

C A

Determination of the content of hydrocarbons and organic vapors in air. V. R. Vassalberg, Zirofobov, Lab. 13, 1102-5(1040). A portable combustion app. with a vacuum chamber for inducing gas flow over the Pt wire for combustion is described. A self-contained supply of standard NaOH is used for the titration of the CO<sub>2</sub> formed. G. M. Kosolapoff

CA

Catalytic combustion column for gas analysis. V. E. Vasserberg and G. M. Zhabrova. *Zavodskaya Lab.* 19, 1230 (1940).—An app. suitable for gas analysis in the field utilizes a combustion tube, filled with suitable catalyst, which is wrapped with Pt or Pd asbestos, heated preliminarily by ignition of some alc. poured on it, then injected into a can contg. some MeOH; the continued combustion of MeOH vapor on the catalyst maintains 280–300° within the combustion tube, which can be raised to 400° by forcing air from bellows into the combustion chamber. G. M. Kosolapoff

CA

Causes of the optimum of the catalytic activity as a function of the dispersity and effective specific surface area of a catalyst. A. M. Rubinshtein and V. E. Vassurburg (Inst. Org. Chem., Acad. Sci. U.S.S.R.; Moscow). *Doklady Akad. Nauk S.S.S.R.* 79, 263-6 (1951).—A ppt. of  $\text{Al(OH)}_3$  obtained from a boiling  $\text{Al(NO}_3)_3$  soln. with 5%  $\text{NH}_4\text{OH}$  was sep'd into 3 portions of increasing particle size. The 3 portions were converted into  $\gamma\text{-Al}_2\text{O}_3$  by heating, and their

sp. surface areas  $s$  and crystal sizes  $d$  det'd. The data ( $s$ , sq.m./g. by adsorption of  $\text{MeOH}$  and  $\text{C}_6\text{H}_6$ ,  $d$  in Å.) are: I, 286 and 182,  $< 26$ ; II, 286 and 179, 35; III, 286 and 254, 51.4. The striking feature is the strong discrepancy of  $s$  values det'd. by adsorption of  $\text{MeOH}$  and  $\text{C}_6\text{H}_6$  in the case of I and II, as contrasted with their closeness in the case of III. This difference can be due only to the difference of size of the  $\text{MeOH}$  and  $\text{C}_6\text{H}_6$  moles, and to the presence in I and II of very fine pores, accessible to  $\text{MeOH}$  but not accessible to the larger  $\text{C}_6\text{H}_6$  mole. This conclusion is borne out by the above x-ray det'n. of  $d$ ; packing of the larger crystal grains of III leaves relatively larger pores, easily accessible even to  $\text{C}_6\text{H}_6$ , whereas the pores left by packing of the smaller grains of I and II must be markedly smaller. The sp. catalytic activities (per/g.) relative to the activity of III taken = 1.00, in the dehydration of  $\text{HCO}_2\text{H}$  and of  $\text{EtOH}$ , are, I, 0.68 and 0.69; II, 0.64 and 0.4 g.; III, 1.00 and 1.00. Thus, the catalytic activity is greater on the catalyst with the larger pores. Since, on the other hand, it is known that considerable increases of  $d$  is accompanied by a fall of  $s$  and of the catalytic activity, there must exist an

optimum of grain size with a max. of catalytic activity. Det'n. of the sp. surface area only by low-temp. adsorption of  $\text{N}_2$  is, consequently, insufficient for the characterization of the catalytic activity. An adequate measure of that activity would be an "effective sp. surface area," det'd. by adsorption of mole. of a size as close as possible to the size of the reacting mole. The conclusion about the relation between the micropore size and the catalytic activity was further tested by the dehydration of  $\text{BuOH}$  and  $\text{AmOH}$ . With  $\text{BuOH}$ , the ratio of the activities of I and III is about the same as with  $\text{EtOH}$ , although the abs. activities are about 10% higher. With  $\text{AmOH}$ , I formed practically no gaseous decompo. products, whereas III showed a weak activity which fell to zero within a few mins., along with the formation of a black C deposit. When this coked catalyst was tested, without regeneration, with  $\text{BuOH}$ , decompo. of  $\text{BuOH}$  took place at a satisfactory rate. This proves that the difference of behavior of III towards  $\text{BuOH}$  and  $\text{AmOH}$  is wholly due to the pore size which permits penetration of  $\text{BuOH}$  but not of the larger  $\text{AmOH}$  mole, which, therefore, can react only at the outer geometric surface. The lower catalytic activity of I and II towards  $\text{EtOH}$  as compared with their activity towards  $\text{HCO}_2\text{H}$  indicates that their pores are partially inaccessible even to  $\text{EtOH}$ . N. Thon

VASSERBERG, V. E.

Chemical Abst.  
Vol. 48 No. 9  
May 10, 1954  
General and Physical Chemistry

*Chem*  
Effect of the dimensions of the elementary crystallites on the porosity and the activity of alumina catalysts in the dehydration reaction. *A. M. Rubinshteyn, V. E. Vasserberg, and N. A. Pribytkova. Bull. Acad. Sci. U.S.S.R., Div. Chem. Sci. 1952, 325-32 (Engl. translation).—See C.A. 46, 0061d.*  
H. L. H.

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CIA-RDP86-00513R001859020006-0"

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)

5(3)

AUTHORS:

SOV/62-59-2-34/40  
Vasserberg, V. E., Balandin, A. A., Maksimova, M. P.

TITLE:

Orientation of Adsorbed Molecules in the Monomolecular Layer on Oxidizing Catalysts (Ob oriyentatsii adsorbirovannykh molekul v monomolekulyarnom sloye na okisnykh katalizatorakh)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 2, pp 363-365 (USSR)

ABSTRACT:

In the present paper the authors investigated the adsorption of the lowest saturated alcohols, from C<sub>1</sub> to C<sub>4</sub>, of n-pentane and dichloro ethane by differently produced Al<sub>2</sub>O<sub>3</sub>-samples and MgO-, ThO<sub>2</sub>- and ZnO-catalysts. From the determinations of the adsorption isothermal lines at 25° it was seen that the adsorption in the monomolecular layer is decreasing in the following order: CH<sub>3</sub>OH > C<sub>2</sub>H<sub>5</sub>OH > n-C<sub>3</sub>H<sub>7</sub>OH > n-C<sub>4</sub>H<sub>9</sub>OH > i-C<sub>3</sub>H<sub>7</sub>OH = i-C<sub>4</sub>H<sub>9</sub>OH > s-C<sub>4</sub>H<sub>9</sub>OH > t-C<sub>4</sub>H<sub>9</sub>OH. The size of the elementary places occupied by the adsorbed alcohol molecules on the surface depends both on the structure of the alcohol and on the catalyst. It was assumed that at moderate temperature

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Orientation of Adsorbed Molecules in the Monomolecular Layer on Oxidizing Catalysts

there is also a plane orientation in addition to the normal one of the adsorbed molecules (hydroxyl groups are oriented towards the surface). The portion of planely oriented molecules is different for various alcohols and catalysts. For this reason it is advisable to introduce instead of the actual size of the elementary place a new term, the "effective specific place"  $\sigma_{eff}$ . It depends on the numerical ratio of the planely and parallely adsorbed molecules and is different for one and the same alcohol on various catalysts. The variation of the chemical character of the catalyst considerably affects the  $\sigma_{eff}$ . (Table). There are 1 table and 9 references, 6 of which are Soviet.

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: July 15, 1958

Card 2/2



VASSERBERG, V.E.; BALANDIN, A.A.

Elementary stages of the dehydration of alcohols on  $Al_2O_3$  catalysts.  
Probl. kin. i kat. 10:356-362 '60. (MIRA 14:5)

1. Institut organicheskoy khimii AN SSSR.  
(Alumina) (Dehydration (Chemistry))  
(Alcohols)

S/020/60/134/002/039/041XX  
B004/B067

AUTHORS: Vasserberg, V. E., Balandin, A. A., Academician, and  
Georgiyevskaya, T. V.

TITLE: Conjugate Dehydration of Alcohols in an Adsorbed Layer on  
Aluminum Oxide Catalysts

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 134, No. 2,  
pp. 371-373

TEXT: In studying the dehydration of alcohols in  $Al_2O_3$  (Refs. 1-3) the authors observed different reaction rates in catalysts which had been prepared in different ways. In the present paper, they examined such catalysts. No. 1:  $Al_2O_3$  precipitated by means of NaOH at pH = 6.3; No. 2:  $Al_2O_3$  obtained by hydrolysis of aluminum isopropylate; No. 3: precipitated from aluminate solution by means of  $CO_2$  at  $0^\circ C$ . First, the different activities of the catalysts in the dehydration of  $C_2H_5OH$  and iso- $C_3H_7OH$  were confirmed. Furthermore, the dehydration of isopropanol in the presence of ethanol was studied. Since the dehydration of isopropanol

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proceeds rapidly already at 120 - 150°C, whereas ethanol does not yet react at this temperature, the dehydration of isopropyl alcohol was studied on a catalyst whose surface was covered with ethanol which was considered an inert substance. Furthermore, water and methanol were used as inert substances. The effects of these inert substances were found to be different. Water, methanol, or ethanol adsorbed in equal quantities reduced the dehydration of isopropanol to a different degree, this reduction depending also on the method of catalyst preparation. Since this could not be explained by a blocking of the catalyst surface, the authors thoroughly studied the kinetics of the joint decomposition of isopropanol and ethanol. First, ethanol was adsorbed at 120 - 150°C, then isopropanol, and the pressure rise of the olefin formed was measured. It was found that the pressure  $p_{\infty \text{ theor}} = 0.6 - 0.7$  mm Hg calculated for a 100% decomposition of isopropanol was much higher ( $p_{\infty \text{ exp}} = 1.1 - 1.6$  mm Hg) and increased in the course of reaction. Hence, the authors conclude that when ethanol and isopropanol are jointly adsorbed on the catalyst, a conjugate dehydration occurs. The dehydration of ethanol was strongly

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Adsorbed Layer on Aluminum Oxide Catalysts

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accelerated (compared with that of pure ethanol), while that of isopropanol was delayed. The authors therefore conclude that the complexes adsorbed on the catalyst surface are not isolated but react with neighboring molecules, and are capable of forming combined complexes (ethanol-isopropanol and methanol-isopropanol complexes) which decompose more slowly than the isopropanol complexes. There are 3 figures and 3 references: 2 Soviet and 1 German.

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

SUBMITTED: May 17, 1960

Card 3/3

VASSERBERG, V.E.; BALANDIN, A.A.; LEVI, G.I.

Radiochemical study of the mechanism of dehydration catalysis. Part 1:  
Reactions of  $C^{14}$ -dimethyl ether with hydrocarbons. Kin. 1 kat 2  
no.1:61-65 Ja-F '61. (MIR 14:3)

1. Institut organicheskoy khimii imeni N.D. Zelinskogo AN SSSR.  
(Ether) (Hydrocarbons) (Dehydration) (Chemistry)

S/195/61/002/005/020/027  
E030/E185

AUTHORS: Levi, G.I., and Vasserberg, V.E.

TITLE: Radiochemical study of the mechanism of dehydration catalysis. II. The interaction between  $C^{14}$ -dimethyl ether with carbonyl, or some other oxygen-containing compounds

PERIODICAL: Kinetika i kataliz, v.2, no.5, 1961, 758-761

TEXT: The present paper is a continuation of previous work (Ref.1: V.E. Vasserberg, A.A. Balandin, G.I. Levi, Kinetika i kataliz, v.2, 61, 1961); both were presented at the Conference on Isotopes in Catalysis.

Studies have been made of the passage of  $C^{14}$  from dimethylether into reaction products with ketones, aldehydes, glycols, and some complex and cyclic ethers, in the presence of an alumina catalyst at 316-320 °C and a pressure of 1 atm. These, and earlier results, support the hypothesis of interactions by intermediate complexes on the surface of the alumina catalyst, at high temperatures and pressures. All experimental details are the same as in the previous work (Ref.1). Earlier work

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showed movement of the  $C^{14}$  from ethyl, isopropyl, and benzyl alcohols, but not for toluol groupings of alcohols; to see the mechanisms operative in dehydration catalysis the present work therefore extended to cover various types of carbonyl and oxygen-containing compounds. The results are given in Table 1. The activity of the products is given by the specific activity in pulse/min.mg  $BaCO_3$  ( $\alpha$ ) and in % of the initial activity of dimethyl ether (A), which was 22000-24000 pulse/min.mg  $BaCO_3$  (in experiments with complex ethers - 35% lower). Firstly, except for acetylacetone, carbonyl groups, similar to alcohols and ethers, also permit  $C^{14}$  to reach the second and subsidiary products in considerable activity. Secondly, acetone used as second component was separated and converted into 2,4-dihydro-phenylhydrazone, which had considerable activity, and about 10 higher melting point than the pure unradioactive material. Thirdly, acetylacetone and 1,2-propanediol had no activity after the test at a relatively low temperature (230 °C), testifying to satisfactory efficiency in separating the initial marked

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dimethylether from the resulting products. The results obtained in the present and the previous work (Ref.1) show that in the presence of an alumina catalyst an isotopic exchange takes place under conditions of dehydration catalysis. They confirm the suggestion made before, that there is an interaction between the intermediate products formed on the surface of the catalyst, giving not association products but substitution products, through radical-like complexes on the catalyst surface. Experimental results obtained not long ago agree with this (Ref.5: V.E. Vasserberg, A.A. Balandin, I.R. Davydova, Dokl. AN SSSR, v.136, 377, 1961. Ref.6: V.E. Vasserberg, I.R. Davydova, T.V. Georgiyevskaya, Kinetika i kataliz, v.2, 774, 1961). This hypothesis should cover a wide range of catalytic processes, such as cracking, hydro-dehydrogenation, isomerization, etc. Two questions appear resolved. First, dioxane, although an ether with a very stable ring, can undergo isotope exchange, since the dioxane-1,2 glycol system is clearly analogous to the diethylether-ethyl alcohol system. Second, the difference in behaviour between  $\beta$ - and  $\alpha$ -diketones arises

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Radiochemical study of the ..... S/195/61/002/005/020/027  
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because the former readily chelate, especially with lighter metals such as aluminium. The chelation destroys the surface activity, as observed; the  $\gamma$ -ketones chelate only with heavier metals, such as copper, and hence retain their activity on alumina. Acknowledgments are expressed to Academician A.A. Balandin, who directed the work, and to laboratory worker A.A. Sidakova who participated in the experiments. There are 1 table and 6 Soviet-bloc references; two of them Russian translations from non-Soviet-bloc publications. ✓

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

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S/195/61/002/005/022/027  
E075/E536

AUTHORS: Vasserberg, V.E., Davydova, I.R. and Georgiyevskaya, T.V.  
TITLE: Application of para-ortho conversion of hydrogen to the investigation of elementary stages in heterogeneous catalytic processes

PERIODICAL: Kinetika i kataliz, v.2, no.5, 1961, 773-779

TEXT: The authors for the first time used the property of free radicals to catalyse para-ortho conversion of hydrogen. This was done to establish the presence of free radicals on the catalyst surface with reactions taking place in the adsorbed layer. The first reaction investigated was dehydration of isopropylalcohol on manganese sulphate. This reaction proceeds in the adsorbed layer with a measurable velocity at 165-180°C. At 180°C the period of half-conversion  $\tau_{0.5}$  for the decomposition is equal to 20 min and the energy of activation is 23 kcal/mole. It was shown that the process of dehydration in the adsorbed layer is hampered by impurities, but not to such an extent as for  $Al_2O_3$  investigated later. The method and apparatus used was described previously (Ref.18: V. E. Vasserberg, A. A. Balandin, I. R. Davydova, Dokl. AN SSSR, 134, 377, 1960). The results show that, whilst 50%  
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mixture of para- and ortho-hydrogen is not changed under the experimental conditions in the presence of the catalyst and, also, in the presence of the alcohol vapours without the catalyst, 15% of the theoretical para-ortho conversion is achieved when the alcohol vapour is contacted with the catalyst. The second reaction investigated was dehydration of alcohols on  $Al_2O_3$ .  $Al_2O_3$  used was obtained by passing gaseous  $CO_2$  into solution of  $Al(NO_3)_3$  at  $0^\circ C$  and baking the precipitate at  $200-250^\circ C$  for several hours under high vacuum. It was shown that the capacity of  $Al_2O_3$  to produce the ortho-para conversion depends on its degree of hydration. The samples heated at  $130^\circ C$  are inactive both in respect of the conversion and the dehydration reactions, whereas the samples heated to  $400^\circ C$  catalyse both the conversion and the dehydration reaction.  $Al_2O_3$  heated at  $200-250^\circ C$  under  $1-2 \times 10^{-4}$  mm Hg catalyses the dehydration, but does not produce para-ortho conversion of hydrogen. The apparatus used was somewhat different from that described previously (Ref.18). It consisted of a circulating system capable of being evacuated to very low pressures. The circulation of hydrogen is provided by an

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electromagnetic pump. With the aid of several stopcocks it was possible to circulate hydrogen through the reactor, or else pass hydrogen under "once through" conditions. The alcohols could be introduced into the heated evaporator in three different ways: a) in sealed ampoules, b) directly from a test tube, and c) from an electrolytic burette joined to the neck of the evaporator. Thermal conductivity detector was used to measure the degree of ortho-para hydrogen conversion (the resistance of the tungsten wire used was 60 Ohm at  $-196^{\circ}\text{C}$ , 60 mA current and 50 mm hydrogen pressure). The resistance changes due to formation of para-hydrogen were of the order of 3.5 Ohm which could be easily measured with 1-2% precision. The detector was calibrated by passing through the apparatus known mixtures of para- and ortho-hydrogen produced by passing the 50% mixture through activated charcoal. It was found that with isopropyl alcohol the para-ortho conversion reaches 25% of theoretical value, thus demonstrating the formation of free radicals. Results of experiments with tert-butyl alcohols indicated that the para-ortho conversion almost does not take place. This was contrary to the expected increased conversion, in view of the reported (Ref.21:B.A.Dolgoplosk, Card 3/5

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Application of para-ortho ...

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E075/E536

B. L. Yerusalimskiy, V. A. Krol', Sh.Voprosy khimicheskoy kinetika, kataliza i reaktsionnoy sposobnosti, Izd-vo AN SSSR, 1955, p.810) relatively high stability of tert-butyl free radicals in the liquid phase. On the other hand the dehydration of diethyl ether was accompanied by a marked para-ortho conversion (13% theoretical). The second admission of ethyl ether did not produce any ortho-para conversion, but when the temperature of the reactor was raised by 20°C (thus producing a partial desorption of water and regeneration of active sites) the dehydrogenation proceeded again with the accompanying para-ortho conversion (8.5% theoretical). The authors explain the differences between the properties of the adsorbed C<sub>2</sub> and tert-C<sub>3</sub> radicals in the dehydration reaction, by inability of the latter radicals in the adsorbed state to catalyze the ortho-para conversion. The adsorbed C<sub>2</sub> radicals do not lose this ability. The author conclude that for the first time they have proved directly the formation of intermediate structures possessing paramagnetic properties common to free radicals under conditions of heterogeneous catalysis. The authors believe that the formation of free radicals should take place for other

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heterogeneous reactions such as isomerisation, polymerisation, disproportionation etc. Acknowledgments are expressed to Academician A. A. Balandin for interest in this work and to S. L. Kiperman for supplying the apparatus used in the first part of this work. There are 3 figures, 2 tables and 22 references: 19 Soviet-bloc and 3 non-Soviet-bloc.

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

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Card 5/5

VASSERBERG, V.E.; BALANDIN, A.A.; MAKSIMOVA, M.P. (Moskva)

Adsorption of lower aliphatic alcohols on alumina catalysts  
and the orientation of the adsorbed molecules. Zhur. fiz.  
khim. 35 no. 4:858-866 Ap '61. (MIRA 14:5)

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

89617

S/020/61/136/002/026/034  
B004/B056

5.1190 2209

AUTHORS: Vasserberg, V. E., Balandin, A. A., Academician, and Davydova, I. R.

TITLE: Formation of Radical-like Intermediary Forms of Surfaces in Heterogeneous Catalysis

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 2, pp. 377-380

TEXT: The formation of free radicals on the surface of catalysts is dealt with. The experimental material (Refs. 1-14) led many researchers to the assumption that heterogeneous catalysis takes place with the participation of free radicals loosely bound to the catalyst. However, no experimental proof has hitherto been obtained. To supply this proof, the reaction of isopropanol dehydration was chosen, because it takes place at low temperatures in the adsorbed layer, and thus the lifetime of the radical-like complexes could be expected to be longer than at high temperatures. As such complexes are characterized by unpaired electrons, the method was based upon proving their paramagnetism which accelerates

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Formation of Radical-like Intermediary  
Forms of Surfaces in Heterogeneous Catalysis

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B004/B056

the para-ortho transformation of hydrogen. In selecting the suitable catalyst, such were not found to be eligible as, like  $Al_2O_3$ , were themselves active catalysts of p-o transformation.  $MgSO_4$  was chosen as a catalyst of alcohol dehydration, because the latter does not activate the p-o transformation below  $300^\circ C$ , and thus does not produce any effect on this transformation at the dehydration temperature ( $150-180^\circ C$ ). For each experiment, fresh  $MgSO_4$  was used, because a regeneration could not be carried out (reduction and formation of  $H_2S$  in hydrogen at  $300^\circ C$ ). A continuous-flow glass device was used for the purpose. The catalyst installed in it was annealed at  $300^\circ C$  for 3 hours at  $1 \cdot 10^{-5}$  mm Hg. Before each experiment, the question was examined as to whether the catalyst itself did not bring about the p-o transformation. For this purpose, a mixture of 50% para- and ortho-hydrogen was in each case made to circulate at the temperature of dehydration in the apparatus, and samples were periodically taken, whose thermal conductivity was examined. For this purpose, a test tube made of molybdenum glass with a tungsten wire ( $d = 20\mu$ ), which had a resistance of 300 ohms at room temperature, was used. X

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Formation of Radical-like Intermediary Forms  
of Surfaces in Heterogeneous Catalysis

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Thereupon, evacuation was carried out to  $1 \cdot 10^{-5}$  mm Hg, and the ampoule with  $i\text{-C}_3\text{H}_7\text{OH}$  was smashed by means of an electromagnet. All processes were carried out under exclusion of oxygen which was also paramagnetic. As soon as the alcohol had evaporated and been adsorbed, a 50% mixture of  $p\text{-}$  and  $o\text{-H}_2$  was introduced, and after 10-15 min samples were taken for determining thermal conductivity. After the experiment had been completed, evacuation to  $1 \cdot 10^{-5}$  mm Hg again followed, and the inactivity of the catalyst alone with respect to  $p\text{-o}$  transformation was again tested with 50%  $p\text{-}$  and  $o\text{-H}_2$ . Experimental results are given in Table 1. The following results were obtained: 1) The 50%  $p\text{-}$  and  $o\text{-H}_2$  mixture undergoes no change in contact with the catalyst, with the vapors of the reaction products and of the alcohol in the absence of a catalyst. 2) In contact with the catalyst, on which the dehydration of the alcohol is carried out, a  $p\text{-o}$  transformation occurs, which attains 13.5%. This result is considered to be a direct proof of the formation of multiplet complexes with paramagnetic properties. The formation of such complexes is assumed also for other heterogeneous catalytic reactions. Proof is, however, rendered

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difficult by the authors' method because all catalysts used for hydro-  
genation and dehydrogenation catalyzed the p-o transformation of H<sub>2</sub> them-  
selves but, in the case of catalytic oxidation, paramagnetic oxygen  
disturbs. Mention is made of N. D. Zelinskiy, V. V. Voyevodskiy, F. F.  
Vol'kenshteyn, N. N. Semenov, Ya. T. Eydus, S. Z. Roginskiy, M. I.  
Temkin, and S. L. Kiperman. There are 1 figure, 1 table, and 17 references:  
15 Soviet, 1 Belgian, and 1 German.

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: August 30, 1960

Legend to Table 1: a) Number of experiment; b) quantity of catalyst, g;  
c) temperature, °C; d) quantity of initial alcohol, ml; e) duration of  
circulation, min; f) degree of ortho-para transformation; g) infinite.

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Formation of Radical-like Intermediary Forms  
of Surfaces in Heterogeneous Catalysis

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Table 1

№ опыта (a)	Кол-во ката-лиз., г (b)	Т-ра, °C (c)	Кол-во. исходн. спирта, мл (d)	Время циркуля-ции, мин. (e)	Степень прева-рщения, % (f)
1	0	180	0,2	бескон.)	0
2	0	200	0,4	"	0
3	3,3	156	0,0	"	0
	3,3	156	0,05	15	13,3
	3,3	156	0,05	бескон.)	13,3
4	10,7	185	0,0	"	0
	10,7	185	0,4	15	13,5
	10,7	185	0,4	бескон.)	13,5
5	11,0	187	0,0	"	0
	11,0	187	0,2	15	5,3
	11,0	187	0,2	бескон.)	5,3
6	11,0	183	0	"	0
	11,0	183	0,4	15	13,2
	11,0	183	0,4	бескон.)	13,2

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VASSERBERG, V.E.; VALANDIN, A.A., akademik; GEORGIYEVSKAYA, T.V.

Reciprocal effect of reacting molecules at the surface of  
dehydration catalysts. Dokl. AN SSSR 140 no.4:859-862 0 '61.  
(MIRA 14:9)

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

VASSERBERG, V.E.; BALANDIN, A.A., akademik; GEORGIYEVSKAYA, T.V.

Inhibition of surface reactions on catalysts and the mobility  
of adsorbed molecules. Dokl. AN SSSR 140 no.5:1110-1113 0 '61.  
(MIRA 15:2)

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

PAVLOV, Boris Alekseyevich; TARENT'YEV, Aleksandr Petrovich, prof.;  
VASSERBERG, V.E., red.; LUR'YE, M.S., tekhn. red.

[Course in organic chemistry] Kurs organicheskoi khimii. Izd.4.  
stereotipnoe, ispr. Moskva, Goskhimizdat, 1962. 592 p.  
(MIRA 15:10)

(Chemistry, Organic)

VASSERBERG, V.E.; BALANDIN, A.A.; MAKSIMOVA, M.P.

Geometric configuration of adsorbate molecules and the dimensions of elementary surface areas in the adsorption layer. Izv. AN SSSR. Otd. khim. nauk no. 10:1865-1868:0 '62. (MIRA 15:10)

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



LEVI, G.I.; VASSERBERG, V.E.

Recirculating catalytic apparatus. Kin.i kat. 3 no.4:527-528  
Jl-Ag '62. (MIRA 15:8)

1. Institut organicheskoy khimii imeni N.D.Zelinskogo AN SSSR.  
(Catalysis) (Chemical reactors)

VASSERBERG, V.E.

Standardization and automation of certain laboratory processes  
for the preparation and investigation of catalysts. Kin.1 kat.  
3 no.4:556-564 J1-Ag '62. (MIRA 15:8)

1. Institut organicheskoy khimii AN SSSR i Laboratoriya imeni  
N.D.Zelinskogo.

(Catalysts)

S/062/63/000/001/003/025  
B101/B186

AUTHORS: Maksimova, M. P., Vasserberg, V. E., and Balandin, A. A.

TITLE: Effect of the degree of dehydration of the  $Al_2O_3$  surface on its adsorptive properties and on the elementary area of the molecules adsorbed

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 1, 1963, 17-21

TEXT: The elementary area  $\omega$  populated by an adsorbed Ar atom or  $N_2$ ,  $C_2H_5OH$ ,  $n-C_5H_{12}$  or  $C_6H_{12}$  molecules was determined in  $Al_2O_3$  samples calcined at  $300^\circ C$  (sample I) up to  $1000^\circ C$  (sample IV). The adsorption of Ar and  $N_2$  was measured at  $-195^\circ C$ , that of the organic compounds at  $25^\circ C$ .  $\omega_{Ar}$  was assumed constant at all temperatures and equal to  $16.6 \text{ \AA}^2$ .  $\text{\AA}^2$  - values found for sample I:  $\omega_{N_2} = 17.2$ ;  $\omega_{C_2H_5OH} = 28.2$ ;  $\omega_{n-C_5H_{12}} = 54.2$ ;

Card 1/3

Effect of the degree of ...

S/062/63/000/001/003/025  
B101/B186

$\omega_{C_6H_{12}} = 54.5$ ; for sample IV: 15; 24.3; 46.5 and 44.5, respectively.

$\omega_{N_2}$  was almost constant for all  $Al_2O_3$  samples heated to more than  $300^\circ C$ .

Conclusions: The determination of the specific area of  $Al_2O_3$  catalysts by  $N_2$  adsorption is not affected by the degree of surface dehydration.

The slight changes of  $\omega_{C_2H_5OH}$  do not explain the previously observed

(Zh. fiz. khimii, 35, 858 (1961)) large differences of  $\omega$  when alcohol was adsorbed on  $Al_2O_3$  samples of various origin, which were dehydrated

at  $500^\circ C$ . The reduction of  $\omega_{C_2H_5OH}$  with increasing dehydration may be

explained by formation of highly active oxygen bridges between the aluminum atoms in intensely calcined samples. The  $\omega$  of the two hydrocarbons varies between physical values. The anomalous increase of  $\omega$  observed by M. M. Dubinin (Izv. AN SSSR, Otd. khim. n. 1960, 1739) in fluorized silicagels was not observed with  $Al_2O_3$ , although interaction

Card 2/3

Effect of the degree of ...

S/C62/63/000/001/003/025  
B101/B186

between the molecules of the adsorbate is equally possible. Hence, the BET (Brunnauer, Emmett, and Teller) equations can be used for  $Al_2O_3$ , as its surface is only slightly inhomogeneous. There are 1 figure and 2 tables. The most important English-language reference is: I. B. Peri, R. B. Hannan, J. Phys. Chem., 64, 1526 (1960).

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: April 23, 1962

Card 3/3

VASSERBERG, V. Ye.

"Interaction between adsorbed molecules and the mechanism of the elementary acts in the dehydration of alcohols on oxide catalysts."

report submitted to 3rd Intl Cong on Catalysis, Amsterdam, 20-25 Jul 64.

Inst of Organic Chemistry im Zelinskiy, AS USSR, Moscow.

AID P - 4947

Subject : USSR/Electronics  
Card 1/1 Pub. 89 - 14/18  
Author : Vasserman, A.  
Title : ~~Calculation of chokes for fluorescent lamps~~  
Periodical : Radio, 8, 44-45, Ag 1956  
Abstract : The author explains the principles of operation of a fluorescent lamp, and gives a simple method of calculating ballast chokes for this lamp. Three drawings, 1 table.  
Institution : None  
Submitted : No date

AUTHOR: Vasserman, A. SOV-107-58-4-40/57

TITLE: A System for the Starterless Ignition of Luminescent Tubes  
(Bezstartornaya skhema zashiganiya lyuminescentnykh lamp)

PERIODICAL: Radio, 1958, Nr 4 p 44 (USSR)

ABSTRACT: A scheme for the swift ignition of luminescent tubes without using a starter is described. It is based on the use of a tapped filament transformer to heat the cathodes and at the same time supply the voltage. A conductive plate fitted to the glass envelope of the tube further aids ignition and the period required is cut from 15 seconds (using a starter) to 1-2 seconds. Transformer winding data is given.  
There is 1 circuit diagram and 1 table.

1. Discharge tube heaters--Design    2. Discharge tubes--Equipment

Card 1/1



VASSEMAN, A., inzhener-konstruktor.

Graphic method of calibrating the cutoff valve frame on a steam engine. Mor.flot 16 no.4:26-27 Ap'56. (MLRA 9:8)

1. Rishkiy sudostroitel'nyy-sudoremontnyy zavod.  
(Boilers, Marine)

VASSERMAN, A. A.; RABINOVICH, V. A.

"Calculation of the viscosity and the thermal conductivity of air and its components for wide range of parameters."

report submitted for 2nd All-Union Conf on Heat & Mass Transfer, Minsk, 4-12 May 1964.

Odessa Inst of Naval Engineers.

STAROSEL'SKIY, A.A., dotsent, kand.tekhn.nauk; VASSERMAN, A.A., inzh.  
SEMENOV, V.S., inzh.

Results of endurance testing of piston rings of diesel engines. Vest.  
mash. 41 no.3:11-15 Mr '61. (MIRA 14:3)  
(Piston rings--Testing)

VASSERMAN, A.A., KAZAVCHINSKIY, Ya.Z.

Equation of state for air. Inzh.-fiz.zhur. no.4:81-84 Ap '60.  
(MIRA 13:8)

1. Institut inzhenerov morskogo flota, Odessa.  
(Air) (Equation of state)

VASSERMAN, A.A.; MEL'KNER, K.A.

Apparatus for determining the wear of cylindrical bushings by  
the method of impressions. Zav.lab. 26 no.8:1026-1027 '66.  
(MIRA 13:10)

1. Odesskiy institut inzhenerov morskogo flota.  
(Testing machines)

ZAGORUCHENKO, V.A.; VASSERMAN, A.A.

Equation of state and the thermodynamic properties of methane. Inzh.  
fiz.zhur. 4 no.11:59-63 N '61. (MIRA 14:10)

1. Institut inzhenerov morskogo flota, g. Odessa.  
(Equation of state) (Methane--Thermal properties)

S/152/61/000/004/005/003  
B126/B219

AUTHORS: Vasserman, A. A., Zagoruchenko, V. A.  
TITLE: The thermodynamic properties of natural gases in the state of a perfect gas  
PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Neft' i gaz, no. 4, 1961, 69-72

TEXT: For various technical calculations in connection with natural gases. exact data on their thermodynamic properties are required, which in general are obtainable only from the values of a perfect gas. For the temperature interval -100 to +300°C, which is important for practice, the authors established equations for the molecular heat capacities  $\mu_{p_0}$  of the

natural-gas components that possess the properties of a perfect gas, and calculated from those the thermodynamic properties of natural gas from three deposits. The highest accuracy was achieved with equation (1),

$\mu_{p_0} = a + bT + cT^2 + dT^3$ , where  $T^{\circ K} = t^{\circ C} + 273.15$ . In the following

Card 1/4

S/152/61/000/004/005/009  
 B126/B219

The thermodynamic properties...

Table 1, the coefficients of Eq. (1) are given for seven basic components of the natural gases.

Table 1

Coefficients	CH <sub>4</sub>	C <sub>2</sub> H <sub>6</sub>	C <sub>3</sub> H <sub>8</sub>	C <sub>4</sub> H <sub>10</sub>	C <sub>5</sub> H <sub>12</sub>	N <sub>2</sub>	CO <sub>2</sub>
a	9.8417	8.8173	11.1479	10.7781	13.2085	6.9362	4.9703
b · 10 <sup>2</sup>	-2.2643	-1.1312	-1.8102	1.4592	1.9960	0.0275	1.5192
c · 10 <sup>4</sup>	0.7725	1.0713	1.8039	1.3257	1.5949	-0.0163	-0.0696
d · 10 <sup>6</sup>	-0.05350	-0.09004	-0.16070	-0.12557	-0.15290	0.00317	-0.00151

From the data of Table 1 and from the percentage by volume r<sub>i</sub> of the natural gases from three deposits (Table 2), equations for the molecular heat capacities of these gases were obtained according to formula (2)

$$\mu_{p_0}^c = \sum \mu_{poi}^c \cdot r_i$$

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S/152/61/000/004/005/009  
B126/B219

The thermodynamic properties...

Table 2  
Percentage by volume of natural gases from three deposits, %

no. of deposit	CH <sub>4</sub>	C <sub>2</sub> H <sub>6</sub>	C <sub>3</sub> H <sub>8</sub>	C <sub>4</sub> H <sub>10</sub>	C <sub>5</sub> H <sub>12</sub>	N <sub>2</sub>	CO <sub>2</sub>
1	92.9	6.0	0.5	-	0.5	0.09	0.01
2	98.6	0.4	0.14	0.06	-	0.7	0.1
3	97.6	0.3	0.2	0.1	0.1	1.5	0.2

The values of the enthalpy,  $i_o$ , and the temperature portion of the entropy,  $s_o^T$ , for the mentioned substances were calculated by the equations for their molecular heat capacities  $\mu c_{p_o}$  and by the known relations:

at 
$$i_o = \int c_{p_o} dT + \text{const} \quad (3)$$

$$s_o^T = \int \frac{c_{p_o}}{T} dT + \text{const} \quad (4).$$

The constants of integration were calculated from the conditions that  $i_o = 0$  and  $s_o^T = 0$  at  $t = -100^\circ\text{C}$ . The thermodynamic properties of the  
Card 3/4

The thermodynamic properties...

S/152/61/000/004/005/009  
B126/B219

natural gases of other deposits can also be calculated from the data in Table 1. There are 3 tables and 17 references; 4 Soviet-bloc and 13 non-Soviet-bloc. The two references to English language publications read as follows: Hilsenrath J., Tables of Thermal Properties of Gases, NBS, Circ. 564, 1955; Kobe K. A., Long E. G., Petroleum Refiner, 28, 113, 1949. ✓

ASSOCIATION: Odesskiy institut inzhenerov morskogo flota (Odessa  
Institute of Engineers of Naval Forces)

SUBMITTED: December 15, 1960

Card 4/4

VASSERMAN, A.A.; MASYUK, S.P.

Investigating the shape of pyramidal impressions on cast iron  
under various loads. Zav.lab. 27 no.8:1028-1029 '61. (MIRA 14:7)

1. Odesskiy institut inzhenerov morskogo flota.  
(Cast iron--Testing)

VASSERMAN, A. A.

Effect of the elastic recovery of impressions in heating on  
the results of testing cast iron for wear. Zav. lab. 28 no.12:  
1490-1491 '62. (MIRA 16:1)

1. Odesskiy institut inzhenerov morskogo flota.

(Cast iron--Testing)

VASSERMAN, A.A.; ZAGORUCHENKO, V.A.; KAZAVCHINSKIY, Ya.Z.

Equation of state for methane - ethane mixtures. Zhur. fiz.  
khim. 36 no.11:2527-2529 N'62. (MIRA 17:5)

1. Odesskiy institut inzhenerov morskogo flota.

VABSERMAN, A.A.; KRUGLOBOLEKO, V.A.

Determining the thermodynamic properties of compressed natural  
gases with a predominating content of methane and ethane. Inv.  
vys. ucheb. zav.; neft' i gaz 6 no.1:81-85 '63. (11A 17:19)

1. Odesskiy Institut inzhenerov morskogo flota.

STAROSEL'SKIY, A.A. , dotsent; SEMENOV, V.S., kand.tekhn.nauk; VASSERMAN,  
A.A., inzh.

Interrelationship between elements of cast-iron friction pairs.  
Izv.vys.ucheb.zav.; mashinostr. no.8:128-132 '63. (MIRA 16:11)

1. Odesskiy institut inzhenerov morskogo flota.

VASSERMAN, A.A., inzh.

Thermodynamic properties of air at temperatures up to 1000° C  
and pressures up to 1000 bar. Teploenergetika 10 no.11:81-85  
N '63. (MIRA 17:1)

1. Odesskiy institut inzhenerov morskogo flota.



ACCESSION NR: AP4038662

S/0170/64/000/004/0044/0050

AUTHOR: Vasserman, A. A.; Rabinovich, V. A.

TITLE: On the problem of calculating the viscosity of real gases

SOURCE: Inzhenerno-fizicheskiy zhurnal, no. 4, 1964, 44-50

TOPIC TAGS: Real gas viscosity, dynamic gas viscosity, gas viscosity calculation, air viscosity calculation, excess real gas viscosity

ABSTRACT: The article shows the desirability of using the equation of state of a real gas represented by elementary functions for calculating the viscosity over a wide range of parameter variations by means of an equation derived by I. G. Golubev. An equation was formulated for the viscosity of air, and calculations were made for temperatures in the range of 0 to 1000°C and pressures of  $(1-1000) 10^5 \text{ n/m}^2$ . Calculated and experimental data on the viscosity of air in the range of 0 to 150°C and values of the coefficient of dynamic viscosity of air for the 0-1000°C range are tabulated. Orig. art. has 2 figures, 5 formulas, and 2 tables.

Card 1/2

ACCESSION NR: AP4038662

ASSOCIATION: Institut inzhenerov morskogo flota, Odessa (Institute of Naval Engineers)

SUBMITTED: 12Aug63

DATE ACQ: 19May64

ENCL: 00

SUB CODE: ME .

NO REF SOV: 006

OTHER: 003

Card 2/2

VASSERMAN, L.A.

Thermal properties of nitrogen and oxygen in the saturated  
states. Inzh. fiz. zhur. 7 no.6:86-91 '64. (MIRA 17 18)

1. Institut inzhenerov morskogo flota, Odessa.

L 23052-65 EWT(1)/EWT(m)/EPF(c)/EPR Pr-4/PB-4 RPL WW/JW/JD

ACCESSION NR: AP4047979

S/0076/64/038/010/2386/2391

AUTHOR: Vasserman, A. A. (Odessa)

TITLE: Equation of state for nitrogen<sup>11</sup>

SOURCE: Zhurnal fizicheskoy khimii, v. 38, no. 10, 1964, 2386-2391

TOPIC TAGS: nitrogen, equation of state

ABSTRACT: An equation of state<sup>21</sup> for nitrogen was derived in which the compressibility at reduced densities from  $\omega = 0$  to 2.8 from the saturation curve to 100°C was described with a high degree of precision:

$$\sigma = \alpha_0 + \alpha_1 \tau + \beta \psi + \gamma \varphi, \tag{1}$$

where  $\sigma = pV/RT_k$ ,  $\tau = T/T_k$ ,  $\omega = \rho/\rho_k$ ,  $T_k = 126,25^\circ\text{K}$ ,  $\rho_k = 0,2952 \text{ kg/cm}^3$ ,  
 $R = 296,77 \text{ joules/kg degree}$

L 23052-65

ACCESSION NR: AP4047979

$$\alpha_0 = \sum_{n=1}^9 a_n \omega^n, \quad \alpha_1 = 1 + \sum_{n=1}^7 b_n \omega^n, \quad \beta = \sum_{n=1}^7 c_n \omega^n, \quad \gamma = \sum_{n=1}^7 d_n \omega^n,$$

$$\psi = \sum_{n=1}^3 \frac{a_n}{\tau^n}, \quad \varphi = \sum_{n=1}^3 \frac{f_n}{\tau^n}. \quad (2)$$

Coefficients of the elementary functions are given in the enclosed table. The equation satisfies the critical point, critical conditions and Maxwell's rule, and reliably represents Boyle's curve, the ideal gas curve and the inversion curve. The S-shape of the subcritical isotherms of the general equation of state is determined not by the degree of the equation but by the presence of metastable states in the substance. Orig. art. has: 4 figures, 3 tables and 2 equations.

ASSOCIATION: Odessky institut inzhenerov morskogo flota (Odessa Institute of Merchant Marine Engineers)

SUBMITTED: 10Oct63

SUB CODE: IC, GC

ENCL: 01

NO REF SOV: 007

OTHER: 025

Card 2/3

L 23052-65

ACCESSION NR, AP4047979

ENCLOSURE: 01  
0

n	a <sub>n</sub>	b <sub>n</sub>	c <sub>n</sub>	d <sub>n</sub>	e <sub>n</sub>	f <sub>n</sub> (r > 0.85)	g <sub>n</sub> (r < 0.85)
1	0,404542	0,316582	-1,814524	0	3,277580	3,695590	3,261570
2	-3,444243	0,517685	0	3,384076	-5,913405	-7,153137	-5,187333
3	7,844826	-0,860416	2,103310	-9,264376	6,097272	7,681485	4,042341
4	-5,780725	0,714054	9,745215	-4,694076	-3,054597	-4,418098	-2,088340
5	3,398125	-0,343053	-11,342514	8,952847	0,593120	0,091130	0,372068
6	-1,503158	0,070004	4,353589	-3,775098			
7	0,584358	-0,005217	-0,577354	0,535398			
8	-0,139577						
9	0,013766						

Card 3/3

L 24169-65 EWT(1)/EWT(m)/EPP(c)/EPR/EWP(t)/EWP(b) Pr-4/Ps-4 IJP(c)

ACCESSION NR: AP5002579

JD

S/0076/64/038/012/2942/2946

AUTHOR: Vasserman, A. A. (Odessa)

TITLE: The thermodynamic stability of nitrogen in the supercritical region

26  
25  
E

SOURCE: Zhurnal fizicheskoy khimii, v. 38, no. 12, 1964, 2942-2946

TOPIC TAGS: nitrogen, nitrogen stability, vapor pressure, quasispinodal, supercritical region, isothermal compression

ABSTRACT: The thermodynamic stability of nitrogen in the supercritical region was calculated with respect to mechanical and thermal effects by Vasserman's equation of state (Zh. fiz. khimii v. 38, 2386, 1964). The stability coefficient with respect to mechanical effects and its derivative were calculated and the quasispinodal was shown to intersect the binodal at the reduced temperatures 0.91 and 0.933, defining the section of the stable region where mechanical stability decreases upon isothermal compression. The quasispinodal has a loop shape in the  $P-T$  diagram, as shown in Fig. 1 of the English text. The maxima and minima of the stability coefficient are shown in Fig. 2 of the English text. The critical point of nitrogen is shown in Fig. 3 of the English text. The critical point of nitrogen is shown in Fig. 3 of the English text.

Card 1/3

L 24169-65

ACCESSION NR: AP5002579

ASSOCIATION: Odesskiy institut inzhenerov morskogo flota (Odessa marine engineers institute)

SUBMITTED: 10Oct63

ENCL: 01

SUB CODE: GC

NO REF SOV: 022

OTHER: 004

Card 2/3



L 24169-65

ACCESSION NR: AP5002579

ENCLOSURE: 01

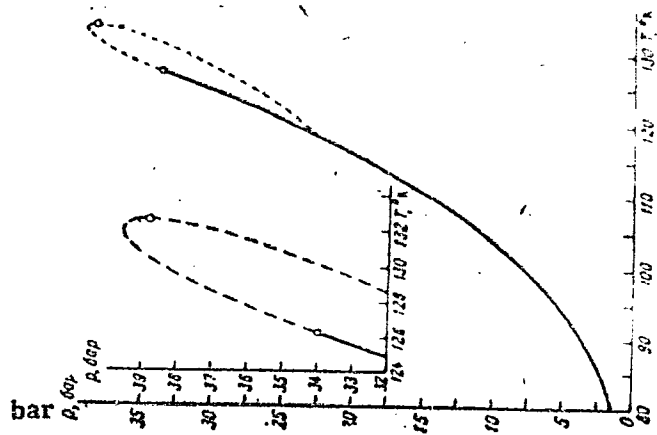


Fig. 1. Quasispinodal of nitrogen (dotted line) and the vapor pressure curve (solid line)

Card 3/3

I. 32008-66 EWT(l)/EWT(m)/T/EWP(t)/ETI IJP(c) JD  
ACC NR: AP6014232 SOURCE CODE: UR/0115/66/000/003/0977/0080

AUTHOR: Vasserman, A. A.; Rabinovich, V. A.

ORG: none

TITLE: Thermodynamic properties of nitrogen up to 1300°K and 1000 bar

SOURCE: Izmeritel'naya tekhnika, no. 3, 1968, 77-80

TOPIC TAGS: thermodynamic property, enthalpy, entropy, nitrogen

ABSTRACT: Tables of the most important thermodynamic properties of nitrogen are discussed. On the basis of extensive references, tables of specific volume, enthalpy, entropy and heat capacity covering temperature range from 250°K to 1300°K and pressure range from 1.0 to 1000 bars, have been compiled. In addition, some computed values are also given and their relationship to experimental data is discussed. Some of the methods used in obtaining the values in the tables are discussed and error estimates are made. On the basis of agreement between computed values and values measured by many workers, the tables are recommended by the authors as sufficiently accurate for engineering work in the relevant temperature and pressure ranges. Orig. art. has: 6 tables.

SUB CODE: 20/1 ORIG REF: 006/

OTH REF: 018

SUBM DATE: none

UDC: 546.17(083.3)

Card 1/1

ACC NR: M6036725

Monograph

UR/

Vasserman, Aleksandr Anntol'yevich; Kazovchinskiy, Ynkov Zakharovich; Rabinovich, Viktor Abramovich

Thermophysical properties of air and its components (Teplofizicheskiye svoystva vozdukh<sup>a</sup> i yego komponentov) Moscow. Izd-vo "Nauka". 1966. 374 p. biblio. , diagr. , (4 in pocket), tables. (At head of title: Akademiya nauk SSSR) Errata slip inserted. 3400 copies printed.

TOPIC TAGS: air, thermal property, thermodynamic analysis, thermodynamic function, power plant, gas property, gas dynamics, gas viscosity

PURPOSE AND COVERAGE: This book is intended for scientists, designers, engineers, technicians, and students engaged in research, design, and study of thermal power installations and the separation of gases from a gas mixture. This book presents a method for setting up an equation with which to define the state of an actual gas by means of elementary functions derived from experimental thermal data. The resultant equations are sufficiently accurate to be used for determining thermal and caloric values. Such values were determined for air, nitrogen, oxygen, and argon, and their thermodynamic characteristics data have been arranged in tabular form. Diagrams indicating the state of each substance are also given. Experimental data on the viscosity and heat conductivity of air and its components are analyzed and inferences are drawn. The authors express gratitude to A. Ye. Sheyndlin, V. I. Yepifanova and V. I. Nikolayev for

Card 1/2

UDC: 546.217

ACC NR: AM6036725

their advice. There are 65 references, 20 of which are Soviet.

TABLE OF CONTENTS [Abridged]

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Key to the symbols used in tables I--XXI -- 5

- Ch. 1. Analytical description of experimental data on thermal properties of actual gases -- 6
- Ch. 2. Thermodynamic properties of nitrogen -- 39
- Ch. 3. Thermodynamic properties of oxygen -- 106
- Ch. 4. Thermodynamic properties of argon -- 159
- Ch. 5. Thermodynamic properties of air -- 208
- Ch. 6. Tenacity of air and its components -- 274
- Ch. 7. Thermal conductivity of air and its components -- 322

SUB CODE: 20/      SUBM DATE: 30May66/      ORIG REF: 158/      OTH REF: 264

Card 2/2

ACC NR: AT7000961

SOURCE CODE: UR/0000/66/000/000/0090/0097

AUTHOR: Vasserman, A. A.; Rabinovich, V. A.

ORG: Odessa Institute of Naval Engineers (Odesskiy Institut Inzhenerov Morskogo Flota)

TITLE: Thermal conductivity of air in the 0-1000°C interval and pressures below 400 bar

SOURCE: AN UkrSSR. Teplofizicheskiye svoystva veshchestv (Thermophysical properties of materials). Kiev, Izd-vo Naukova dumka, 1966, 90-97

TOPIC TAGS: heat transfer rate, heat conductivity, pressure effect, air

ABSTRACT: On the basis of the previously published data the article shows the calculations of the thermal conductivity of air up to 1000°C and 400 bar pressure. An equation which best describes the thermal conductivity of air as a function of pressure and temperature is as follows:

$$\lambda_{p,T} = \lambda_T + 263,8 \cdot 10^{-6} \exp\left(-\frac{1,55}{p^{0,5}}\right) \text{ [kj/m}\cdot\text{sec}\cdot\text{deg]}$$

where  $\lambda_{p,T}$  is the thermal conductivity as a function of temperature and pressure,  $\lambda_T$ 

Card 1/2

ACC NR: AT7000961

is the thermal conductivity of air at pressure equal to one dyne/cm<sup>2</sup> and  $\rho$  is the density of air. In general the values of  $\lambda_{p,T}$  calculated by means of this equation agree with the experimental values within  $\pm 2\%$  and only along the 200°C isotherm and  $p = 300$  bar does the maximum discrepancy reach  $-3.7\%$ . On the basis of the relationship from the kinetic theory of gases which relates the thermal conductivity to viscosity and heat capacity at constant volume, the validity of thermal conductivity at higher pressures was verified. Due to the absence of experimental data, the calculations of thermal conductivity in air at elevated pressures in a negative temperature interval were not made in this work. Orig. art. has: 4 tables, 2 figures.

SUB CODE: 20/

SUBM DATE: 20Jul65/

ORIG REF: 007/

OTH REF: 005

Card 2/2

VASSERMAN, A.L., inzhener.

Apparatus for switching-in high pressure mercury discharge lamps  
with corrected chromaticity (RVDL). Svetotekhnika 3 no.3:16-19  
Mr '57. (MIRA 10:3)

1. Moskovskiy elektrolampovyy zavod.  
(Electric lighting, Mercury vapor)

VASSERMAN, A L



VASSERMAN, A.L., inzh.

Small ignition devices for superhigh-pressure spherical mercury  
lamps. Svetotekhnika no.1:26-27 Ja '59. (MIRA 12:1)

1. Moskovskiy elektrolampovyy zavod.  
(Electric lighting, Mercury vapor)

IVANOV, V.P.; VASSERMAN, A.L.; BUKAROVA, A.A.; ZHIL'TSOV, V.P.

Power supply for pulse lamps operating under conditions of high  
repetition rates of flash. Usp.nauch.fot. 6:62-63 '59. (MIRA 13:6)

(Photography, Flash light)  
(Electric discharge lighting)

S/196/62/000/020/008/021  
E194/E155

AUTHORS: Marshak, I.S., Vasil'yeva, V.I., and Vasserman, A.L.

TITLE: 'Sirius': the most powerful tubular xenon lamp in the world

PERIODICAL: Referativnyy zhurnal, Elektrotehnika i energetika, no.20, 1962, 6, abstract 20 V 31. (Svetotekhnika, no.3, 1962, 7-13).

TEXT: The construction and characteristics of a 100 kW xenon lamp developed in the Moskovskiy elektr.-lampovyy zavod (Moscow Electric Lamp Works) are fully described. When operating with water-cooling, the luminous output of the lamp corresponds to a power per unit length of 1100 W/cm. reaching 50 lumens per watt. The lamp operates without ballast and uses a starting device similar to that previously developed for xenon lamps types ДКСТ-20000 (DKST-20000). The lamps were tested in a special experimental rig set up in the engineering pavilion of the Exhibition of Achievements of the National Economy. This equipment consisted of three lamps of output up to 100 kW connected in the  
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'Sirius': the most powerful ...

S/196/62/000/020/008/021  
E194/E155

phases of a three-phase a.c. 380/220 V supply. The lamps were physically positioned in a star-pattern with mirror reflectors joined together in a unit mobile construction installed in the dome of the pavilion. The lighting is remote-controlled from a panel in a room of the pavilion. Cooling water for the lamps was pumped to the lighting fitting; to avoid overheating a water-pressure relay disconnected the lamps if the water pressure fell below 0.4 atm. The experimental equipment confirmed the possibility of using high-power ballastless xenon lamps with water cooling for illumination.

6 illustrations. 6 references.

[Abstractor's note: Complete translation.]

Card 2/2

VASSERMAN, A.L., inzh.; ROSHCHEVA, N.A., inzh.

A differential current transformer for measurements in fluorescent lamp high-speed ignition networks. Svetotekhnika 8 no.10:25-27  
0 '62. (MIRA 15:9)

1. Moskovskiy elektrolampovyy zavod.  
(Fluorescent lighting) (Electric transformers)  
(Electric measurements)

VASSERMAN, A.L., inzh.

Starting device for large tubular DKST 20,000 xenon-filled  
lamps. Svetotekhnika 9 no.1:7-12 Ja '63. (MIRA 16:1)

1. Moskovskiy elektrolampovyy zavod.  
(Fluorescent lamps)

VASSERMAN, A.L.; SKVORTSOV, B.V.

Elements of flashtube feed systems. Usp.nauch.fot. 9:126-130  
'64. (MIRA 18:11)

L 15281-66 EWT(1)/EWT(m)/T/EWP(t)/EWP(b) IJP(c) JD

ACC NR: AT6001401

SOURCE CODE: UR/3180/64/009/000/0159/0166

AUTHOR: Marshak, I.S.; Vasil'yev, V.I.; Vasserman, A.L.; Tokhadze, I.L.

ORG: none

TITLE: Superpower ballastless tubular xenon lamps as a new kind of efficient sources for high-speed cinematography

SOURCE: AN SSSR. Komissiya po nauchnoy fotografii i kinematografii. Uspekhi nauchnoy fotografii, v.9, 1964. Vysokoskorostnaya fotografiya i kinematografiya (High-speed photography and cinematography), 159-166

TOPIC TAGS: light source, high speed photography, xenon lamp

ABSTRACT: Following a brief outline of the historical development of xenon high-density discharge tubes the authors present a survey of theoretical and experimental data on superpower ballastless xenon lamps which may be used for high-speed cinematography. Scientific literature and experiments carried out by the authors are used to discuss: 1) the dependence of the specific resistance of tubular lamps on the electric gradient for various lamp parameters and cooling conditions; 2) light emission intensity as a function of power per unit length of the discharge; 3) the voltage drop across lamps of different lengths for the same current; 4) characteristics of continuously operating xenon tubular lamps of different power; 5) the circuitry for igniting ballastless xenon a-c lamps; 6) a circuit diagram of devices for the switching of xenon tubes into brief high-overload operating condition; 7) the maximum power liberated

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49  
44  
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ACC NR: AT6001401

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within the tube as a function of the length of operation under overload conditions; and 8) the spectral distribution of the radiation from tubular xenon lamps. The authors thank N. V. Rogatin, V. A. Suvorov, T. M. Gorya, I. P. Orekhov, V. B. Milenin and other comrades for their extensive participation in this work. Orig. art. has: 10 formulas, 7 figures, and 1 table.

SUB CODE: 14 / SUBM DATE: none / ORIG REF: 011 / OTH REF: 004

Card

2/2

7/1/85

5(2)

AUTHORS: Abrikosov, N. Kh., Vasserman, A. M., SOV/20-123-2-19/50  
Poretskaya, L. V.

TITLE: Investigation of the SnTe - GeTe System (Issledovaniye  
sistemy SnTe - GeTe)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 2, pp 279 -  
281 (USSR)

ABSTRACT: In pseudo-binary systems formed by semiconductor compounds with a structure of the type NaCl, i.e. PbSe-PbTe and SnTe-PbTe, continuous solid solutions (Refs 1, 2) are formed. In the present paper a ternary system Sn-Ge-Te in the range between SnTe and GeTe was investigated. In both compounds the metal properties are stressed. The phase diagram of the system Sn-Te is known (Refs 3 - 6). The only chemical compound SnTe in the system melts with an outspoken maximum at 790°. No range of solid solutions on a SnTe basis was found. Also in the system Ge-Te (Ref 10) there is only one compound Ge-Te which melts after a peritectic reaction at 725°. The limit of the range of solid solutions on the Ge-Te basis on the tellurium side is said to be located (according to Ref 11) at the concentration of 50 atom% Te.

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Investigation of the SnTe - GeTe System

SOV/20-123-2-19/50

The phase diagram of the system Sn-Ge is of the eutectic type with a eutectic that is very close to that of pure tin. The melting temperature of the eutectic is  $232^{\circ}$  (Ref 12). The authors melted the metals mentioned in the title in evacuated quartz ampules and mixed them by shaking; finally they were cooled in air. The alloys were annealed at  $320^{\circ}$  for 320 hours (for the X-ray analysis at  $500^{\circ}$ ). The results of the thermal analysis are given in figure 1. The liquidus- and solidus curves pass through a minimum at a concentration of about 80% GeTe and at  $700^{\circ}$ . All curves of the thermograms had a shape typical of the crystallization of solid solutions. The investigation of the microstructure of the alloys showed the formation of a continuous series of solid solutions. The X-ray analysis proved the results of either of the mentioned methods: the radiograms of annealed alloys showed a gradual transition of a face-centered cubic lattice of the compound SnTe to a face-centered rhombohedral lattice of GeTe. Table 1 gives the values of the constants of the crystal lattice of the alloys investigated. The above-mentioned investigation proved that in the system Sn-Ge-Te in the range between the two non-isostructural compounds

Card 2/3

Investigation of the SnTe - GeTe System

SOV/20-123-2-19/50

SnTe and GeTe a continuous series of solid solutions with a minimum in the melting-point diagram is formed. There are 4 figures, 1 table, and 12 references, 3 of which are Soviet.

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR  
(Institute of Metallurgy imeni A. A. Baykov of the Academy of Sciences, USSR)

PRESENTED: June 28, 1958, by I. P. Bardin, Academician

SUBMITTED: June 24, 1958

Card 3/3

GUL', V.Ye., KOVRIQA, V.V., VASSERMAN, A.M.

Effect of supermolecular structures on the strength of polypropylene.

Report to be presented at the 13th Conference on high-molecular compounds  
Moscow, 8-11 Oct 62

GUL', V.Ye.; KOVRIGA, V.V.; VASSERMAN, A.M.

Effect of supermolecular structure on the strength of polypropylene.  
Dokl. AN SSSR 146 no.3:656-658 S '62. (MIRA 15:10)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M.V.Lomonosova  
i Moskovskiy tekhnologicheskoy institut myasnoy i molochnoy  
promyshlennosti. Predstavleno akademikom. R.A.Karginym.  
(Propene)

VASSERMAN, A.M.; TUROVTSEVA, Z.M. [deceased]

Determination of oxygen in metals and inorganic compounds by the method of reducing fusion in an inert gas medium (survey). Zhur. anal. khim. 19 no.11:1377-1384 '64.

(MIRA 18:2)

1. Vernadskiy Institute of Geochemistry and Analytical Chemistry,  
U.S.S.R. Academy of Sciences, Moscow.

WASSERMAN, I.I.; (deceased)

Improved heating method for rapid determination of oxygen in refractory materials and metals. Report No.1. Description of the method. Some examples of its application. Zhur. anal. khim. 20 no.12:1359-1365 '65. (MIRA 18 12)

I. Institut goskhimii i analiticheskoy khimii imeni V.I. Vernadskogo ul. 28/1, Moskva.



VASSERMAN, A.M.; BUCHACHENKO, A.I.; ROZANTSEV, Ye.G.; NEYMAN, M.B.

Dipole moments of molecules and radicals, Di-tert-butyl nitroxide.  
Zhur. struk. khim. 6 no.3:467-468 My-Js '65.

(MIRA 18:8)

1. Institut khimicheskoy fiziki AN SSSR.

GORBENKO, V.I., inzh.; VASSERMAN, A.Sh., inzh.; KIKISH, O.V., inzh.

Modernization of hyperbolic cooling tower. Elek. sta.  
36 no.12:27-30 D '65. (MIRA 18:12)

GAYEVOY, Ye.V., kand. sel'skokhoz. nauk; VASSERMAN, B.A., inzhener-  
tekhnolog; RADKEVICH, D.P., starshiy inzhener; TRUDOLYUBOVA,  
G.B., mladshiy nauchnyy sotrudnik; BRYUZGINA, G.A., mladshiy  
nauchnyy sotrudnik; GEGUZINA, I.Yu., mladshiy nauchnyy  
sotrudnik; BLYANSKAYA, N.V., tehnik

New method for the conservation treatment of raw leather  
in a mobile apparatus. Trudy VNIIMP no.15:67-78 '63.  
(MIRA 17:5)

URSUL, M.M.; RADUL, M.M., red.; VASSERMAN, B.I., red.; POSAZHENNIKOVA,  
Ye.F., red.; POLONSKIY, S.A., tekhn. red.

[The canning industry of the Moldavian S.S.R.; ways of the  
development and distribution of the canning industry and its  
raw material base] Konservnaia promyshlennost Moldavskoi SSR;  
puti razvitiia i razmeshcheniia konservnoi promyshlennosti i  
ee syr'evoi bazy. Pod red. M.M.Radula. Kishinev, Izd-vo  
"Shtiintsa" Akad. nauk Moldavskoi SSR, 1962. 181 p.

(MIRA 16:5)

1. Chlen-korrespondent Akademii nauk Moldavskoy SSR (for Radul).  
(Moldavia--Canning industry)

KISKIN, Petr Khristoforovich; VASSERMAN, B.I., red.; LEDVICH, M.M.,  
tekhn. red.

[Key for determining grape rootstock]Kliuch dlia opredelenia  
podvoev vinograda. Kishinev, Izd-vo "Shtiintsa" Akad. nauk  
Moldavskoi SSR, 1961. 91 p. (MIRA 16:2)  
(Moldavia--Grapes--Varieties)

BOROTNIKOV, V.B.; VASSERMAN, B.I., red.; MARKOVICH, G.L., tekhn. red.

[Problems of construction economics; based on the materials of the construction industry of the Moldavian S.S.R.] Voprosy ekonomiki stroitel'stva; po materialam stroitel'noi industrii MSSR. Kishinev, Izd-vo "Shtiintsa" Moldavskogo filiala Akad. nauk SSSR, 1961. 185 p.  
(MIRA 14:11)

(Moldavia—Construction industry)

BOGATSKIY, V.I.; VASSEPMAN, B.Ya.; MOISEVSKIY, N.Sh.

Recent data on the gas potential of the southern part of the  
upper Pechora depression. Gaz. prom. 8 no.8:1-4 '63.  
(MIFA 17:11)

VASSERMAN, B.Ya.; SAZONOV, N.V.

Paralleling Subdomanik deposits of the southern Timan and the Volga-Ural region. Dokl. AN SSSR 140 no.2:427-429 S '61. (MIRA 14:9)

1. Predstavleno akademikom D.V.Nalivkinym.  
(Timan Ridge--Geology, Stratigraphic)  
(Volga-Ural region--Geology, Stratigraphic)



ANOSHIN, V.A.; VASSERMAN, B. Ya.; SAZONOV, N.V.

New data on the oil and gas potentials of carbonate sediments  
in the southern part of the Timan-Pechora area. Neftegaz, geol.  
i geofiz. no.4:39-42 '63 (MIRA 17:7)

1. Voyvozhneftegazrazvedka.

VASSERMAN, B.Ya.; MODELEVSKIY, M.Sh.

Relation of the oil potential of the structures in the southern part of the Pechora depression to the time of their formation. Neftegaz. geol. i geofiz. no.9:15-20 '64.

(MIRA 17:11)

1. Trest Voyvozhneftegazrazvedka.

VASSERMAN, B.Ya.; LITVINENKO, N.I.

Geological structure and oil occurrences of the Pashnya oil field.  
Neftegaz. geol. i geofiz. no.11:3-6 '65. (MIRA 18:12)

1. Treat "Voyvozhneftegazrazvedka" i Ukhtinskoye territorial'noye  
geologicheskoye upravleniye.

KREMS, A.Ya.; VASSEMAN, B.Ya.

Certain features of the structure and distribution of oil fields  
in the Pechora depression and main trends of their further search.  
Geol.nefti i gaza 9 no.2:15-20 F '65.

(MIRA 18:4)

1. Ukhtinskoye territorial'noye geologicheskoye upravleniye.