TECHNOLOGY OF LUBRICATING-COOLING LIQUID TREATMENT USING WASTES OF METALLURGICAL PRODUCTION

The composition of adsorption complex was developed. The technological scheme of water purification from emulsified oil products was proposed. This scheme includes the sorbent introduction to the medium under purification, treatment of obtained suspension in magnetic field followed by separation of sorbent with filtration. The results of waste water efficiency purification are given. The interrelation between sorption capacity and electro kinetic potential was revealed.

Key words: lubricating-cooling liquid, iron-ore concentrate, electric-furnace slag, magnetic treatment, adsorption capacity, electro-kinetic potential

Yu.S. PESTOVSKIY

USE OF AGGREGATION OF GOLD NANOPARTICLES BY POLYELECTROLYTES FOR SURFACE-ENHANCED RAMAN SPECTRUM SIGNAL INTENSITY INCREASE

During immobilization of gold nanoparticles onto surfaces treated with polyelectrolytes the different types of aggregates are formed. Surface concentration of nanoparticles and aggregates and types of aggregates depend on polyelectrolyte nature. Autometallography significantly increases ability of surfaces obtained to enhance signal in Raman spectrum of immobilized dye. Signal intensity also depends on counterion introduced into polyelectrolyte solution.

Key words: autometallography, gold nanoparticles, surface-enhanced Raman scattering (SERS)

L.N. IVANOVA, R.M. SULTANOVA, S.S. ZLOTSKIY, V.A. DOKICHEV

CATALYTIC INTERACTION OF CYCLIC ESTERS WITH METHYLDIAZOACETATE

Catalytic interaction of methyldiazoacetate with cyclic esters in the presence of ion liquid [bmim]⁺PF₆⁻ as addition to Rh₂(OAc)₄ was established to result in the formation of introduction products of metoxycarbonylcarbene on C-H bond of heterocycle.

Key words: catalysis, methyldiazoacetate, cyclic esters, ion liquids