BALANDIN, A.A., akademik; VASSERBERG, V.E., kandidat khimicheskikh nauk.

Catalytic chemistry and chemistry of the future. Znan.sila 31 no.2:
29-34 F '56. (MLRA 9:5)

(Catalysis)

BALANDIN, A.A.

Theory of catalysis selectivity from the studies of the department of organic catalysis of Moscow State University. Uch.zap.Mosk.un. no.175:97-122 '56. (MLRA 10:3)
(Catalysis)

ANDIN

BALANDINA, V.A. [translator]; VYSOTSKIY, Z.Z. [translator]; BALANDIN, A.A., akademik, redaktor; RUBINSHTEYN, A.M., professor, redaktor; OGANDZHANOVA, N.A., redaktor; BELEVA, M.A., tekhnicheskiy redaktor

[Advances in catalysis and related subjects. Translated from the English] Katalis, issledovanie gomogennykh protsessov. Perevod s angliiskogo V.A.Balandinoi i Z.Z.Vysotskogo. Pod red. A.A Balandina, A.M.Rubinshteina. Moskva, Izd-vo inostr.lit-ry, 1957. 252 p.
(Catalysis) (MLRA 10:9)

BALANDIN, A A

PHASE I BOOK EXPLOITATION 1181

Akademiya nauk SSSR. Institut fizicheskoy khimii

Problemy kinetiki i kataliza. [t] IX: Izotopy v katalize (Problems of Kinetics and Catalysis. [v] 9: Isotopes in Catalysis) Moscow, Izd-vo AN SSSR, 1957. 442 p. 3,500 copies printed.

Eds: Roginskiy, S.Z., Vinogradova, O.M., Keyer, N.P. and Yanovskiy, M.I., Corresponding Members, USSR Academy of Sciences; Ed. of Publishing House: Vasserberg, V.E.

PURPOSE: This book is for specialists interested in the theoretical and practical problems of the application of isotopes in catalysis.

COVERAGE: This collection of articles forms volume 9 of "The Problems of Kinetics and Catalysis." Most of the papers were presented at the Conference on Isotopes in Catalysis which took place in Moscow, March 31 - April 5, 1956. Scientists from the Academy of Sciences of

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Problems of Kinetics and Catalysis (Cont.) 1181

of the USSR, the Ukrainian Academy of Sciences, institutes of the chemical and petroleum industries, and several vuzes took part. Scientists from the six people's republics China, GDR, Poland, Czechoslovakia, Hungary and Rumania also participated. This conference was the first of its sort not only in the Soviet Union, but internationally. Several articles which could not be included in the program of the conference are given in the text. Each article has figures, tables, and a bibliography.

TABLE OF CONTENTS:

PART I. CATALYTIC REACTIONS OF HYDROGEN

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Problems of Kinetics and Catalysis (Cont.) 1181

Discussion:

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3

BALANDIN, A. A.

"Intermediate Surface Forms in Catalysis."

M.V. Lomonosov State Univ., Moscow. Poverkhnost. Khim. Soedinen. i Rol v Yavleniyakh Adsorbtsii, Sbornik Trudov Konferents. Adsorbtsii 1957, 277-310.--

BALANDIN, A., [illegible]

"On the Structural and Energy Factors in Hydrogenation and Dehydrogenation Catalysts," a paper submitted at the 16th International Congress of Pure and Applied Chemistry, Paris, 18-24 July 1957.

BALANDIN, A. A., BOGDANOVA, O. K., ISAGULYANTS, G. V., [illegible], M. B. [illegible], [illegible]

"Application of radio-carbon in investigation the mechanism of consecutive reactions to butane-butylene-divinyl," a paper submitted at the International Conference on Radioisotopes in Scientific Research, Paris, 9-20 Sep 57.

[illegible]

BALANDIN, A.A.; VASYUNINA, N.A.; BARYSHEVA, G.S.; CHEPIGO, S.V.

Catalysts for hydrogenation of polysaccharides. Izv.AN SSSR.Otd. khim.nauk no.3:392 '57. (MIRA 10:5)

1.Institut organicheskoy khimii im. N.D. Zelinskogo Akademii nauk SSSR i Vsesoyuznyy nauchno-issledovatel'skiy institut gidroliznoy promyshlennosti.

(Catalysts) (Hydrogenation)
(Polysaccharides)

FREIDLIN, L. Kh.; BALADIN, A.A.; and RUDNEVA, K.G.

"Properties of a Nickel Catalyst Prepared by the Decomposition of the Double Nickel-magnesium Salt of Formic Acid." Izvest. Adad. Nauk SSSR, Otdel. Khim. Nauk 1957, 436-42.--The properties of a skeletal Ni catalyst and of a Ni-MgO catalyst, prepd. from a mixed Ni-Mg salt of HCO_2H, were compared on the basis of hydrogenation reactions at room temp. The data show that vinyl esters, 1-heptyne, mesityl oxide, styrene acetals with a double and triple bond, PhAc, and Ph_2CO are hydrogenated at approx. the same rate on both catalysts. MeCOEt, and BzH are hydrated more rapidly on the Ni-MgO catalyst. The activity of the Ni catalyst is greater for the hydrogenation of 2-octene, PhCh:CHCH$_2$OH, PhCH;CHCO$_2$H, peperylene, cyclohexene, tolan, and for compds. contg. the Si atom. The Ni-MgO is as good as the skeletal catalyst from the standpoint of themal stability, adsorption of H, and regeneration by oxidation.

Inst. Organic Chem. im. N.D. Zelinskiy, AS USSR

BALANDIN, A A

USSR/Physical Chemistry - Kinetics, Combustion, Explosions, Topochemistry, Catalysis. B-9

Abs Jour: Referat. Zhurnal Khimiya, No 3, 1958, 7258.

Author : A.A. Balandin, L. Kh. Freydlin, N.V. Nikiforova,
Inst : Academy of Sciences of USSR.
Title : Kinetics of Catalytic Reduction of Organic Peroxides and Hydroperoxides. Report 1. Hydrogenation of Isopropylbenzene Hydroperoxide, Ethylphenylisopropyl Peroxide and Tetralin Hydroperoxide.

Orig Pub: Izv. AN SSSR. Otd. khim. n., 1957, No 4, 443-450.

Abstract: The hydrogenation kinetics of isopropylbenzene hydroperoxide (I), ethylphenylisopropyl peroxide (II), tetralin hydroperoxide (III) and ditertiarybutyl peroxide dissolved in CH_3OH, C_2H_5OH, $C_6H_{13}OH$, C_6H_{12}, C_6H_6 or decalin was studied. The reactions were carried out in glass vessels under p = 1 atm and at 5 to 50° on Raney's catalyst and palladium black. The zero order is observed nearly

Card : 1/2

BALANDIN, A.A.

CHEPIGO, S.V., kand.tekhn.nauk; **BALANDIN, A.A.**, akademik; VASYUNINA, N.A.,
kand.khim.nauk; SERGEYEV, A.P.

Preparing polyatomic alcohols by means of catalytic conversion of polysaccharides of vegetable origin. Khim.nauka i prom. 2 no.4:416-424 '57. (MIRA 10:11)

(Alcohol) (Polysaccharides)

BALANDIN, A.A.

BOGDANOVA, O.K.; BALANDIN, A.A.; SHCHEGLOVA, A.P.

Effect of the structure of alcohol molecules on the kinetics of their dehydrogenation. Izv.AN SSSR.Otd.khim.nauk. no.7:787-794 Jl '57. (MIRA 10:10)

1.Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.
(Alcohol) (Dehydrogenation)

БАЛАНДИН, А.А.

BOGDANOVA, O.K.; BALANDIN, A.A.; SHCHEGLOVA, A.P.

Effect of the structure of alcohol molecules on the kinetics of their dehydrogenation. Report No. 2: Alcohols $C_4 - C_8$.
Izv. AN SSSR.Otd.khim.nauk. no.7:795-800 Jl '57. (MIRA 10:10)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.
(Alcohol) (Dehydrogenation)

BALANDIN, A.A.

Precise method for the determination of relative adsorption coefficients. Izv.AN SSSR.Otd.khim.nauk. no.7:882 Jl '57.
(MIRA 10:10)

1.Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.
(Adsorption)

BALANDIN, A.A.; BOGDANOVA, O.K.; SHCHEGLOVA, A.P.

Effect of the structure of alcohol molecules on the kinetics of their dehydrogenation. Report No.3: Comparing the results obtained for different alcohols. Izv. AN SSSR. Otd. khim. nauk no.8:909-915 Ag '57. (MIRA 11:2)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.
(Alcohols) (Chemical structure) (Dehydrogenation)

BALANDIN, A.A.; NEYMAN, M.B.; BOGDANOVA, O.K.; ISAGULYANTS, G.V.; SHCHEGOLOVA, A.I.; POPOV, Ye.I.

Dehydrogenation of butane - butylene mixtures using tagged atoms. Probl. kin. i kat. 9:45-60 '57. (MIRA 11:3)

(Dehydrogenation) (Butane)

KIPERMAN, S.L.; BALANDIN, A.A.; DAVYDOVA, I.R.

The bond energy of a nickel catalyst with oxygen. Izv. AN SSSR. Otd. khim. nauk no.9:1129-1132 S '57. (MIRA 10:12)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.
(Catalysis) (Nickel) (Oxygen)

BALANDIN, A.A.

AUTHORS: Freydlin, L. Kh., Balandin, A. A., Fridman, G. A.

62-11-5/29

TITLE: Investigation of the Vapour-Phase Hydrolysis of Chlorobenzene Under Presence of a Phosphate Catalyst (Issledovaniye parofaznogo gidroliza khlorbenzola v prisutstvii fosfatnogo katalizatora).

PERIODICAL: Izvestiya AN SSSR, Otdelenie Khimicheskikh Nauk, 1957, Nr 11, pp. 1328-1332 (USSR)

ABSTRACT: Here the reaction of the hydrolysis of the chlorobenzene in the vapour-phase under presence of phosphate catalysts was investigated. The activity of a mono-component phosphate catalyst during absence of "promotors" was confirmed. The influence of the temperature on the transformation degree of the chlorobenzene and the selectivity of the process was investigated. It is shown that the phosphate catalyst is thermally more stable than the silica gel catalyst and less sensitive to the desactivating effect of mineral admixtures. The assumption is expressed that in the activation process of the

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Investigation of the Vapour-Phase Hydrolysis of Chlorobenzene Under Presence of a Phosphate Catalyst.

62-11-5/29

hydrolysis reaction in vapour-phase by phosphate and silica gel catalysts a similarity is existing. There are 3 figures, 4 tables, and 13 references, 12 of which are Slavic.

ASSOCIATION: Institute for Organical Chemistry imeni N. D. Zelinskiy of the AN USSR (Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR).

SUBMITTED: July 27, 1956.

AVAILABLE: Library of Congress

Card 2/2

BALANDIN, A.A.

62-12-9/20

AUTHORS: Kiperman, S.L., Balandin, A.A., Davydova, I.R.

TITLE: On the Influence Exercised Upon the Activity of the Nickel Skeleton Catalyst of Fine Crushing by Means of Vibration (O vliyanii na aktivnost' skeletnogo nikelevogo katalizatora tonkogo izmel'cheniya putem vibratsionnogo pomola)

PERIODICAL: Izvestiya AN SSSR Otdeleniye Khimicheskikh Nauk, 1957, Nr 12, pp. 1482-1484 (USSR)

ABSTRACT: The skeleton catalysts obtained by the leaching of the respective alloys are today widely in use (in particular for the carrying out of reactions in the liquid phase). In this connection too little attention is paid to the important dispersion, especially when pulverized catalysts are used. In order to explain the influence exercised by the dispersion of catalysts upon their activity the authors employed the method of fine crushing of the nickel-aluminum alloys (see table and diagram). As regards the result of the experiment it may be said that the activity (and specific activity) of the nickel-skeleton catalysts, which had previously been pulverized by vibration crushing, showed a higher activity of catalysts in the reactions of their hydrogenesis of cyclohexane and the dehydrogenerization of

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On the Influence Exercised Upon the Activity of the Nickel Skeleton Catalyst of Fine Crushing by Means of Vibration

62-12-9/20

the isopropyl alcohol in the liquid phase. It is assumed that the cause of the increased activity is due to a change of the micro-roughness of the surface or by the existence of an internal diffusion deceleration. There are 1 figure, 1 table, and 7 references, 6 of which are Slavic.

ASSOCIATION: Institute for Organic Chemistry AN USSR imeni N.D.Zelinskiy (Institut organicheskoy khimii im. N.D.Zelinskogo Akademii nauk SSSR).

SUBMITTED: July 9, 1957

AVAILABLE: Library of Congress

Card 2/2

1. Nickel skeleton catalyst-Crushing-Vibration 2. Nickel aluminum-Alloys

BALANDIN, A. A.; SLOVOKHOTOVA, T. A.; and STRASHNOVA, I. A.

"Catalytic Splitting of Isomeric Xylenes by Water Vapor." Vestnik Moskov Univ. Ser Mat., Mekh., Astron., Fiz. i Khim. 12, No. 1, 101-10 (1957).--The Decompn. was carried out in the presence of Ni(33 and 17%) as catalyst over the Al_2O_3 at 350-450° with velocity of hydrocarbons 0.2 ml./min. and the volumetric ratio between H O and hydrocarbons 5:1, Under this conditions the m- and p-xylene form 60-80% toluene. Yields of C_6H_6 and other gaseous products are not higher than 20%. The o-xylene at 410°, gives toluene with 46% yield and at 460° with 27% and forms more C_6H_6 and gaseous products.

Moscow universitet, Kafedra organicheskogo kataliza.

BALANDIN, A.A.

Principles for calculating the kinetics of catalytic dehydrogenation, dehydration and cracking in a flow system. Vest. Mosk. un.Ser.mat.mekh.astron.fiz. khim. 12 no.4:137-167 '57. (MIRA 11:5)

1.Kafedra organicheskogo kataliza Moskovskogo gosudarstvennogo universiteta.

(Catalysis) (Chemical reaction, Rate of)

SLOVOKHOTOVA, T.A.; BALANDIN, A.A.; NAZAROVA, D.V.

Catalytic conversions of ethane with participation of water vapor. Part 1: Effect of water concentration in the reacting mixture on conversions of ethane. Characteristics of carbon formation. Vest. Mosk. un. Ser. mat., mekh., astron., fiz. khim., 12 no.5:193-198 '57. (MIRA 11:9)

1.Kafedra organicheskogo kataliza Moskovskogo gosudarstvennogo universiteta.
(Ethane) (Chemical reaction, Rate of)

BALANDIN, A.A.; RAYK, S.Ye.

Effect of skeleton nickel on hydrocarbons under conditions of a lasting contact. Zhur. prikl. khim. 30 no.11:1711-1715 N '57. (MIRA 11:2)

1. Kafedra organicheskogo kataliza Moskovskogo gosudarstvennogo universiteta.
(Catalysts, Nickel) (Hydrocarbons)

BALANDIN, A.A.

USSR/Physical Chemistry - Kinetics, Combustion, Explosions, Topochemistry, Catalysis. B-9

Abs Jour : Referat Zhur - Khimiya, No 1, 1958, 509

Author : A.A. Balandin, S.L. Kiperman.

Inst : -

Title : To the Question of Kinetics of Dehydrogenation of Alcohols

Orig Pub : Zh. fiz. khimii, 1957, 31, No 1, 139-149

Abstract : Basing on the assumption that the process proceeds in stages, the general equation of kinetics of alcohol dehydrogenation on a quasihomogeneous catalyst surface (RZhKhim, 1954, 33897) was derived by the method of stationary concentrations; this equation agrees with experimental data. If the speed constant c_2 of the surface reaction is less than the speed constant of desorption of alcohol and reaction products, then the constants in the denominator of the kinetic equation will represent corresponding adsorption factors, but if c_2 is greater than the other

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USSR/Physical Chemistry - Kinetics, Combustion, Explosions, Topochemistry, Catalysis. B-9

Abs Jour : Ref Zhur - Khimiya, No 1, 1958, 509

constants, then the equation constants will represent complex expressions containing the constants of the Brensted relation between the activation energy and the thermal effect of the state. It is shown that the relation between the speed constants of stages in the forward and the reverse directions does not depend on the place of a heterogenous surface. The activating action of little amounts of water observed in a certain temperature range, as well as the formation of little amounts of acetic acid at the dehydrogenation of C_2H_5OH on Cu the authors explain by a partial parallel oxidation and reduction of the catalyst surface. The Brensted relation between the activation energy and the thermal effect of corresponding stages of the process remains valid in case of reactions of homologs of the same type on the given catalyst surface, and the magnitudes of its constants remain approximately the same.

Card 2/2

BALANDIN, A. A.

"The mechanism of heterogeneous catalysis and the kinetics of catalytic dehydrogenation." Zhur. Fiz. Khim. 31, 745-69 (1957).--The multiplet theory of heterogeneous catalysis and its application to the interpretation of catalytic dehydrogenation kinetics are reviewed. The nature of the catalyst active centers is discussed. The possiblity is cemonstrated of an exptl. detn. of free-energy changes, heat contents, and entropy of adsorption processes on active centers, and the detn. of bond-energy between the reacting atoms in a mol. with the atom of the active center of the catalyst.

Adademiya Nauk SSSR. Institut Organicheskoy dhimii im. N.D. Zelinskogo and Moscow State Univ. im. M.V. Lomonsov.

BALANDIN, A.A.

USSR/Physical Chemistry - Kinetics, Combustion, Explosions, Topochemistry, Catalysis. B-9

Abs Jour: Referat. Zhurnal Khimiya, No 3, 1958, 7256.

Author : A.A. Balandin, N.V. Nikiforova, L.Kh. Freydlin.
Inst : Academy of Sciences of USSR.
Title : Kinetics and Sequence of Bond Hydrogenation in Peroxide Compounds on Nickel Catalyst.

Orig Pub: Dokl. AN SSSR, 1957, 112, No 4, 649-652.

Abstract: The liquid phase hydrogenation of isopropylbenzene hyiroperoxide, ethylphenilisopropyl peroxide, tetraline hydroperoxide, 3-methyl-lbutine hydroperoxide, cyclohexene hydroperoxide, benzoyl peroxide, tertiary butylperbenzoate, n-nitrobenzoyl peroxide and ditertiary butyl peroxide was carried out in ethyl alcohol, benzene and toluene solutions under $p = 1$ atm and at 5 to 30° on Raney's catalyst. It is shown that the hydrogenation sequence of various functional groups in peroxide compounds

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USSR/Physical Chemistry - Kinetics, Combustion, Explosions, Topochemistry, Catalysis.

B-9

Abs Jour: Referat. Zhurnal Khimiya, No 3, 1958, 7256.

agrees with the forecasts made on the basis of the multiplet theory. First, the nitro-group is hydrogenated, then the peroxide group, further the first bond in the C=C group, next the π-bond in the C=C group, and, at last, the gydrogenolysis of the bonds C-O and C-C takes place most difficultly. The hydrogenation activation energy of these compounds is from 2 to 10 kcal per mole. In the authors' opinion, the observed hydrogenation sequence permits to assume that hydrogenation of non-saturated peroxides may serve as a catalytic method of preparing non-saturated alcohols.

Card : 2/2

[illegible]

BALANDIN, A.A.

AUTHOR KIPERMAN, S.L., BALANDIN, A.A., Member of the Academy. [illegible]

TITLE On Bond Energy between nickel catalysts and various elements of Organic Compounds. 20-3-26/67
(O velichinakh energii svyazi nikelevykh katalizatorov s elementami organicheskikh soyedineniy - Russian)

PERIODICAL Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 2, pp 335-338, (U.S.S.R.)
Received 6/1957 Reviewed 7/1957

ABSTRACT When solving the problem of scientific selection of catalysts the determination of binding energies of the latter with differnet elements is of essential importance. Here the following methods are applicable; the thermochemical, the adsorption-chemical, and the kinetic method. The latter was in former times used only in connection with the oxydation catalysts. The authors here attempt to apply this method for the computation of bond energy by means of reactions not applied before. They investigated the bond energies of the nickel-catalysts with hydrogen and deuterium, with carbon on the occasion of a double bond and of a simple bond, with oxygen and with nitrogen. As obvious from the theories quoted above the kinetical method can be applied for finding out the bond energy values of the nickle-catalysts with different elements under application of such reactions as paraortho-transformation of hydrogen, isotope exchange, hydrogenisation and hydrogenolysis. The values chiefly harmonize with

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[illegible]

On Bond Energy between Nickel Catalysts and various Elements of Organic Compounds.

20-2-26/67

those ones that have been computed in a completely different way. The fluctuations of activity of the catalysts which lead to a modification of by some thousands Kal/mol have little influence on the Q-values (bond energies). In several cases they have no influence on the transition to other samples of catalysts; the doubling of 9, however, leads to a modification of Q_{N-Ni} by 50%. Under the application of the bond energy values obtained the authors compute the adsorption potential q (that is the total bond energy of the reacting atoms with catalysts) for dehydrogenisation of formic acid on Ni.
(1 schedule, 12 citations from Slavic publications).

ASSOCIATION Institute for Organic Chemistry "ZELINSKIY, N.D.".
PRESENTED BY
SUBMITTED 24.10.1956.
AVAILABLE Library of Congress.
Card 2/2

AUTHOR BALANDIN A.A. Member of the Academy, KLABUNOVSKIY Ye.I. PA - 315o

TITLE On the Stereochemistry of Catalytic Active Complexes.
(O stereokhimii kataliticheski aktivnykh kompleksov -Russian)

PERIODICAL Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 3, pp 585-587 (USSR)
Received 6/1957 Reviewed 7/1957

ABSTRACT With reference to the author's work in D, 1956, Vol 11o, Nr 4, the present paper explains the process of reaction. For this purpose the hydrogenization of the compound (I) is carried out.
(I) is 2,3-dihydro-(2,3; 5', 6') (5,6; 5",6") (7,8; 5"', 6"')-tribenzoebicyclo-(2,2,2)-octadien-5,7-dion-1',4'. Hydrogenization was carried out at 45° and an atmospheric pressure above the catalyzer in freshly distilled dioxane (peroxides are lacking). The experimental method and the production of the catalyzer is described in D, 1956, Vol 11o, Nr 4; Investigation showed that the substance obtained is the product III: 1',2',3',4',5',6'- hexahydro-(2,3;5',6')(5,6; 5",6") (7,8; 5"', 6"')- tribezoebicyclo-(2,2,2)-octadien-5, 7-dion-1',4'. This compound has as yet not been described in publications. In pure form these are yellow crystals with a melting point at 182 - 3°. This product showed no reaction to chinoide structure, did not react to an olefine compound, formed no phenylurethane, and did not react to maleinanhydride.On the occasion of the reaction with 2,4-dinitrophenylhydracine the product (III)

Card 1/2 gave a well-crystallizing mono-2,4-dinitrophenylhydrazone with a

On the Stereochemistry of Catalytic Active Complexes. PA - 3150

melting point at 185 - 8°. The multiplet theory makes it possible to construct stereochemical models of active complexes of the investigated reactions. The structure of such models is described. (With 2 illustrations and 6 citations from Slavic publications).

ASSOCIATION Institute for Organic Chemistry "N.D.Zelinskiy" of the Academy of Science of the U.S.S.R.
PRESENTED BY
SUBMITTED 4.10.1956
AVAILABLE Library of Congress
Card 2/2

AUTHOR BALANDIN A.A., Member of the Academy, TETENI, P. 20-5-41/67

TITLE The Kinetics of the Dehydrogenation of Alcohols Over a Copper Catalyst Deposit.
(Kinetika degidrogenizatsii spirtov nad osazhdennym mednym katalizatorom -Russian)

PERIODICAL Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 5, pp 1090-1093 (U.S.S.R.)
Received 7/1957 Reviewed 8/1957

ABSTRACT

This problem was investigated by previous papers by the same author, where it was shown that the activation velocity and -energy of this process is either not at all or to a very low degree dependent on the k-structure of the alcohols. It was further found that the adsorption coefficients of ethyl-, n-propyl-, and isopropyl alcohol are equal to one another on the copper catalyst. In the present work alcohos differing considerably in structure were investigated: ethyl-, isopropyl, benzylalcohol, and cyclohexanol. In contrast to previous works the catalyst was produced by the precipitation of copper hydroxide by ammonia from a 20% solution of nitric copper. As already previously proved, alcohol dehydrogenization subordinates itself to the general kinetic equation of monomolecular reaction in the flux. In the case of the dehydrogenization of alcohols without admixtures this equation is as follows:

$\frac{dm}{dl} = k \frac{A_1 - m}{A_1 + (z_2+z_3-1)m}$; where k denotes the constant of reaction;

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The Kinetics of the Dehydrogenation of Alcohols 20-5-41/67
Over a Copper Catalyst Deposit.

A_1-the afflux velocity of the alcohol, and m-the velocity of the elimination of hydrogen(further details in a previous paper-8). The values of relative adsorption displacement were the same as in the case of other substances.The values of the relative absorption coefficients for acetaldehyde and hydrogen differ from those obtained by previous works, but at that time a catalyst was used which was produced by the annealing of netric copper, and was subsequently reduced by hydrogen.As table 2 shows these coefficients for hydrogen are independent of temperature.The aggreement of physical adsorption heats of the alcohols investigated indicates the participation of chemical forces in the adsorption process of the alcohols during catalysis.The results obtained show that the structure of the hydrocarbon radicals of alcohol exercises only little influence on the value of the activation enrgy of dehydrogenization on the metal copper catalyst-.The insignificant influence exercised by the hydrocarbon radical on the activation energy confirms the multiplet theory. It may be explained by the fact that the substituent outside the frame exercises nearly the same influence both on the value of the atomic bindings within the molecule which disintegrates during the reaction, and on the bindings of the atoms of the reacting molecule with the catalyzer atoms.

Card 2/3 (With 1 illustration, 6 tables, 9 Slavic references)

The Kinetics of the Dehydrogenation of Alcohols Over a Copper Catalyst Deposit. 20-5-41/67

ASSOCIATION	Moscow State University "M.V.LOMONOSOV"
PRESENTED BY	
SUBMITTED	6.12.1956
AVAILABLE	Library of Congress
Card 3/3	

Balandin, A. A.

USSR/Physical Chemistry - Kinetics, Combustion, Explosions, Topochemistry, Catalysis. B-9

Abs Jour: Referat. Zhurnal Khimiya, No 3, 1958, 7257.

Author : A.A. Balandin, M.B. Turova-Polyak, A.Ye. Agronomov, I.M. Khorlina, L.S. Kon'kova.
Inst : Academy of Sciences of USSR. Moscow State Univ. im M. V. Lomonosova.
Title : Catalytic Dehydration of Alcohols on Anhydrous Magnium Sulfate.

Orig Pub: Dokl. AN SSSR, 1957, 114, No 4, 773-776.

Abstract: The dehydration of cyclohexanol, cyclopentanol, pentanol-2 and propanol-2 in the vapor phase at 400 to 410° and at the volume rate of 0.4 in presence of anhydrous $MgSO_4$ proceeds practically to the end. The apparent activation energies in the range from 360 to 400° are from 14370 to 15910 cal per mole, which, in the authors' opinion, is stipulated either by the same orientation of alcohol molecules with reference to the catalyst surface, or by that all these reactions are

Card : 1/2 -42-

20-5-25/60

AUTHOR: BALANDIN,A.A., Member of the Academy

TITLE: The Principles of the Chemistry of Enzymes and Antimetabolites from the Standpoint of the Theory of Catalysis. (Osnovy khimii fermentov i antimetabolitov s tochki zreniya kataliza)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol 114, Nr 5, pp 1008 - 1011 (USSR)

ABSTRACT: 1. Enzymes are colloidal, microheterogeneous catalysts. The author here proves that the multiplet-theory can give an explanation for the special characteristic properties of the enzymes: their high selectivity and activity. In the reaction their index-group must first be sorted out, i.e. the reacting atoms which come in touch with the atoms of the catalyst. The enzymes listed in tab.1 show that the majority of fermentative reactions has a doublet or triplet index. Different indices usually correspond to different types of enzymes. The indices of tab. 1 form a multiplet classification which agrees with that accepted in fermentology. 2.Each type with the same index contains up to ten enzymes with a narrower selectivity; this is caused by the influence of extra-indexal substituents. 3. Just as in catalysis, the substituents in the fermentative reactions influence the energies of the reacting linkages which are in the index. The energetic influence of substituents is based upon electron shift on the linkage energy in the index. 4. A more subtle gradation is produced by the structural agreement of the substituents. This is indicated by the heterogeneous

Card 1/3

20-5-25/60

The Principles of the Chemistry of Enzymes and Antimetabolites from the Standpoint of the Theory of Catalysis.

catalysis of optically active substances. A complex of the doublet index group is optically inactive by its symmetry. But an optically active catalyst, deposited on an optically active carrier (e.g.metal-quartz), selectively accelerates the reaction of an optical antipode from their mixture. From this the author draws the conclusion the asymmetric influence of a catalyst or enzyme is not concentrated in the reacting group (of the index), but in the extraindexal substituents. The adsorption stadium is dissymmetric, the catalysis stadium symmetric. In order to make it possible to superimpose substituents, a sufficient take-out has to be present beside the active center. Its existence is confirmed by the study of catalytic dehydrogenation of molecules of complicated form. The nature of the take-outs is explained by the fact that the carrier - apoferment - is a molecular albuminoid. In these the molecules are most densely packed, so that the projections of one molecule extend into the hollows of another. The binding hydrogen does not take a special position. If a molecule is taken out on the surface, a take-out is created. In such a take-out a molecule of another type can find room, which, however, has to possess a portion equal or similar to the one taken out. During the many years of natural selection in the chemistry of enzymes a specially precise structural agreement between apoferments and substituents developped.5.The enzyme-inhibitors influence various reaction stadia.Highly absorbable substances(Hg,HCN

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The Principles of the Chemistry of Enzymes and Anti-metabolites from the Standpoint of the Theory of Catalysis. 20-5-25/60

S) block the active centers of various enzymes independent of their structure. On the contrary, antimetabolites out of hundreds of enzymes of one cell may poison only a single one by the fact that their side-chains adsorb on the structurally close take-outs of the albuminoid portion of the enzymes. The author's theory of antimetabolism shows that the theory of Vulli which considers an antimetabolite a heterogeneous catalytic poison and the theory of Erlenmeyer which points out the parallelism between antimetabolism and epitaxism, do not exclude but supplement each other. By this the author explains the principle of the production of immune bodies. (3 illustrations, 1 table, 4 Slavic references).

ASSOCIATION "N.D.Zelinsky" Institute for Organic Chemistry of the Academy of Science of the U.S.S.R.

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Card 3/3

[illegible]

AUTHORS	Balandin, A.A., Academician, Teteni P.	20-4-26/60
TITLE	The Kinetics of the Catalytic Dehydrogenation of Isopropyl Alcohol in the Presence of Fourth-Peroid Transition Metals. (Kinetika katalitichoskoy degidrogenizatsii isopropilovogo spirta v prisutstvii perekhodnykh metallov IV perioda.)	
PERIODICAL	Doklady Akademii Nauk SSSR, 1957, Vol. 115, Nr 5, pp. 727-730 (USSR)	
ABSTRACT	This kinetics of catalysts such as iron, cobalt and nickel has been little investigated. But this reaction may serve as a model reaction in the study of the above-mentioned catalysts which are widely spread in practice. In the present paper these metals were used in a form obtained by precipitation. The experiments were carried out in an ordinary flow set-up. It was found that the investigated catalysts (temperature range: for iron and cobalt up to 250°C, for nickel up to 215°C) exclusively perform the dehydrogenation of isopropyl alcohol to acetone. In that connection pure hydrogen developed. The catalyzate contained only acetone and the not thoroughly reacted alcohol. As it was shown earlier this reaction	
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The Kinetics of the Catalytic Dehydrogenation of Isopropyl Alcohol in the Presence of Fourth-Peroid Transition Metals.

is subject to the general kinetic equation of the monomolecular catalytic reaction in the flow. For alcohols without admixture it has the form:

$$\frac{dm}{dl} = k \frac{(A_1 - m)}{A_1 + (z_2 + z_3 - \ell)m} \qquad (1)$$

where k - is the speed constant of the reaction, A_1 - the supply speed of the initial substance, z_2 and z_3 - the relative adsorption coefficients of the ketone and of hydrogen, m - the quantity of hydrogen separated per minute, and l - the length of the layer of the catalyst. The integration of equation (1) leads to:

$$k = (z_2 + z_3) A_1 \ell n \frac{A_1}{A_1 - m} - (z_2 + z_3 - \ell)m. \qquad (2)$$

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Tables 1 and 2 give the results of the determination of the coefficients of adsorption. They show that the above

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The Kinetics of the Catalytic Dehydrogenation of Isopropyl Alcohol in the Presence of Fourth-Peroid Transition Metals.

introduced to formula (2). For the nickel catalyst the value $z_2 + z_3$ was found at the necessary temperature by interpolation of the straigth line of the logarithmic dependence (fig.1). The results are given in tables 3-5 and fig. 2. The true activation energy of alcohols on Fe and Co was for the first time determined here. From the results it follows that the activation energy here decreases from iron to nickel. The activity of the catalysts of the fourth-period transition metals increases with the decrease in the atomic number of the metal and with the shortening of the interatomic distance. These new results are of importance for the determination of the dependence of the catalytic activity of the elements on their position in Mendeleyev's periodic system.
There are 2 figures, 5 tables and 9 Slavic references.

ASSOCIATION: Moscow State University imeni M.V. Lomonosov.
(Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova)

SUBMITTED: March 23, 1957.

AVAILABLE: Library of Congress.

CARD 4/4

20-4-26/60

The Kinetics of the Catalytic Dehydrogenation of Isopropyl Alcohol in the Presence of Fourth-Peroid Transition Metals.

mentioned coefficients of acetone and hydrogen on iron- and cobalt-catalysts do not depend on temperature. Such a dependence is only observed in the case of nickel. Here the coefficients of both substances decrease with increasing temperature. The dependence is logarithmic (fig. 1). From the obtained results the heat differences of hydrogen, acetone and isopropyl alcohol were calculated and the following values obtained:

$$\lambda_{ac} - \lambda_{alc} = 3{,}7 \text{ kcal/Mol and } \lambda_{H_2} - \lambda_{alc} =$$

14,5 kcal/Mol. In the case of iron and cobalt the adsorption heats of alcohol and the products are equal or approximate. Further the adsorption coefficients were used in the calculation of the reaction constants at various temperatures. For determining the true activation energy of the dehydrogenation with every individual catalysts experiments were made with different temperatures at a constant volume speed. For calculating the speed constants the values of A_1, m and z_2+z_3 were

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[illegible]

AUTHORS: Balandin, A. A., Academician, and Vasyunina, N. A. 20-1-22/42

TITLE: Note on the Selective Hydration of Monosaccharides and Polyatomic Alcohols (Izbiratel'noye gidrirovaniye monosakharidov i mnogoatomnykh spirtov).

PERIODICAL: Doklady AN SSSR, Vol. 117, Nr 1, pp. 84-87 (USSR)

ABSTRACT: I. According to scientific and patent publications (reference 1) the following reactions take place above nickel catalysators in an aqueous solution at a hydrogen pressure of 150-300 atm. 1) Monosaccharides are hydrated almost entirely to polyatomic alcohols at a temperature of 120-130°C (xylose to "xylite", glucose to sorbitol) 2) At a temperature rise, the hydroxyl groups of the alcohols are split off, primarily the end groups. In this way 1,2 propylene glykol is produced from glycerine, and isopropyle alcohol from this substance. Alcohols of higher order do not loose their hydroxyl groups as easily as the alcohols of lower order. 3. The production of uric acids from monosaccharides (in quantities not exceeding a few percents mills) at a lack of hydrogen is even more difficult

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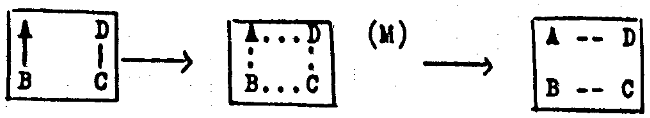
which acids cause an acid milieu-reaction. 4) The decomposition reactions of the C - C combination, occuring mostly in the center of the molecule, to a certain extent compete with this reactions, in general, however, they take place at even higher temperatures (220-230°C). In this way propylene glykol and glycerine is produced from sorbitol. II. It appears from the references 3 and 4, that at an hydrolysis of hydrocarbons the cracking of the C - C combination occurs in the position 3,4. The explanation of this phenomen given by Shmidt is refuted by the authors, just as the opinion by Natta, Rigamonti and Beata (reference 4). III. Subsequently, the multiplett-theory of catalysis is applied to the reactions (reference 5). It furnishes the correct sequence of hydration and hydrolysis of various compounds, comprising furane derivates, "tripticene" and of organic peroxydes. This theory separates the reacting atoms within the molecule into index-, doublet groups



(1)

Note on the Selective Hydration of Monosaccharides and Polyatomic Alcohols 20-1-22/42

These atoms are in contact with the catalyst (but not necessarily at the same time). The reaction velocity is the higher, the better the structural and energetic correspondence is complied with. This correspondence is the more perfect, the lower the energetic threshold (-E), or, the greater the value $E = - Q_{AB} - Q_{CD} + (Q_{AK} + Q_{BK} + Q_{CK} + Q_{DK})$ (2)

If the indices of the reactions concerned are taken and the values of Q are introduced into equation (2), the results of table 1 for a nickel catalyser are obtained. IV. The influence of structure on the velocity of the reaction of one special type is effected by the substituents, which are posed outside the bounds ("zaramochnyye zamestiteli"). In this way the introduction of a substituent, i.g. at the atom A in formula (1) influence the quantity Q_{AB} and Q_{AK} in formula (2). From this results a modification of E (reference 11) and subsequently the reaction velocity is modified. From the further equations (3) it follows, that by means of the introduction of a substituent at A $\delta E = - \delta \Delta F - (T \delta \Delta S - \delta Q_{AD} + \delta Q_{AK})$ (4). From this the equation $\Delta E \simeq - \delta \Delta F$.

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Note on the Selective Hydration of Monosaccharides and Polyatomic Alcohols 20-1-22/42

is deduced. From this it follows, that the reaction proceeds the faster, the more the free energy of the reaction $\delta\Delta F$ is reduced by the process of substituting. The values of $\delta\Delta F$ are given in table 2 and 3 for the compounds under investigation here. The sequence of reactions computed from the tables are in accordance with the experimental results. It follows, therefore, that the application of the multiplet theory in the field of the hydration of monosaccharides and of polyatomic alcohols possesses good prospects. There are 3 tables and 12 references, 9 of which are Slavic.

ASSOCIATION: Institute for Organic Chemistry imeni N. D. Zelinskiy AN USSR (Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR).

PRESENTED: September 6, 1957

AVAILABLE: Library of Congress

Card 4/4

BALANDIN, A. A. and TOLSTOPYATOVA, A. A. (Inst. Org. Chem. AS USSR)

"Rare Earth Elements as Catalysts in Organic Chemistry. Oxides of Cerium, Lanthanum, and Samarium." p. 307/

Rare Earth Elements; Extraction, Analysis and Application) Moscow, Izd-vo AN SSSR, 1958, 331,p. Akad. nauk. SSSR, Inst. geokhim. i analiticheskoy khimii.

Collection of reports presented at the June 1956 Conf. on Rare Earth Elements

BALANDIN, A. A., PATRIKEYEV, V. V., MITROFANOV, S. Y. and ORLOVA, K. I.

"Refinement and Desulfurization of Petroleum with the Simultaneous Enrichment of Ore without Introducing Hydrogen from Without." p. 153.
book Khimiya sera-organicheskikh soyedineniy, soderzhaschikhaya v neftyakh i nefteproduktekh; materialy II nauchnoy sessii, (Chemistry of Sulfur-Organic Compounds Contained in Petroleum Products; papers of the 2nd Scientific Session) v. 1. Ufa, Izd. Bashkirskogo filiala AN SSSR, 1958.

Abstract: A coarse concentrate of finely stamped ore is brought into contact with sulfrous gasoline vapors at 450-550°C. Mineral ores containing compounds of metals show catalytic properties. With the rupture of C-C or C-S and C-H bonds, these minerals (depending upon their properties) are reduced from sulfides and are covered with coke films. These changes may be exploited for flotation or other methods of enriching ore. Catalytic cracking takes place simultaneously. (Data are tabulated and other facets of the process are discussed.)

BALANDIN, A. A., BOGDANOVA, O. K., ISAGULYANTS, G. V., NEYMAN, Yu. V. and POPOV, Ye. I.
(Inst. of Organic Chem. AS USSR)

"Investigation of the Mechanism of Successive Reactions Butane-Butylene-Divinyl by Using Radioactive Carbon C^{14}." p. 52.

Isotopes and Radiation in Chemistry, Collection of papers of 2nd All-Union Sci. Tech. Conf. on Use of Radioactive and Stable Isotopes and Radiation in National Economy and Science, Moscow, Izd-vo AN SSSR, 1958, 380pp.

This volume published the reports of the Chemistry Section of the 2nd AU Sci Tech Conf on Use of Radioactive and Stable Isotopes and Radiation in Science and the National Economy, sponsored by Acad Sci USSR and Main Admin for Utilization of Atomic Energy under Council of Ministers USSR Moscow 4-12 Apr 1957.

BALANDIN, A. A. Moscow.

"Towards the Development of the Unity Theory of Catalysis, Concerning Structure and Energy Facors." (Plenary lecture)

report submitted for Annual Meeting East German Chemical Society, 28 Oct 1 Nov 1958, Leipzig , E G.D.R.

AUTHORS: Balandin, A. A., Klabunovskiy, Ye. I., Kozina, . 62-1-3/29
M.P., Ul'yanova, O. D.

TITLE: Thermochemical Detection of the Energies of Compounds (Termokhimicheskoye opredeleniye energiy svyazey). Report 1: The Energies of the Compounds Sn - C in Tetramethyl and Tetraethyl Tin (Soobshcheniye 1. Energii svyazey Sn - C v tetrametil- i tetraetilolovo)

PERIODICAL: Izvestiya AN SSSR Otdeleniye Khimicheskikh Nauk, 1958, Nr 1, pp 12-17 (USSR)

ABSTRACT: The data in technical literature concerning the energies of compounds (used in the computation of the adsorption potentials of the catalysts) are insufficient. Above all no publication gives concrete data on the energies of the compounds C,H,O,N with elements belonging to the composition of the most important catalysts. Therefore it was important to start a systematical investigation of the compound energies necessary for the catalysis also by thermo-chemical way. In the present paper the authors report on the detection of the combustion heat of tetramethyl- and tetraethyl-tin, the heat formation from elements, and the energies of the compound Sn - C (tables 1 and 2). The found data give more precise

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Thermochemical Detection of the Energies of Compounds
Report 1: The Energies of the Compounds Sn - C in Tetramethyl and
Tetraethyl Tin

62-1-3/29

rules governing the homologous series than do those hitherto found by researchmen. Furthermore it was shown that the applied calorimetric methods can also be used for the detection of the combustion heat of the metal-organic compounds with rather great preciseness. (Tables 3,5,6). Furthermore each investigated compound demands a special approach to the methods of its combustion, and therefore it is necessary to carry out numerous preliminary experiments. Furthermore the spectrum of the combination dispersion of tetraethyl-tin was detected for the first time. There are 6 tables and 24 references, 7 of which are Slavic.

ASSOCIATION: Institute of Organic Chemistry imeni N. D. Zelinskiy,
AS USSR and State University imeni M. V. Lomonosov, Moscow
(Institut organicheskoy khimii imeni N. D. Zelinskogo Akademii
nauk SSSR i Moskovskiy gosudarstvennyy universitet imeni M. V.
Lomonosova)

Card 2/2

SUBMITTED: [illegible]

[illegible]

1. Metalorganic compounds-Combustion 2. Compounds-Energy measurement
3. Calorimeters Applications 4. Tetramethyl-tin-Thermochemistry
5. Tetraethyl-tin-Thermochemistry

AUTHORS: Balandin, A. A., Bogdanova, O. K., Isagulyants, G. V., Neyman, M. B., Popov, Ye. I.

62-1-4/29

TITLE: The Application of Radioactive Carbon in the Comparison Between the Dehydrogenation Velocities of Butane and Butylene (Primeneniye radiougleroda dlya sravneniya skorostey degidrogenizatsii butana i butilena)

PERIODICAL: Izvestiya AN SSSR Otdeleniye Khimicheskikh Nauk, 1958, Nr 1, pp. 18-23 (USSR)

ABSTRACT: The investigation (with the application of C^{14}) was carried out by means of a special catalyst under conditions especially favorable for the obtaining of divinyl. Since it turned out that divinyl can be formed from butylene and that butane cannot be transformed into divinyl, it was concluded that the reaction (divinyl from butane) passes only through the stage of the formation and desorption of butylene. Therefore the desorption of butylene cannot be a final stage of the entire reaction. The authors report on the carrying out of the investigation: The correlation between the dehydrogenation velocity of butane and butylene in divinyl at the chromium catalyst was found by means of computations -corresponding to the experimental data obtained already before. It was

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The Application of Radioactive Carbon in the Comparison Between the Dehydrogenation Velocities of Butane and Butylene. 62-1-4/29

shown that the ratio of the velocities of the dehydrogenation of butane in butylene and of butane in divinyl is for both catalysts of the same order and corresponds to the ratio 20:1. In the experiments with chromium catalysts the velocity ratio in the formation of divinyl from butane corresponded to 1:1000 and in the experiments with an alumochromium catalyst to 1:25. Furthermore it was confirmed that the formation of divinyl from butane takes place over the stage of the formation of butylene. It was shown that the constants (in the denominator of the kinetic equation of dehydrogenation) represent adsorption coefficients. There are 6 figures, 4 tables, and 5 references, 4 of which are Slavic.

ASSOCIATION: Institute of Organic Chemistry imeni N. D. Zelinskiy, AS USSR (Institut organicheskoy khimii imeni N. D. Zelinskogo Akademii nauk SSSR).

SUBMITTED: January 4, 1957

Card 2/2

1. Butane-Dehydrogenation 2. Butylene-Dehydrogenation 3. Carbon isotopes (Radioactive)-Applications 4. Chromium catalyst-Applications

AUTHORS: Slovokhotova, T.A., Balandin, A.A., and Nazarova, D.V. SOV/55-58-1-26/33

TITLE: Catalytic Change of Ethane With Participation of Water Vapor. II. The Dependence of the Velocity of Several Ethane Reactions With Participation of Water on the Volume Velocity and Temperature (Kataliticheskoye prevrashcheniye etana s uchastiyem parov vody. II. Zavisimost' skorosti razlichnykh reaktsiy etana v prisutstvii vody ot ob"yemnoy skorosti i temperatury)

PERIODICAL: Vestnik Moskovskogo universiteta, Seriya fiziko-matematicheskikh i yestestvennykh nauk, 1958, Nr 1, pp 193-201 (USSR)

ABSTRACT: The authors investigated the dependence of the ethane changes for a catalytic influence of nickel on the volume velocity of the consumption of ethane and the temperature. Reactions: $C_2H_6+4H_2O = 2CO_2+7H_2$; $C_2H_6 = 2C+3H_2$; $C_2H_6+H_2 = 2CH_4$. It was stated: For a carbon concentrated catalyzer of constant activity the activating energy of the ethane reaction with water is almost constant for a change of the volume velocity of 6-12 l ethane for 1 l of the catalyzer and for H_2O-concentration of 16.6 to 29.6, and in the mean = 15000 cal. For a fresh catalyzer the same energy amounts

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Catalytic Change of Ethane With Participation of Water Vapor. II. The Dependence of the Velocity of Several Ethane Reactions With Participation of Water on the Volume Velocity and Temperature

SOV/55-58-1-26/33

23650 cal.
There are 7 references, 6 of which are Soviet, and 1 American.

ASSOCIATION: Kafedra organicheskogo kataliza (Chair of Organic Catalysis)

SUBMITTED: January 11, 1957

Card 2/2

BALANDIN, A. A.

AUTHORS: Balandin, A. A., Freydlin, L. Kh., Nikiforova, N. V.

62-2-2/28

TITLE: The Kinetics of the Catalytic Reduction of Peroxides and Hydroperoxides (Kinetika kataliticheskogo vosstanovleniya perekisey i gidroperekisey). Report 2: Hydrogenation of Benzoyl Peroxide, Tertiary Butylperbenzoate and Hydroperoxides of Cyclohexane (Soobshcheniye 2. Gidrirovaniye perekisi benzoila, tretichnobutilperbenzoata i gidroperekisi tsiklogeksana).

PERIODICAL: Izvestiya AN SSSR Otdeleniye Khimicheskikh Nauk, 1958, Nr 2, pp. 133-144 (USSR).

ABSTRACT: In the proceding report it was shown by the example of the hydroperoxide of isopropylbenzene, ethylphenylisopropylperoxide and tetralinhydroperoxide that organic peroxide compounds may be easily subjected to hydrogenolysis (over a nickel catalyst). This also corresponds to the multiplet-theory. In the present paper it is shown that only the 0 — 0 bond in the compounds breaks (references I and II). The observed lowest stability of this bond on Ni corresponds to the requirements of theory. The authors investigated the

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The Kinetics of the Catalytic Reduction of Peroxides and Hydroperoxides. Report 2: Hydrogenation of Benzoyl Peroxide, Tertiary Butylperbenzoate and Hydroperoxides of Cyclohexane.

62-2-2/28

kinetics of the hydrogenation of benzoyl peroxide and tertiary butylperbenzoate (on Ni) and cyclohexenhydroperoxide (on Ni, Pd and Pt). The authors further determined: the order of reaction of the constants of velocity and the activation energies of the given processes. The hydrogenation of the peroxides can be used as catalytic method for the production of unsaturated alcohols. There are 6 figures, 1 table, and 17 references, 9 of which are Slavic.

ASSOCIATION: Institute for Organic Chemistry imeni N. D. Zelinskiy AN USSR (Institut organicheskoy khimii imeni N. D. Zelinskogo Akademii nauk SSSR).

SUBMITTED: October 16, 1956

AVAILABLE: Library of Congress

1. Peroxides-Reduction 2. Hydroperoxides-Reduction
3. Peroxides-Hydrogenation

Card 2/2

BALANDIN, A. A.

AUTHORS: Freydlin, L. Kh., Balandin, A. A., Fridman, G. A. 62-2-3/28

TITLE: The Vapor-Phase Hydrolysis of Benzene Halides on an Activated Phosphate Catalyst. (Parofaznyy gidroliz galoidbenzolov na promotirovannom fosfatnom katalizatore).

PERIODICAL: Izvestiya AN SSSR Otdeleniye Khimicheskikh Nauk, 1958, Nr 2, pp. 145-151 (USSR).

ABSTRACT: It was shown that the three-substituted phosphate of calcium is suitable as active and stable one-component catalyst of the reaction of the vapor-phase hydrolysis of chlorobenzene. It was assumed that the type of activity of the two catalysts is very similar. The similarity of the mechanism of the activating action of silicagel and phosphate is also confirmed by the fact that the reactivity of chloro-, bromo- and iodobenzenes uniformly decreases on both catalysts (in the order C_6H_5Cl C_6H_5Br C_6H_5J). The investigation showed that the reaction of the hydrolysis of chlorobenzene in 3-substituted calcium phosphate is activated on copper chloride. It was found that the reactivity of benzene halides in the investigated reaction decreases to the same extent as on silicagel. The problem of the correlation between general and active surface in

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The Vapor-Phase Hydrolysis of Benzene Halides on an Activated Phosphate Catalyst. 62-2-3/28

the silicagel- and phosphate-catalyst was discussed. Furthermore the number of active parts in the catalyst was determined. There are 5 figures, 5 tables, and 13 references, 11 of which are Slavic.

ASSOCIATION: Institute for Organic Chemistry imeni N.D. Zelinskogo AN USSR (Institut organicheskoy khimii imeni N.D. Zelinskogo Akademii nauk SSSR).

SUBMITTED: October 16, 1956

AVAILABLE: Library of Congress

1. Benzene halides-Hydrolysis 2. Silacagel catalyst
3. Calcium phosphate catalyst

Card 2/2

БАЛАНДИН, А. А.

AUTHORS: Balandin, A. A., Isagulyants, G. V., Popov, Ye. I., 62-2-18/28
Derbentsev, Yu. I., Vinogradov, S. L.

TITLE: The Application of Radioactive Carbon for the Investigation of the Dehydration Mechanism of Ethyl Alcohol Over Aluminum Oxide (Primeneniye radiougleroda dlya issledovaniya mekhanizma degidratsii etilovogo spirta nad okis'yu alyuminiya).

PERIODICAL: Izvestiya AN SSSR Otdeleniye Khimicheskikh Nauk, 1958, Nr 2, pp. 233-235 (USSR).

ABSTRACT: The problem of the above-mentioned dehydration mechanism has long been discussed in publications. Various authors assume that the formation of ethylene takes place over the stage of the formation of the diethyl ether. Others, however, think that ethylene and ethers form as a result of 2 independent parallel reactions. For the purpose of solving this problem the authors performed the dehydration of ethylene alcohol with addition of diethyl ether. See formulae (2),(3),(4). As the final result of the performed reactions showed, alcohol, ether and ethylene possess a spicific radioactivity (see figure 1). The authors determined: the dehydration velocity of ethyl alcohol and ether in ethalene as well as the common

Card 1/2

The Application of Radioactive Carbon for the Investigation of the Dehydration Mechanism of Ethyl Alcohol Over Aluminum Oxide. 62-2-18/28

conversion of alcohol and ether over aluminum oxide at 300° C. They found that ethylene forms in two different ways: directly from alcohol, and over ether. There are 2 figures, 1 table, and 8 references, 6 of which are Slavic.

ASSOCIATION: Institute for Organic Chemistry AN USSR imeni N.D. Zelinskiy (Institut organicheskoy khimii imeni N.D. Zelinskogo Akademii nauk SSSR).

SUBMITTED: September 21, 1957

AVAILABLE: Library of Congress

1. Carbon Isotopes (Radioactive)-Applications 2. Ethanol-Dehydration 3. Aluminum oxide-Applications

Card 2/2

[illegible] KH

62-58-4-4/32

AUTHORS: Patrikeyev, V. V., Balandin, A.A., Khidekel', M. L.

TITLE: Adsorption and Catalysis (Adsorbtsiya i kataliz)
Communication 1: Hydrogenation of Maleic and Fumaric Acid in Liquid Phase (Soobshcheniye 1: Gidrogenizatsiya maleinovoy i fumarovoy kislot v zhidkoy faze)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Khimicheskikh Nauk, 1958, Nr 4, pp. 411-418 (USSR)

ABSTRACT: In spite of the great practical importance of the hydrogenation of maleic and fumaric acid and of numerous investigations in this field, many a problem of the mechanism of hydrogenation remains unsettled. This is especially the case with regard to the knowledge of the quantity of the substance adsorbed on the catalyst which could solve many problems, as for instance, the effect of the solvent and the reaction product on the mechanism of reaction as well as on the kinetics. In the present paper the authors describe the methods and the investigation of the catalytic hydrogenation process (in liquid phase). The apparatus for the

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62-58-4-4/32

Adsorption and Catalysis. Communication 1: Hydrogenation of Maleic and Fumaric Acid in Liquid Phase

catalytic hydrogenation is described in great detail (see figures 1-3). The authors found that maleic acid can be better adsorbed and hydrated in a 96% alcohol than fumaric acid. Succinic acid has a displacing effect on fumaric and maleic acid. In the acid mixture of 96% alcohol on skeleton nickel fumaric acid is better adsorbed than maleic acid, however it hydrates more slowly. In the investigation of the catalytic hydrogenation process (in mixtures) the surface concentrations of the reagents during reaction must be considered. There are 13 references, 12 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute for Organic Chemistry imeni N. D. Zelinskiy, AS USSR)

SUBMITTED: November 7, 1957

AVAILABLE: Library of Congress

Card 2/2 **1. Catalytic hydregenation--Processes 2. Liquid maleic acid --Applications 3. Liquid fumaric acid--Applications**

SOV/62-58-8-2/22

AUTHORS: Freydlin, L. Kh., Balandin, A. A., Borunova, N. V., Agronomov, A. Ye.

TITLE: On the Relation Between the Activity and Stability of Nickel-Aluminium Catalysts and the Macro-Structure of the Carrier (O svyazi mezhdu aktivnost'yu i stabil'nost'yu nikel'-glinozemnykh katalizatorov i makrostrukturoy nositelya)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk, 1958, Nr 8, pp. 923-928 (USSR)

ABSTRACT: In the introduction the authors briefly discuss the influence of the macrostructure of the carrier on the activity of the nickel-aluminium catalyst (Refs 1-3). Then they describe their investigation of the relation between the activity and stability of nickel-aluminium catalysts on the one hand, and the character of the macro-structure of aluminium oxide on the other hand. This investigation showed that the dehydrating activity of the catalyst can mainly be recognized by the type of porosity of the carrier. It was found that catalysts produced by the application of nickel on coarse-porous aluminium oxide have a higher activity and greater stability than those produced by the application

Card 1/2

SOV/62-58-8-2/22

On the Relation Between the Activity and Stability of Nickel-Aluminium Catalysts and the Macro-Structure of the Carrier

of nickel on fine-porous aluminium oxide. The latter has the effect that the activity of the catalyst is considerably reduced. There are 4 figures, 1 table, and 10 references, 9 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy, AS USSR)

SUBMITTED: March 5, 1957

Card 2/2

AUTHORS: Tolstopyatova, A. A., Balandin, A. A., Karpeyskaya, Ye. I. SOV/62-58-10-4/25

TITLE: Kinetic Determination of the Binding Energies With the Chromium Oxide Catalyst. (Kineticheskoye opredeleniye energiy svyazi s katalizatorom okis' khroma)

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1958, Nr 10, pp 1184-1191 (USSR)

ABSTRACT: In the present paper the authors investigated the dehydrogenation and dehydration kinetics of isopropyl alcohol as well as the dehydrogenation of cyclohexane on chromium oxide (obtained by annealing ammonium bichromate). The authors found the relative adsorption coefficient of acetone and hydrogen. They also determined the activation energy of the reactions of the dehydrogenation and dehydration of isopropyl alcohol, as well as of the dehydrogenation of cyclohexane. The binding energies of the atoms reacting in the molecule with the catalyst were determined. The authors also compared the catalytic properties of chromium oxide produced by other methods with those described already. There are 6 figures,

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Kinetic Determination of the Binding Energies With the Chromium Oxide Catalyst SOV/62-58-10-4/25

9 tables, and 12 references, 11 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova i Institut organicheskoy khimii im. N.D. Zelinskogo Akademii nauk SSSR. (Moscow State University imeni M. V. Lomonosov and Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: April 2, 1957

Card 2/2

5(3)

AUTHORS: Balandin, A. A., Isagulyants, G. V. SOV/62-58-11-5/26

TITLE: Dehydrogenation of Some Hydroaromatic Hydrocarbons on a Chromium Catalyst (Degidrogenizatsiya nekotorykh gidroaromaticheskikh uglevodorodov nad khromovym katalizatorom)

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1958, Nr 11, pp 1303-1309 (USSR)

ABSTRACT: In the present paper the authors especially tried to establish equal conditions of reaction for various hydrocarbons. For this reason the data determined may be compared qualitatively as well as quantitatively with each other. The authors applied the running-thru method. The general scheme of the apparatus corresponded to a similar scheme described in reference 1. The catalyst was produced according to the method described in reference 4. Its activity was constant and was controlled after dehydrogenation of cyclohexane. Dehydrogenation of cyclohexane, Dekalin, methyl cyclohexane, 1,3-dimethyl cyclohexane, Tetralin, 2-methyl-5,6,7,8-tetrahydro naphthalene was investigated on the chromium catalyst. The 4 compounds mentioned last were investigated for the first time. The

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Dehydrogenation of Some Hydroaromatic Hydrocarbons on a Chromium Catalyst SOV/62-58-11-5/26

activation energies of cyclohexane, methyl cyclohexane, 1,3-dimethyl cyclohexane, Tetralin, and methyl Tetralin were determined on the chromium oxide. The hydrocarbons similar in structure - cyclohexane, methyl cyclohexane, dimethyl cyclohexane, and Dekalin - are characterized by similar constants of the Arrhenius equation which, however, do not agree. The occurrence of methyl groups in the cyclohexane ring slightly reduces these constants. At high temperatures this leads to a considerable difference in dehydrogenation velocity. Tetralin and methyl Tetralin can be dehydrogenated at a greater number of active places than cyclohexane and its homologs. Dehydrogenation is in this case characterized by greater constants of the Arrhenius equation. For the dehydrogenation of all hydrocarbons mentioned the factors of the exponential functions are logarithmically dependent on the activation energy. The distribution constant is the same in all cases. There are 7 figures, 10 tables, and 5 references, 3 of which are Soviet.

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Dehydrogenation of Some Hydroaromatic Hydrocarbons on a Chromium Catalyst SOV/62-58-11-5/26

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: May 14, 1957

Card 3/3

5(3)

AUTHORS: Levi, G. I., Balandin, A. A. SOV/62-58-12-20/22

TITLE: The Energy Barriers of the Reactions of Opening and Closing of Hydrocarbon Cycles (Ob energeticheskikh bar'yerakh reaktsiy razmykaniya i zamykaniya tsiklov uglevodorodov)

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1958, Nr 12, pp 1497-1498 (USSR)

ABSTRACT: This is a brief account of the calculation of the amount of the energy barriers of the hydrogenolysis of hydrocarbons with an opening of 3-, 4- and 5-membered cycles (Table 2) and the dehydrocyclization with the formation of a cyclopentane cycle. The amount of these barriers (E') can be found by means of the equations of the multiple theory (Ref 2). The quantity E' is the energy difference between the breaking and the forming bond in this or that stage of the reaction, which tends to a limit value. In the case concerned this was assumed to be the adsorption stage, i.e. the stage of the formation of a multiple complex. The smaller the absolute quantity E' the more easily the reaction takes place, all other conditions being maintained. The calculated results are in good agreement

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The Energy Barriers of the Reactions of Opening and Closing of Hydrocarbon Cycles SOV/62-58-12-20/22

with experimental results.
There are 2 tables and 7 Soviet references.

ASSOCIATION: Institut organicheskoy khimii imeni N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy Academy of Sciences, USSR)

SUBMITTED: June 5, 1958

Card 2/2

SLOVOKHOTOVA, T.A.; BALANDIN, A.A.; NAZAROVA, D.V.

Catalytic conversions of ethane in reaction with water vapor. Part 2: Dependence of the reaction rates of ethane in the presence of water on volume velocity and temperature. Vest.Mosk.un.Ser.mat., mekh.,astron.,fiz.,khim. 13 no.1:193-201 '58. (MIRA 11:11)

1. Kafedra organicheskogo kataliza Moskovskogo gos. universiteta.
(Ethane) (Water vapor)
(Chemical reaction, Rate of)

BALANDIN, A.A.

Principles of structure and energy correspondence in enzymatic catalysis. [with summary in English]. Biokhimiia 23 no.3:475-485 My-Je '58 (MIRA 11:8)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR, Moskva
(ENZYMES,
structure & energy correspondence in enzymatic catalysis (Rus))

AUTHORS: Rode, T. V., Balandin, A. A.

SOV/79-28-11-1/55

TITLE: Thermographic Investigation of Regeneration Processes of Chromium Catalysts (Termograficheskoye issledovaniye protsessov regeneratsii khromovykh katalizatorov)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol 28, Nr 11, pp 2909-2915 (USSR)

ABSTRACT: The regeneration of catalysts contaminated by coal deposits which may be removed again consists in the annealing of these deposits in the air current or in the current of a mixture of nitrogen and oxygen at various ratios. As this process has a clear exothermal character it was only natural to employ the differential analysis in its investigation (Ref 1), the temperature conditions being of great importance. Only a few theoretical papers deal with this subject. The first of these papers was that by N. D. Zelinskiy and M. B. Turova (Ref 2) in which the contamination of platinum and palladium catalysts by coal deposits was determined according to the formation of carbonic acid at different temperatures. In the present paper the contamination of chromium catalysts due to coal deposits is investigated according to the thermographic

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Thermographic Investigation of Regeneration
Processes of Chromium Catalysts SOV/79-28-11-1/55

method. It was found that the character of these deposits is different in dependence on the reaction carried out. In some cases the coal membrane has two components, the one of which has a higher combustion temperature than the other. An increase in reaction temperature and a longer duration of the operation of the catalysts without regeneration increases the amount of the second, undesired component. The presence of these two components of the coal membrane on the chromium catalysts contaminated in the decomposition reaction of isopropyl alcohol is proved by the recording of the thermogram of the contaminated catalysts in vacuum in the case of a continuous suction of the developing gases. Instead of the bipartite exothermal effect shown by the combustion of the coal deposits on the vacuum thermograms there are two clear endothermal effects of the thermal decomposition of the two deposits investigated. The application of the differential thermal analysis to the investigation of the coal deposits combustion character and the determination of their combustion temperatures make it possible to approach this regeneration problem in a natural way, as well as to control its combustion

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Thermographic Investigation of Regeneration Processes of Chromium Catalysts SOV/79-28-11-1/55

percentage, and to decrease the temperature in some cases. There are 5 figures, 4 tables, and 6 references, 5 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk SSSR (Institute of Organic Chemistry of the Academy of Sciences USSR)

SUBMITTED: September 7, 1957

Card 3/3

76-32-4-25/43

AUTHORS: Balandin, A. A., Kukina, A. I., Shishova, D. P.

TITLE: Investigation of the Iron-Chromium Catalysts in the Dehydrogenation and Dehydration of Isopropyl Alcohol (Issledovaniye zhelezo-khromovykh katalizatorov v reaktsiyakh degidrogenizatsii i degidratatsii izopropilovogo spirta)

PERIODICAL: Zhurnal Fizicheskoy Khimii, 1958, Vol. 32, Nr 4, pp. 882 - 893 (USSR)

ABSTRACT: In order to be able to investigate the iron catalysts the energetic equations of the multiplet theory were used in this paper, the adsorption potential and the binding energy of the molecules being determined by the catalyst just as well as activity and selectivity. From the experimental part can be seen that the pretreated catalysts were investigated polarographically, that the kinetic experiments were carried out on a flow apparatus, and that the activity, and the selectivity of the measurements of the reaction products were determined. Granular sizes of the catalysts of from 1 - 3 mm were used

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Investigation of the Iron-Chromium Catalysts in the Dehydrogenation and Dehydration of Isopropyl Alcohol

and within the temperature interval of from 32o - 5oo°C it was observed that the activity of iron oxide is essentially greater that that of chromium oxide, the dehydrogenation exceeding dehydration. A cracking of the alcohol into saturated hydrocarbons takes place on iron oxide, a change of the reaction on the addition of chromium oxide having been observed. A ratio of iron oxide- chromium oxide of 1 : 1 effects a predominant splitting-off of hydrogen; x-ray structural analyses showed that also here the components retained their proper structure. With a rise of temperature the composition of the reaction products changes, namely, the content of hydrogen decreases and that of saturated and unsaturated hydrocarbons increases. The most active catalyst proved to be that with an addition of 5o% Fe_2O_3: 5o% Cr_2O_3, a little less with 75% Fe_2O_3 and with a minimum of the dehydration reaction that with 5% Fe_2O_3. From the results obtained the magnitude of the energetic barrier was

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Investigation of the Iron-Chromium Catalysts in the Dehydrogenation and Dehydration of Isopropyl Alcohol

calculated for both reactions just as well as the activation energies and the adsorption potentials. An explanation in connection with multiplet theory is given, just as well as graphical data and tables mentioning results. Finally the authors thank Yu. P. Simanov and N. V. Nikolayev for the lent apparatus as well as for their advice. There are 9 figures, 3 tables and 10 references, all of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University im. M.V. Lomonosov)

SUBMITTED: December 30, 1956

AVAILABLE: Library of Congress

Card 3/3

1. Iron-chromium catalysts--Effectiveness 2. Isopropyl alcohol--Dehydrogenation 3. Isopropyl alcohol--Dehydration

AUTHORS: Tolstopyatova, A. A., Balandin, A. A., SOV/76-32-8-17/37

TITLE: The Catalytic Properties of Cerium Dioxide in the Dehydration and Dehydrogenation of Alcohols and in the Dehydrogenation of Cyclohexane (Kataliticheskiye svoystva dvuokisi tseriya v otnoshenii reaktsiy legidrogenizatsii i degidratatsii spirtov i degidrogenizatsii tsiklogeksana)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 8, pp. 1831-1841 (USSR)

ABSTRACT: In the introduction publications in the field mentioned in the title are mentioned, among them are those by Cremer (Kremer) (Ref 8). In the present paper methanol, ethanol, n-propanol and isopropanol, and cyclohexane were investigated. The authors described the apparatus used, the initial substances as well as the preparation of the catalyst, and the experimental technique. The dehydrogenation of cyclohexane was carried out at 496-548°C, that of methanol at 293-358°C, that of ethanol at 311-363°C, that of n-propanol at 315-360°C, and the simultaneous dehydrogenation and dehydration of isopropanol was carried out at 307-369°C. Individual data (as, for

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The Catalytic Properties of Cerium Dioxide in the Dehydration and Dehydrogenation of Alcohols and in the Dehydrogenation of Cyclohexane

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example, the activation energies) and the results obtained are given separately for each single investigation, as well as tables containing the experimental results. Determinations of the binding energy of C, H and O with CeO_2 were carried out, with data by Cottrell (Kotrel') (Ref 16) being used. A comparison of the values obtained of the activation energy (except for methanol) shows that it is smaller in the case of secondary alcohols than with primary alcohols, and that it increases with a lengthening of the chain. The assumption by Palmer and Constable (Pal'mer and Konstebl) (Ref 17) argued upon by A.Kh. Bork (Ref 18) was disproved by the observations made by O.K. Bogdanova, A.A. Balandin and A.P. Shcheglova (Ref 19) as well as by those mentioned above. The adsorption potential of the catalyst decreases according to the increase of the activation energy; this causes the reaction to take place with greater difficulty. Some explanations on the binding energies are given. L.S. Revenko, Laboratory Worker, participated in the experiments.

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The Catalytic Properties of Cerium Dioxide in the Dehydration and Dehydrogenation of Alcohols and in the Dehydrogenation of Cyclohexane SOV/76-32-8-17/37

There are 5 figures, 7 tables, and 23 references, 11 of which are Soviet.

ASSOCIATION: Akademiya nauk SSSR, Institut organicheskoy khimii im. N.D. Zelinskogo, Moskva (AS USSR, Institute of Organic Chemistry imeni N.D. Zelinskiy, Moscow)

SUBMITTED: March 20, 1957

Card 3/3

Баландин, А.А.

AUTHORS: Balandin, A. A., Academician 20-2-30/60
Bogdanova, O. K., Shcheglova, A. P.,

TITLE: On Free Energy, Heat, and Entropy of the Adsorption Displacement of Alcohols From the Surface of an Oxide Catalyst by Means of Water (O svobodnoy energii, teplote i entropii adsorbtsionnogo vytesneniya spirtov vodoy s poverkhnosti okisnogo katalizatora)

PERIODICAL: Doklady AN SSSR, 1958, Vol. 118, Nr 2, pp. 312-314 (USSR)

ABSTRACT: This work examined the kinetics of dehydrogenizing of binary mixtures of normal structured primary alcohols by water by means of an oxide catalyst. The authors ascertained the coefficients of relative adsorption of water and examined the dependence of these quantities on the length of the carbon chain of alcohol. n-propyl alcohol, n- butyl alcohol, and n -hexyl alcohol were examined. The intial mixtures alcohol-water were produced by addition of water to a dosed quantity of alcohol. The experiments were made in the temperature interval of from 300 - 360°C. The data obtained here are grouped in a table. Another table contains the values of the coefficients of the relative adsorption of water, which were computed for the experimental data by a formula

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On Free Energy, Heat, and Entropy of the Adsorption Displacement 20-2-30/60
of Alcohols From the Surface of an Oxide Catalyst by Means of Water

which is given here. The coefficient of the relative adosorption of water decreases in the case of increasing temperature. The addition of water deminishes the velocity of dehydrogenisation of alcohol by more than 45% at a temperature of 320° C. In case of increasing temperature the slowing-down effect of water decreases. This mekes it possible to draw the following conclusions: The steam gets adsorbed by the catalyst the more, the lower the temperature. The coefficients of adsorption of water at the active centers of the catalyst are, in the examined temperature interval, in the case of water 3,5 to 1,3 times as high as in the case of alcohol. The coefficients of adsorption of water at the various values, mentioned above, have similar values. From the results of the experiments which were obtained here, the following appears: The coefficients of absolute adsorption of water-alcohols are, in case of primary alcohols of normal structure a function of temperature and do not depend on the length of the carbon chain of the alcohol. There are 2 figures, 2 tables, and 5 references, 4 of which are Slavic.

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On Free Energy, Heat, and Entropy of the Adsorption Displacement 20-2-30/60
of Alcohols From the Surface of an Oxide Catalyst by Means of Water

ASSOCIATION:	Institute for Organic Chemistry imeni N.D. Zelinskiy AN USSR (Institut organicheskoy khimii im. N.D. Zelinskogo Akademii nauk SSSR)
SUBMITTED:	August 23, 1957
AVAILABLE:	Library of Congress

Card 3/3