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А Б С Т Р А К Т С

*M.Z. ZARIFYANOVA, I.Sh. KHUSNUTDINOV, A.V. KONSTANTINOVA,  
S.D. VAFINA, A.A. GAIYFULLIN*

**EXTRACTION OF MOLYBDENUM FROM WASTE PRODUCTS OF PROPYLENE  
OXIDE PRODUCTION**

The review on methods for recycling highly toxic industrial wastes of the propylene oxide obtaining process is presented. The ways of molybdenum recovery and the use of an organic part of a waste were considered.

**Key words:** molybdenum catalyst, epoxydat, propylene oxide, by-product, heavy fraction, alkaline waste, molybdenum-containing precipitate

*T.N. KHAMAGANOVA*

**TERNARY BORATES OF YTTERBIUM WITH BARIUM AND STRONTIUM**

The phases of variable composition were synthesized by solid-state reactions in the system of  $Ba_{3-x}Sr_xYb(BO_3)_3$ . The formation of two series of solid solutions was established using X-ray diffraction (Bruker D8 Advance diffractometer,  $\lambda CuK_\alpha$  radiation). The crystallographic parameters of ternary phases were determined.

**Key words:** ternary oxides systems, crystal structure, X – ray diffraction analysis, variable composition phases

*N.S. KOZHEVNIKOVA, S.I. SADOVNIKOV, A.A. URITSKAYA, A.I. GUSEV*

**LEAD HOMOGENEOUS AND HETEROGENEOUS ION EQUILIBRIA IN WATER SOLUTIONS**

The analysis of formation conditions of metal hydroxide and sulfide in an aqueous solution for a system “ $Pb^{2+} - H_2O$ ” was carried out. This system was analyzed taking into account the formation of multinuclear hydroxide complexes. The concentrations fields for stable fo

rmation of  $Pb(OH)_2$  and  $PbS$  were calculated for solutions containing hydroxide and citrate complexes of lead (II). The proposed calculation method is applicable to other chalcogenide systems containing metal ions which form both single- and multinuclear hydroxide complexes.

**Key words:** ionic equilibria, lead ions multinuclear hydroxide complex, system “ $Pb^{2+} - H_2O$ ”, calculation of formation conditions for  $Pb(OH)_2$  and  $PbS$

*V.Ya. FAIYN, B.E. ZAITSEV, M.A. RYABOV*

**ISOMERIC STRUCTURE OF 1-AMINOANTHRAQUINONE**

The explanation of reasons of significant diferencies in electronic absorption spectra of 1-amino-anthraquinones in identical media was proposed. The results of quantum-chemical and correlational analysis indicate the possibility of existence of 1-amino-9,10- and 9-amino-1,10-anthraquinones. For each of them the tautomeric transformations to imines and trans-conformers without intermolecular H-bonds occur.

**Key words:** 1-aminoanthraquinone, absorption electronic spectra, isomerism, rotating isomerism, tautomerization, quantum-chemical calculations, correlation analysis

*V.S. KOLOSNITSYN, E.V. KUZMINA, L.V. SHEINA, E.V. KARASEVA, A.A. YAKOVLEVA*  
**DETERMINATION OF SULPHIDE SULPHUR CONTANT IN LITHIUM POLYSULPHIDES  
SOLUTIONS IN APROTONIC SOLVENTS WITH METHOD OF ACID-BASE TITRATION**

The opportunity of measurement of sulphide sulphur in lithium polysulphide solutions in aprotionic dipolar solvents and electrolyte systems on their base by a method of direct and back acid-base titration with potentiometric indication of endpoint was studied. Errors of determination of sulphide sulphur in the solutions of lithium polysulphides by the method of direct acid-base titration were shown to be 20÷25% whereas by the method of back acid-base titration to be 2÷3%. The large errors of determination of content sulphide sulphur in the lithium polysulphide solutions by the method of back acid-base titration were explained by a slowness of hydrolysis reactions of lithium polysulphide during titration.

**Key words:** acid-base titration, potentiometric indication, sulphide sulphur, lithium polysulphides, aprotionic solvents

*E.S. SAVELIEVA, N.M. ALYKOV*

**COMPARISON OF DIFFERENT EXTRACTION SYSTEMS AT SPECTROPHOTOMETRIC METHOD OF DETERMINATION OF PHOTOSYNTHETIC PIGMENTS (PSP) IN PLANT LEAFS**

The comparison of methods of pre – treatment of a vegetative material was carried out for the purpose of determination of content of photosynthetic pigments (PSP) by spectrophotometry. The extraction by a mixture of eluents allows extracting pigments from material plants more completely. The systems under study the hexane – ethanol (1:1) mixture is the most optimal.

**Key words:** photosynthetic pigments (PSP), allocation methods, determination methods

*Ya.I. KORENMAN, N.Ya. MOKSHINA, A.A. BYCHKOVA*

**FRUCTOSE EXTRACTION WITH HYDROPHILIC SOLVENTS MIXTURES**

The distribution coefficients (D) of fructose in systems of binary mixtures of hydrophilic solvents - ammonium sulphate – water were established. The dependence of D on the composition of solvent mixtures has a synergistic nature. Synergetic coefficients were calculated.

**Key words:** fructose, extraction, hydrophilic solvents, salting-out agents, chromatography

*A.B. LEBED, S.A. KRAYUKHIN, V.I. SKOROKHODOV, S.S. NABOIYCHENKO, G.I. MALTSEV*  
**SORPTION OF PALLADIUM AND PLATINUM FROM NITRATE SOLUTIONS OF SILVER**

The sorption of palladium and platinum ions from nitrate solutions on vinyridine anionite VP-1P was revealed to proceed on two mechanisms: ion-exchange one and by means of a complexation.

**Key words:** sorption, ionite, nitrate solutions, platinum, palladium, complex compounds

*M.S. TUNIN, M.A. PERSIYANOVA*

**DETERMINATION OF GIBBS EXCESS ENERGY AND ACTIVITY COEFFICIENTS OF COMPONENTS OF DIMETHYL SULFOXIDE SOLUTIONS IN METHANOL BY LIGHT SCATTERING METHOD**

The Rayleigh's scattering relative factor ( $R^V$ ) and depolarization degree ( $\Delta_V$ ) of scattered light were measured at different temperature for the methanol-dimethyl sulfoxide system. Results of measurements were used for determination of excess Gibbs's energy and activity coefficients of solution components.

**Key words:** light-scattering method, dimethyl sulfoxide, Gibbs's energy, activity coefficients, enthalpy, entropy

*G.R. AKHATOVA, I.V. SAFAROVA, A.Ya. GERCHIKOV, A.A. ENIKEEV*

**KINETICS OF INTERACTION OF URACYL DERIVATIVES WITH HYDROGEN PEROXIDE**

Kinetics of hydrogen peroxide interaction with number of uracyls were studied in water and 1,4-dioxane. Bimolecular rate constants and activation parameters of this reaction were determined.

**Key words:** uracyl derivatives, bimolecular rate constant, hydrogen peroxide

*O.A. FEDYAEVA*

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

With attraction of IR-spectroscopy and volumetric methods the joint adsorption of carbon dioxide and hydrogen on semi-conductor catalysts CdTe and  $Cd_{0.2}Hg_{0.8}Te$  was studied. The hydrogenation of carbon dioxide was shown to proceed through a step of formation of superficial formate complex, products of decomposition of which are CO, CO<sub>2</sub>, H<sub>2</sub> and H<sub>2</sub>O. Mainly shock mechanism of joint adsorption of gases was established. The carbon dioxide was the most active component in a mixture of carbon dioxide and hydrogen. Schemes of catalytic hydrogenation of carbon dioxide on the CdTe and  $Cd_{0.2}Hg_{0.8}Te$  were offered.

**Key words:** adsorption, active sites, adsorption mechanism, catalytic hydrogenation

*V.B. KHARITONTSEV, P.O. ANDREEV*

**PHASE COMPOSITION OF INTERACTION PRODUCTS OF SAMARIUM WITH SELENIUM**

An interaction of metallic samarium with dispersity of 0.01 mm with selenium in a sealed tube takes place in the range of 570 - 1270 K. This leads to the formation of layers in the particles of phase: SmSe, Sm<sub>3</sub>Se<sub>4</sub>, Sm<sub>2</sub>Se<sub>3</sub>, SmSe<sub>2</sub>. For ratios of 1Sm: 2Se in isothermal conditions the SmSe<sub>2</sub> (100%) is formed at 770 K, 1070 K, 1270 K. For the initial ratio of samarium: selenium the following phases are formed: 2Sm: 3Se- $\gamma$ -Sm<sub>3</sub>Se<sub>4</sub>-Sm<sub>2</sub>Se<sub>3</sub> Th<sub>3</sub>P<sub>4</sub>-type,  $a = 0.8820$  nm; 3Sm:4Se- $\gamma$ -Sm<sub>3</sub>Se<sub>4</sub>,  $a = 0.8925$  nm; 1Sm:1Se - SmSe (45%) NaCl-type,  $a = 0.620$  nm and  $\gamma$ - Sm<sub>3</sub>Se<sub>4</sub>-Sm<sub>2</sub>Se<sub>3</sub> - 40%,  $a = 0,8861$  nm at 1270 K. The  $\alpha$ -Sm<sub>2</sub>Se<sub>3</sub> of low-temperature modification was obtained at 1070 K.

**Key words:** samarium selenides, phase composition, temperature ranges, phase interaction, diselenide dissociation

*N.V. BELOVA, G.V. GIRICHEV, N.I. GIRICHEVA, I.G. ZAITZEVA, I.O. ZYABKO,  
A.V. KRASNOV, N.P. KUZMINA, S.A. SHLYKOV*

#### **MASS-SPECTROMETRIC STUDY OF SCANDIUM $\beta$ -DIKETONATES VAPORIZATION**

The Knudsen effusion method with mass spectrometric monitoring of vapor composition in the frame of second law of thermodynamics the sublimation enthalpies were determined for scandium beta-diketonates: (I) acetylacetonate  $\text{Sc}(\text{C}_5\text{H}_7\text{O}_2)_3$ , (II) dipivaloylomethanate  $\text{Sc}(\text{C}_8\text{H}_{13}\text{O}_2)_3$ , (III) pivalyltrifluoroacetate  $\text{Sc}(\text{C}_8\text{H}_{10}\text{O}_2\text{F}_3)_3$  and (IV) hexafluoroactylacetonate  $\text{Sc}(\text{C}_5\text{HO}_2\text{F}_6)_3$ . The following values were obtained (kcal/mol): 28.5(5) (I) , 25.1(11) (II) , 25.2(5) (III) , 27.1(9) (IV).

**Key words:** metal  $\beta$ -diketonates, scandium acetylacetonate, scandium pivaloylacetonate, scandium pivaloyltrifluoroacetate, scandium hexafluoroactylacetonate, mass spectrometric study, sublimation molar enthalpy

*A.A. YAKOVLEVA, VO DAI TU*

#### **STABILITY OF SUSPENSIONS BASED ON CLAY OF TROSHKOVSKY DEPOSIT**

The characteristics of clay of Troshkovsky deposit located to Irkutsk region were studied. The stability of its suspensions depending on the electrolyte additives of sodium, magnesium and aluminum sulfates was investigated. The thresholds of cations coagulation were determined and the influence of anion type on the threshold value was established.

**Key words:** clay, clay minerals, kaolin, suspension stability, coagulation threshold

*V.D. BUIKLSKIY, A.V. BESPALOV*

#### **STABILIZATION OF SILVER NANOPARTICLES IN ALCOHOLIC SOLUTION OF POLYETHER**

The formation process of silver nano particles in alcoholic solution of polyether was investigated. The prepared sols were characterized by UV-vis spectroscopy and scanning electron microscopy.

**Key words:** silver nano particles, polyether, stabilization, alcoholic solution, reduction

*S.M. ROMANOVA, A.M. MUKHETDINOVA, S.V. FRIDLAND*

#### **MODIFICATION OF CELLULOSE NITRATE ESTERS BY ASYMMETRICAL DIMETHYLHYDRAZINE AND ITS HYDRAZIDES**

The interaction of cellulose nitrate with asymmetrical dimethylhydrazine and carboxylic acid hydrazides was studied. The most probable pathways of reactions were established on the base of physical-chemical studies.

**Key words:** cellulose nitrate, nitrate group replacement, asymmetrical dimethylhydrazine, carboxylic acid hydrazides, nitrate group saponification

*K.A. BALASHOVA, Yu.T. PANOV, O.A. FREEDMAN, A.V. PANKRATOV*

#### **STUDY OF CROSS-LINKING KINETICS OF POLYOLEFINES BY CHEMICAL CROSS-LINKING AGENTS**

The possibility of applying the Brabender plastograph for studying the high pressure polyethylene cross-linking was considered. The influence of foam agent– azodicarbonamide on process of cross-linking in the presence of dicumyl peroxide and novoperoxide-BP40 was studied. Analytical dependencies of relative degree of cross-linking on concentration of cross-linking agent were obtained.

**Key words:** polyethylene, cross-linking, Brabender plastograph, cross linking agents

*T.S. USACHEVA, M.V. KARLYUK, T.G. AGEEVA, O.I. KOIFMAN*

#### **COMPARATIVE STUDIES OF PROPERTIES OF DILUTE SOLUTIONS OF SOME POLYMERS AND CO-POLYMERS AND PORPHIRINE-POLYMERS ON THEIR BASES**

The properties of diluted solutions of poly-4-vinylpyridine, a co-polymer of styrene and 2-vinylpyridine as well as products of their interaction with tetraphenylporphyrin of zinc (ZnTPhP) were investigated. It is shown, that the introduction of ZnTPhP in polymer macromolecule doesn't change the character of interaction of the macromolecular coil with solvent (DMFA). As the initial polymers as products of their modification form the solutions refer to systems with the lower critical temperature of dissolution.

**Key words:** dilute solutions, polymers, styrene co-polymers

*E.A. SOSNIN, G.G. ABASHEV*

**SYNTHESIS AND ELECTROCHEMICAL STUDIES OF CHALKINESS CONTAINING PHENOTHIAZINE AND CARBAZOLE FRAGMENTS WITH DIFFERENT ALKYL RADICALS**

The series of chalkiness containing the carbazole and phenothiazine fragments which were not described before were synthesized. The electrochemical behaviour of the newly prepared compounds in acetonitrile was studied with the cyclic voltammetry method.

**Key words:** chalkiness, carbazole, phenothiazine, cyclic voltammetry

*E.V. FESIK, V.I. ZARAZHEVSKIY, G.D. MAL'CHIKOV*

**RHENIUM-CONTAINING CATALYSTS OF PROCESSES FOR NEUTRALIZATION OF EXHAUST GASES OF CAR. I. CATALYTIC SYSTEMS ON METAL CARRIER**

In the study with a method of autoclave thermolysis of water solutions of  $[\text{Pt}(\text{NH}_3)_4]\text{Cl}_2$ ,  $[\text{Pt}(\text{NH}_3)_4]\text{Cl}_2$  and  $\text{NH}_4\text{ReO}_4$  the samples of catalysts on the steel metal carrier (Pt-Re/stainless steel, Pd-Re/stainless steel) were obtained. The catalytic activity of laboratory samples for the model processes of oxidation of hydrocarbons (propane, *n*-hexane) was studied. Results can be used as a base for creation of new high efficient rhenium-containing catalysts which are not inferior to similar platinum-containing catalysts.

**Key words:** rhenium, heterogeneous catalysts, platinum metals, metal carrier, hydrothermal synthesis, catalytic autoneutralizer, hydrocarbons oxidation

*A.S. ZAKHARCHENKO, A.A. ALESHINA, O.V. KOZLOVA*

**PROPERTIES OF FILM-FORMING POLYMERS USING AT TEXTILE FINISHING**

Properties of polymers using at a modification of textile materials and determining new qualitative parameters of processed fabrics were considered. The comparison of Russian production polymeric preparations with respect to their suitability for fabrics finishing was carried out. The base principles of polymeric modifiers choice was shown for various kinds of textile materials finishing.

**Key words:** polymer, acrylate, deformation, elasticity, film forming

*S.V. ALEEVA, S.A. KOKSHAROV*

**INVESTIGATION AND DESCRIPTION OF CAPILLARITY CHANGE FOR LINEN FABRIC AT ENZYME TREATMENT**

The necessity of complex use of amylolytic and pectolytic enzymes at biopreparation of linen fabric before bleaching was based. The regularity which reflects the influence of removal of fat-and-oil compounds, starch and polyuronide compounds on attainable level of fabric capillarity and cooperativity presence in the action of endogenous depolymerase of amylase and pectinase complexes was obtained. The synergism is due to elimination of steric obstacles for biocatalyst action on corresponding substrate polymers which appear at a penetration of starch into the structure of binding agents in linen complexes at the step of yarn dressing.

**Key words:** linen fabric, polymers biocatalyzed destruction, enzymes activity, capillarity, regressive analysis

*A.M. BESSARABOV, A.V. KVASYUK, A.A. CHIZHUK, G.E. ZAIKOV*  
**SYSTEM ANALYSIS OF INNOVATIVE RESOURCES**

The system analysis of specific weight of innovative resources of polymers and plastics industry in Russian economics was carried out. The main indicators of innovative activity of polymers and plastics industry leading enterprises for 1995-2009 were analyzed in the most important information categories.

**Key words:** system analysis, innovative resources, mathematical modeling, polymers and plastics industry

*E.V. KISELEVA, V.V. MARKOV*

**RESEARCH OF INFLUENCE OF PREPARATION METHOD OF LUBRICATING-COOLING TECHNOLOGICAL AGENTS ON METALS CUTTING PROCESS**

The special technology of technological liquids preparation for metals processing with cutting is proposed. As a result it is possible to obtain liquids with high technological parameters.

**Key words:** cavitation, dispersity, tools stability, surface roughness

*S.V. NATAREEV, E.N. VENKIN, O.S. NATAREEV*  
**MASS TRANSFER IN DRYING PROCESS OF MOIST MATERIAL AT CONVECTIVE  
FEED OF HEAT**

By means of a method of Laplace integrated transformations the analytical solutions of tasks on moisture removal from material were found for chamber dryer of flowing type for periods of constant and dropping drying rate. The model adequacy was checked using clay drying as an example.

**Key words:** drying, chamber dryer, mathematical model

*N.N. SIMAKOV*  
**COMPARISON OF TWO METHODS FOR CALCULATION OF HEAT RADIATION ABSORPTION  
AT CALCULATION OF BODIES HEATING**

The analytical and numerical comparison of two methods for the calculation of heat radiation absorption by liquid and solid bodies during their heating was carried out. The first method was simplified. The second one was more complicated but this method is correct from viewpoint of mathematics and physics. The justification of the first method was confirmed. The conditions and details of its application were specified.

**Key words:** calculation methods comparison, heat radiation absorption, bodies heating

*Yu.S. MARDASHEV, A.N. SHAVROV*  
**DIRECT EVALUATION OF ENTROPY CHANGE THROUGH pH**

On the base of numerical experiments simulating the penetration of ions through the structured membrane the entropy change was shown to be proportional to pH.

**Key words:** entropy, structured membrane, solution pH, Brownian motion

*R.F. SHEKHANOV, S.N. GRIDCHIN*  
**ELECTRO DEPOSITION OF ZINC-NICKEL ALLOY FROM AMMONIUM  
CHLORIDE ELECTROLYTES**

Processes of electro deposition of zinc-nickel alloy from electrolyte with ammonium chloride were investigated. The possibility of obtaining the good-quality electroplating was shown at current densities from 0.5 to 5.0 A/dm<sup>2</sup>.

**Key words:** electrodeposition, electrolyte, zinc, nickel

*Yu.Ya. LUKOMSKIY*  
**ON ANALYSIS OF COMPLEX ELECTRO CHEMICAL PROCESSES**

The letter aim is to show that in complex electrode reactions the rates of elementary consecutive processes are interconnected in the general case. That processes can be described with reaction parameters of discharge-ionization at various elementary limiting steps.

**Key words:** electrochemical processes, electrode reactions, limiting step