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S/120/62/000/004/010/047
E032/E514

24.6730

AUTHORS: Vladimirskiy, V.V., ~~Kobozev, A.S.,~~ Marfenko, S.V., Pevnev, A.K., Porubay, N.I. and Tarasov, Ye.K.

TITLE: Effect of the deformation of the foundations on the orbit of protons in a synchrotron

PERIODICAL: Pribory i tekhnika eksperimenta, no.4, 1962, 60-69

TEXT: Unavoidable displacements of the ground in the vertical and horizontal directions due to seasonal variations in the temperature, humidity and so on, may give rise to relative displacements in the position of magnet sections, which in turn may produce forced oscillations of the proton beam. In the 7 GeV proton synchrotron of the GKAE the magnet is supported by a continuous solid ring which is in principle similar to that employed at CERN. The reinforced-concrete ring which supports the magnet lies directly on the ground which consists of soft morainic deposits. The relatively small dimensions of the ring (R = 40 m) ensured that it could be made sufficiently rigid and thereby minimise the effect of nonuniform settling of the ground on the orbit. The ring was placed at a depth of 5 m. A theoretical

Card 1/3

analysis is now given of the strength of the ring foundation by developing the displacement of the axis of the accelerator chamber due to deformation of the foundations into a Fourier series. Owing to the rigidity of the magnet sections and the small distance between neighbouring sections, the position of all the sections can be specified with sufficient accuracy by the coordinates of 112 points. The Fourier series, therefore, contain a finite number of terms. For each harmonic of the deformation one can then calculate the amplitude of the corresponding periodic orbits. Numerical calculations showed that the 13th, 43rd and neighbouring harmonics were the most dangerous. The mathematical analysis is facilitated by the fact that a mathematical solution is available for the problem of mechanical vibrations of an elastic ring (Love, Mathematical Theory of Elasticity). In their final form the foundations were in the shape of a continuous reinforced-concrete belt of square cross-section having a length of 250 m, height 5 m and width 5 m with a nett load of about 16 tons per running metre. The belt contains two circular cable tunnels (1.25 x 1.95 m^2). The analytical calculations and the design data were then tested experimentally by observations of the position of 28 markers attached to the foundations. Vertical and radial variations for the period 1959/62 are reported in the form of graphs, from which it is concluded that the maximum departure of the orbit from the axis of the chamber, due to the deformation of the foundations, did not exceed 1.5 mm. The amplitude of the deformations of the foundations was of the same order of magnitude (about 1 mm). There are 2 figures and 2 tables.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki GKAE
(Institute of Theoretical and Experimental Physics GKAE)

SUBMITTED: March 31, 1962

KOBOZEV, G. V., Cand Med Sci -- (diss) "Apparatus for frontal microelectrophoresis with optical registration and its application to the study of adsorption properties of proteins in blood serum." Simferopol', 1960. 20 pp; (Krymskiy State Medical Inst im I. V. Stalin); 200 copies; price not given; (KL, 17-60, 169)

TROITSKIY, G.V.; KOBOZEV, G.V.

Design of precision spectropolarimeters used for protein studies. Biokhimiia 28 no.6:992-998 N-D'63 (MIRA 17:1)

1. Chair of Biological Chemistry, Medical Institute, Simferopol'.

KOBOZEV, G. V.

USSR/Medicine - Pathophysiology FD-2561

Card 1/1 Pub. 17-14/23

Author : Meyerson, F. Z.; Kobozev, G. V.

Title : On a method for forming an experimental stenosis of the aorta

Periodical : Byul. eksp. biol. i med. 5, 50-52, May 1955

Abstract : Describes a method for forming an experimental stenosis of the aorta in rabbits which permits the following: constriction of the aorta following an appreciable interval of time after the operation, gradual constriction of the aorta, and removal of the ligature after a period of constriction of the aorta without requiring a second operation. Diagrams. Three references, two of them USSR (since 1940).

Institution : Central Scientific Research Institute of Physical Methods for Therapy imeni I. M. Sechenov (Director O. V. Glebova), Yalta

Submitted : July 22, 1954 by Academician A. D. Speranskiy

Kobozev, G. V.

[illegible] KOBOZEV, G. V.

Integral graded salivograph. Zh. vys. nerv. deiat. 5 no.6:912-915
N-D '55. (MIRA 9:3)

1. Institut fizicheskikh metodov lecheniya imeni. I.M. Sechenova, Yalta.
(SALIVATION,
registration with integral graded salivograph)

MEYERSON, F.Z.; KOBOZEV, O.V.

Method of producing experimental stenosis of the aorta. Biul.eksp. biol.i med. 39 no.5:50-52 My '55. (MLRA 8:7)

1. Iz TSentral'nogo nauchno-issledovatel'skogo insitut fizicheskikh metodov lecheniya imeni I.M.Sechenova (dir. O.V.Glebova), Yalta. Predstavlena akademikom A.D.Speranskim.

(AORTIC, VALVE, stenosis,
exper., technic of prod.)

KOBOZEV, G. V.

KOBOZEV, G.V.

Use of mechanical coulometer in protein electrophoresis [with summary in English]. Ukr.biokhim. zhur. 29 no.3:375-382 '57.
(MIRA 10:9)

1. Kafedra biokhimii Krymskogo meditsinskogo instituta, g. Simferopol'.
(VOLTAMETER) (ELECTROPHORESIS)
(PROTEINS--ANALYSIS)

TROITSKIY, G.V., KOBOZEV, G.V.

Further improvement of the apparatus for protein electrophoresis [with summary in English]. Biokhimiia 23 no.6:869-878 N-D '58
(MIRA 11:12)

1. Kafedra biologicheskoy khimii Krymskogo meditsinskogo instituta Simferopol'.
(ELECTROPHORESIS)

KOBOZEVA, O.N.; KOBOZEV, O.V.

Method of using small quantities of serum for paper electophoresis. Lab.delo 6 no.3:57-58 My-Je '60. (MIRA 13:7)
(PAPER ELECTROPHORESIS) (SERUM)

KOBOZEV, G. V., (USSR)

"A Cuvette for Frontal Electrophoresis, made of Organic Glass with Cooling."

Report presented at the 5th Int'l. Biochemistry Congress, Moscow, 10-16 Aug 1961.

KOBOZEV, I. I., ENGR-HYDROGEOLOGIST

USSR/Geophysics - Hot-Spring Minerals Mar 52

"New Sources of Minerals," I. I. Kobozev, Engr-Hydrogeologist

"Priroda" Vol 41, No 3, pp 119, 120

States that underground waters, by circulating through mineral deposits in the depths of the earth, are often enriched with salts and gases and thus can form mineral sources where they exit at the surface; e.g., at the hot springs of Staraya Russa, Sol'tsy, Kamchatka, northern

230T58

Urals, etc. States that a theoretical study must be made to det the conditions of temp and soly that govern possible sources of minerals. Mentions works on Sakhalin to exploit the mud pots there, and also so-called "sifoids," as sources of CO_2.

230T58

KOBOZEV, I.

New occurrence of carbonic acid saline-alkaline waters like those of springs nos. 17 and 4 in Yessentuki. Vop.kur.fizioter. i lech. fiz. kul't. 21 no.3:95-96 Jl-S '56. (MLRA 9:10)

(NOVOBLAGORODNOYE--MINERAL WATERS)

water--Economic aspects

Card 1/1

PROCESSES AND PROPERTIES INDEX

0P

H

Oxidation of nitric oxide to nitrogen pentoxide by means of ozone in the silent electric discharge. N. I. Kobozev, M. Temkin and S. Frolberg. *J. Gen. Chem.* (U. S. S. R.) 3, 534-41(1933).—With a Berthelot ozonizer connected to a 10,000 v. transformer, a study was made of the reaction $2NO + 3O_3 = N_2O_5 + 3O_2$. A rate of 0.30-0.33 l./min. of air through the ozonizer resulted in an O_3 content of 0.8% by vol. The NO was mixed with N_2 in the ratio 10:90 and the mixt. passed into the ozonized air at a rate of 10 cc./min. In this case the O_3 was in excess of the theoretical amt. required and the reaction was almost instantaneous, 99% of the NO being oxidized. The ratio between O_3 and the HNO_3 obtained varied between 1.231 and 1.91 and was, on the av., 1.48. Hence the rate of decompn. of O_3 in the presence of N_2O_5 was too slow to be effective. By using the same rates of gases, but introducing the NO + N_2 mixt. into the air before it was ozonized, NO_2 was found in the resulting mixt., but not O_3 or N_2O_5. However, when the ratio NO:N_2 was changed from 10:90 to 1:99, and the mixt. was introduced into the air before it passed through the ozonizer (the rates of all gases were the same as above), O_3 and N_2O_5 but not NO_2 were found in the resulting mixt. When the rates of NO + N_2 mixt. and of air were so adjusted that the amt. of O_3 was less than theoretical, and the NO + N_2 mixt. was introduced into the air after it passed through the ozonizer, NO_2 alone or together with N_2O_5, depending on the amt. of O_3 in the air, was found. O_3 had no effect on N_2O.

S. L. Madorsky

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

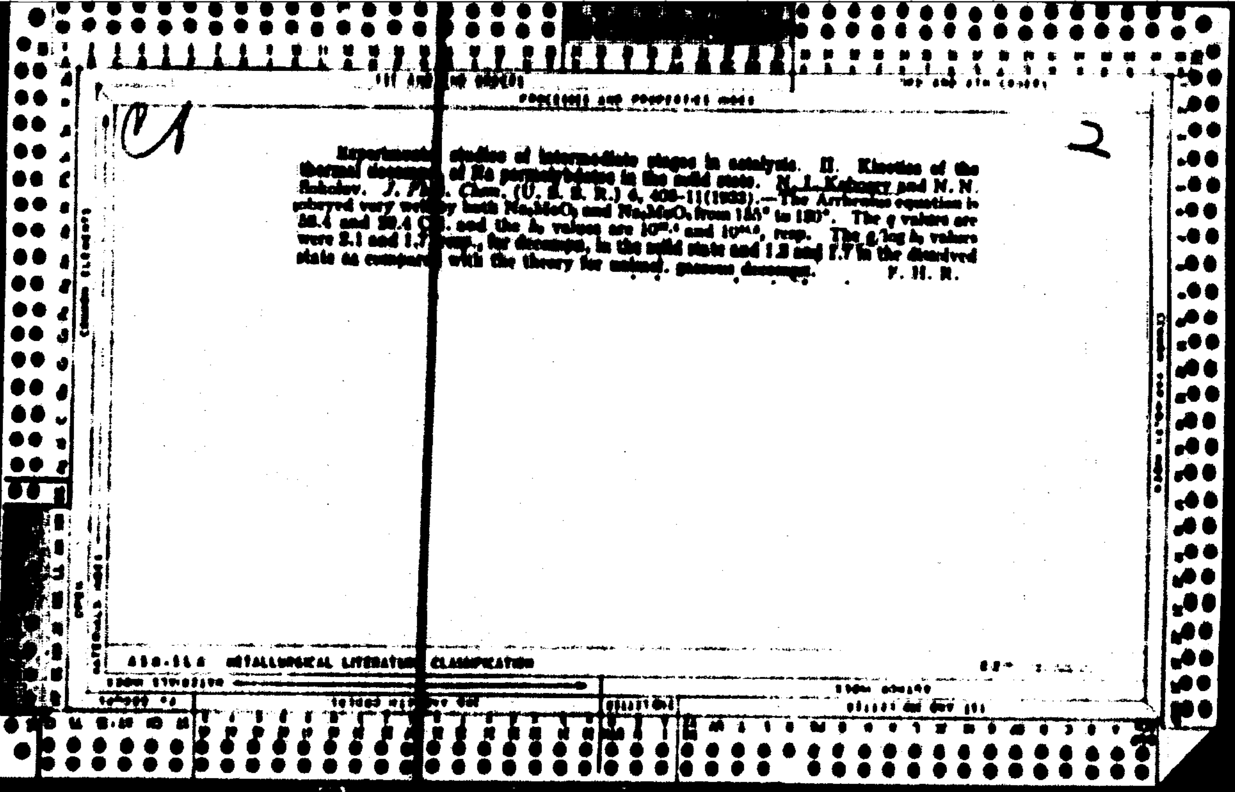
CA

2

Experiment[illegible]al studies of intermediate stages in catalysis. I. Intermediate compounds in t[illegible] catalytic reaction of hydrogen peroxide and sodium molybdate. N. I. Kobozev and [illegible]. N. Sokolov. J. Phys. Chem. (U. S. S. R.) 4, 275-84(1933). Red $Na_2MoO_8 \cdot nH_2O$ ([illegible] = 2.5-3) is prepd. from an aq. soln. of Na_2MoO_4 cooled to 0° by addn. of H_2O_2. Al[illegible] is added, the soln. cooled to −10°, and the red-brown crystals are filtered and wa[illegible]ed with alc.-ether mixt. and dried in cold air. On being heated to 50-60° the crystals d[illegible]comp. into Na_2MoO_4 + $2O_2$. Yellow $Na_2MoO_6 \cdot nH_2O$ is obtained by slow decompn. of [illegible]in layers of the red compd. at room temp. Na_2MoO_4 reacts with H_2O_2 or with MoO_4[illegible] $Cr_2O_7^{--}$ and WO_4^{--} ions and active O atoms, to give Na_2MoO_8. The heat of formation [illegible] 24 Cal. per O atom. The heats of neutralization for H_2MoO_8, H_2MoO_6 and H_2MoO_4 [illegible] 21.7, 15.2 and 6.6 Cal., resp. Thermal decompn. takes place according to the mech[illegible]ism: $Na_2MoO_8 + 4H_2O \rightarrow Na_2MoO_4 + 4H_2O_2$; $2H_2O_2 \rightarrow 2H_2O + O_2$. The catalyt[illegible] decompn. with Pt is unimol. for both Na_2MoO_8 and Na_2MoO_6. An intermediate [illegible]Na_2MoO_7 results from $Na_2MoO_8 \rightarrow Na_2MoO_6 + O_2$; Na_2MoO_8 + $Na_2MoO_6 \rightarrow 2$[illegible]MoO_7. The Arrhenius k_0 values are $10^{[illegible]}$ and $10^{[illegible]}$, resp., and q = 17.4 Cal. f[illegible]both.

F. H. Rathmann

METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

1

2

Experimental studies of intermediate stages in catalysis. II. Kinetics of the thermal decomposition of Na permolybdate in the solid state. N. I. Kobozev and N. N. Sokolov. J. Phys. Chem. (U. S. S. R.) 4, 408-11(1933).—The Arrhenius equation is obeyed very well by both Na_2MoO_8 and Na_2MoO_8 from 1[illegible]° to 1[illegible]°. The q values are 28.4 and 20.4 Cal., and the k_0 values are $10^{[illegible]}$ and $10^{[illegible]}$, resp. The q/log k_0 values were 2.1 and 1.7 [illegible], for decompn. in the solid state and 1.2 and 1.7 in the dissolved state as compared with the theory for unimol. gaseous decompn. F. H. R.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

[redacted]

PROCESSES AND PROPERTIES INDEX

CA

2

Mechanism of the promoter action of iron ammonia catalysts. N. I. Kobozev, D. V. Bredov, I. R. Kavrin and A. N. [illegible]. *Acta Physicochim. U. R. S. S.* 1, [illegible](1934)(in English).—The promoting action of Al_2O_3 and MgO on FeO was studied from the viewpoint of mixed crystals between the promoter and the initial Fe oxide. The formation of mixed crystals is in itself insufficient to cause the promoting action. It was proposed that it was necessary for a promoter to be surface-active with regard to the initial mass of the catalyst. A pronounced difference between the surface tension of Fe_3O_4 and Fe_3O_4 + Al_2O_3 and an absence of such a difference between FeO and FeO + MgO as confirmed by the catalytic activity of Fe reduced from these oxides were sharply shown.

H. H. Rowley

ASO-SLA METALLURGICAL LITERATURE CLASSIFICATION

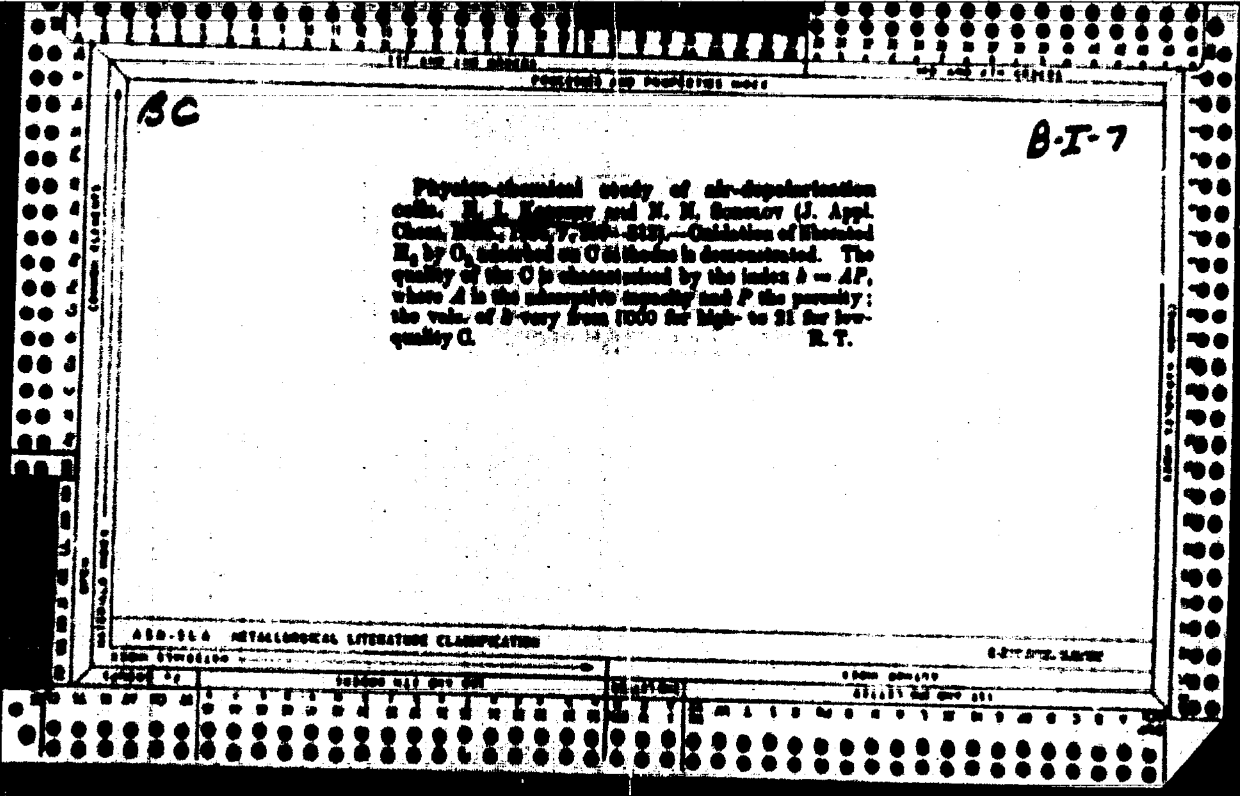
PROCESSES AND PROPERTIES INDEX

Ch

2

The mechanism of the electrodiffusion of hydrogen through palladium. N. I. Kobozev and V. Monblanova. *Acta Physicochim.* (U. R. S. S.) 1, 611-30(1934)(in German); *J. Phys. Chem.* (U. S. S. R.) 6, 308-25(1935).—A comparison was made of the dependence of the electrodiffusion of H_2 through a Pd membrane on the condition of the polarization and diffusion surface of the membrane, by use of H_2, H_2O, C_6H_6, glycerol and butyric acid solns. It was found that the electrodiffusion process was not affected by the variation of phys. properties of the medium in contact with the diffusion side of the membrane. The electrodiffusion was accelerated by poisoning the polarization surface with pyridine, $CS(NH_2)_2$ and Na_3AsO_3 and retarded by poisoning the diffusion surface with the same substances and H_2S. The presence of electrolytes in the soln., particularly KCl and KOH, had a marked effect in retarding on the diffusion side and accelerating on the polarization side. It was shown that the diffusion took place through the intercrystal gaps and that the edges of the crystals formed the diffusion centers. The linear dependence of the diffusion velocity on ΔE, the H potential of the Pd membrane, was shown to hold for both the polarization and diffusion sides. H. H. Rowley

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

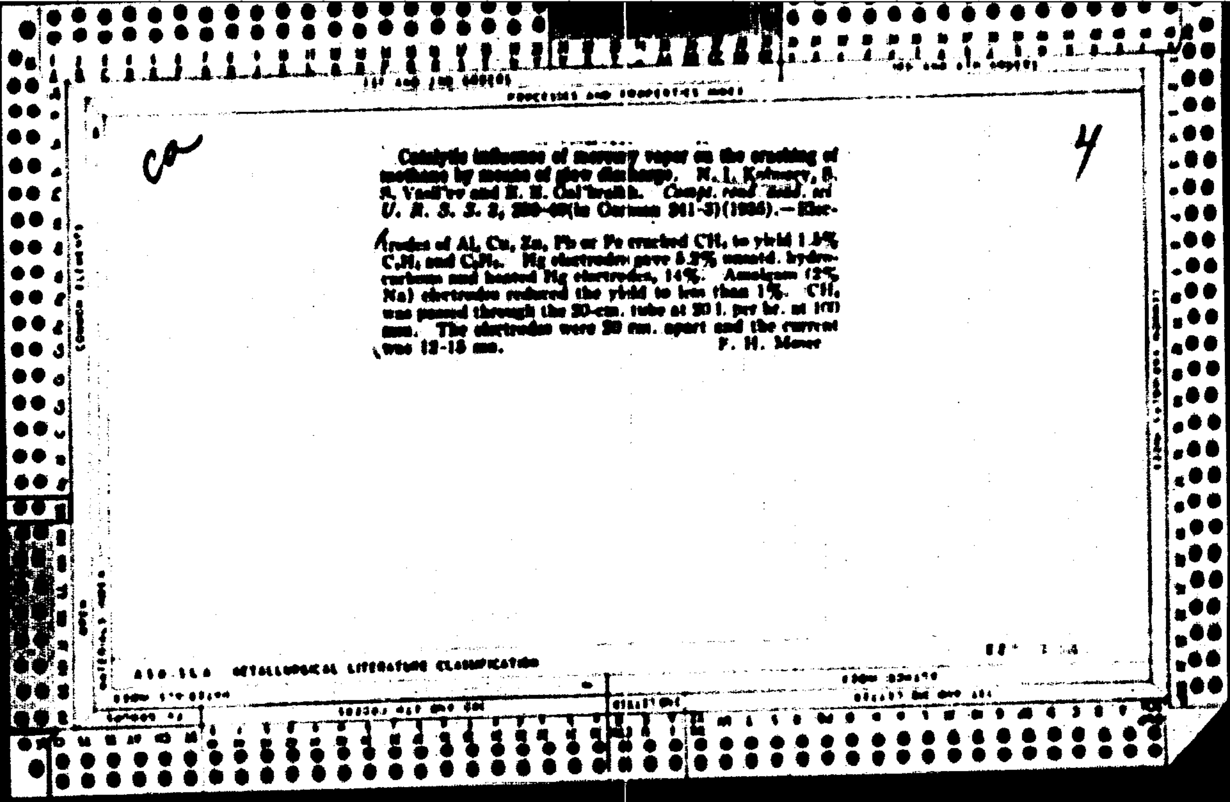


BC

B-I-7

Physico-chemical study of air-depolarization cells. [illegible] and N. N. Semenov (J. Appl. Chem. [illegible]).—Oxidation of liberated H_2 by O_2 adsorbed on C electrodes is demonstrated. The quality of the C is characterized by the index $b = AP$, where A is the adsorptive capacity and P the porosity; the vals. of b vary from 1000 for high- to 21 for low-quality C. R. T.

ASD-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

ca

4

Catalytic influence of mercury vapor on the cracking of methane by means of glow discharge. N. I. Kobozev, S. S. Vasil'ev and E. N. Gal'braikh. *Compt. rend. acad. sci. U. R. S. S.* 2, 238-40(in German 241-3)(1936).—Electrodes of Al, Cu, Zn, Pb or Fe cracked CH_4 to yield 1.5% C_2H_2 and C_2H_6. Hg electrodes gave 5.2% unsatd. hydrocarbons and heated Hg electrodes, 14%. Amalgam (2% Na) electrodes reduced the yield to less than 1%. CH_4 was passed through the 20-cm. tube at 20 l. per hr. at 100 mm. The electrodes were 20 mm. apart and the current was 12-15 ma. F. H. Moser

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

eP

2

3 Inversion of the ammonia equilibrium. M. N. [illegible] and M. I. [illegible]. Acta Physicochim. U. R. S. S. 3, 181-[illegible](in German); J. Phys. Chem. (U. S. S. R.) 7(1936).—On the basis of heat-capacity data of Bryant (C. A. 27, [illegible]), K. and K. obtain for the ammonia reaction $\Delta F^\circ = -10{,}343 + 24.773\,T \log T - 0.0[illegible]\,T^2 + 0.000000[illegible]\,T^3 - 60.18\,T$. Up to 1000° this agrees well with the equation used by Masted (C. A. 13, 1050) but at higher values it gives no "inversion" for the yield of NH_3. The inversion exptly. found by Masted at high temp. is quantitatively attributed to a reaction of the H atoms formed at these high temps. with the N_2 mols. in the cooling zone at about 1500-1000°, giving apparent but false high values for NH_3 formed at high temps.

F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

BC

2-1

[illegible] M. Kemmer [illegible] (Acta Physico[illegible] [illegible] CO_2, CO, and H_2 [illegible] per cu. m. of CH_4 consumed in an [illegible] mixture of CH_4 and O_2 is independent of pressure [illegible] atm. and is uninfluenced by the [illegible] of the wall [illegible] the diameter of the vessel, although the amount of [illegible] oxidised is less in narrow vessels. [illegible] additions of N_2, CO, CO_2, and H_2 is in [illegible] with thermodynamic requirements. The [illegible] temp. calc. from the water-gas equilibrium [illegible] with that calc. from [illegible] heat data, and it is inferred that equilibrium is attained in the [illegible]. If H_2O is present initially CH_2O and HCOOH are formed and equilibrium is not attained. The reaction forms a suitable source of H_2 for the NH_3 synthesis.

R. S.

A10-SLA METALLURGICAL LITERATURE CLASSIFICATION

KOBOZEV N.I.

BC

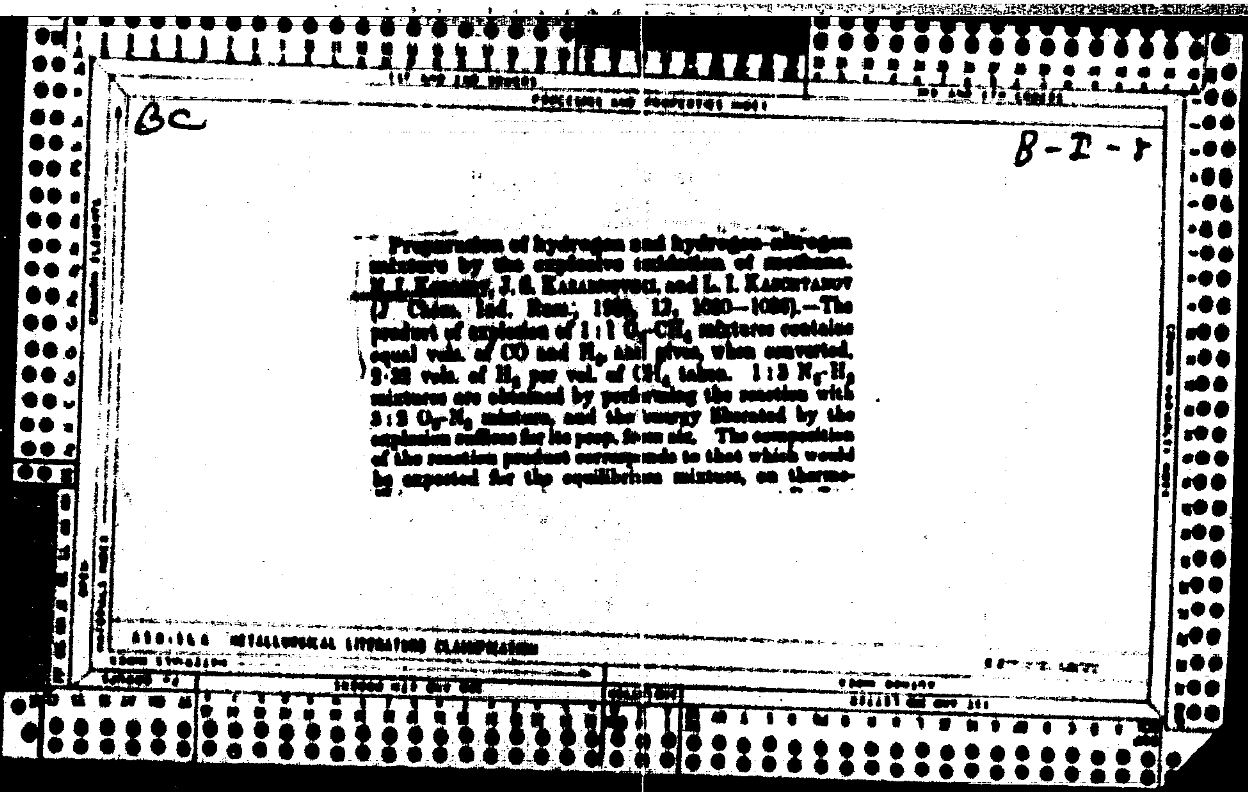
PROCESSES AND PROPERTIES INDEX

B-II-1

[illegible] in the cracking of [illegible] I. [illegible], and [illegible] 1953, 5, 140—146) [illegible] through SiO_2 and [illegible] in two directions: [illegible] + C_2H_4 + H_2; the [illegible] the presence of a [illegible] Ni, [illegible] which [illegible] both SiO_2 and [illegible] the former, and by Ni [illegible] possible, and Ni [illegible]

R. T.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



BC

B-I-r

Preparation of hydrogen and hydrogen-nitrogen mixtures by the explosive oxidation of methane. [illegible], J. S. Karabnovich, and L. I. Karentanov (J. Chem. Ind. Russ., 1935, 12, 1080—1086).—The product of explosion of 1 : 1 O_2-CH_4 mixtures contains equal vols. of CO and H_2, and gives, when converted, 2·33 vols. of H_2 per vol. of CH_4 taken. 1 : 3 N_2-H_2 mixtures are obtained by performing the reaction with 3 : 2 O_2-N_2 mixtures, and the energy liberated by the explosion suffices for its prep. from air. The composition of the reaction product corresponds to that which would be expected for the equilibrium mixture, on thermo-

PROCESSES AND PROPERTIES INDEX

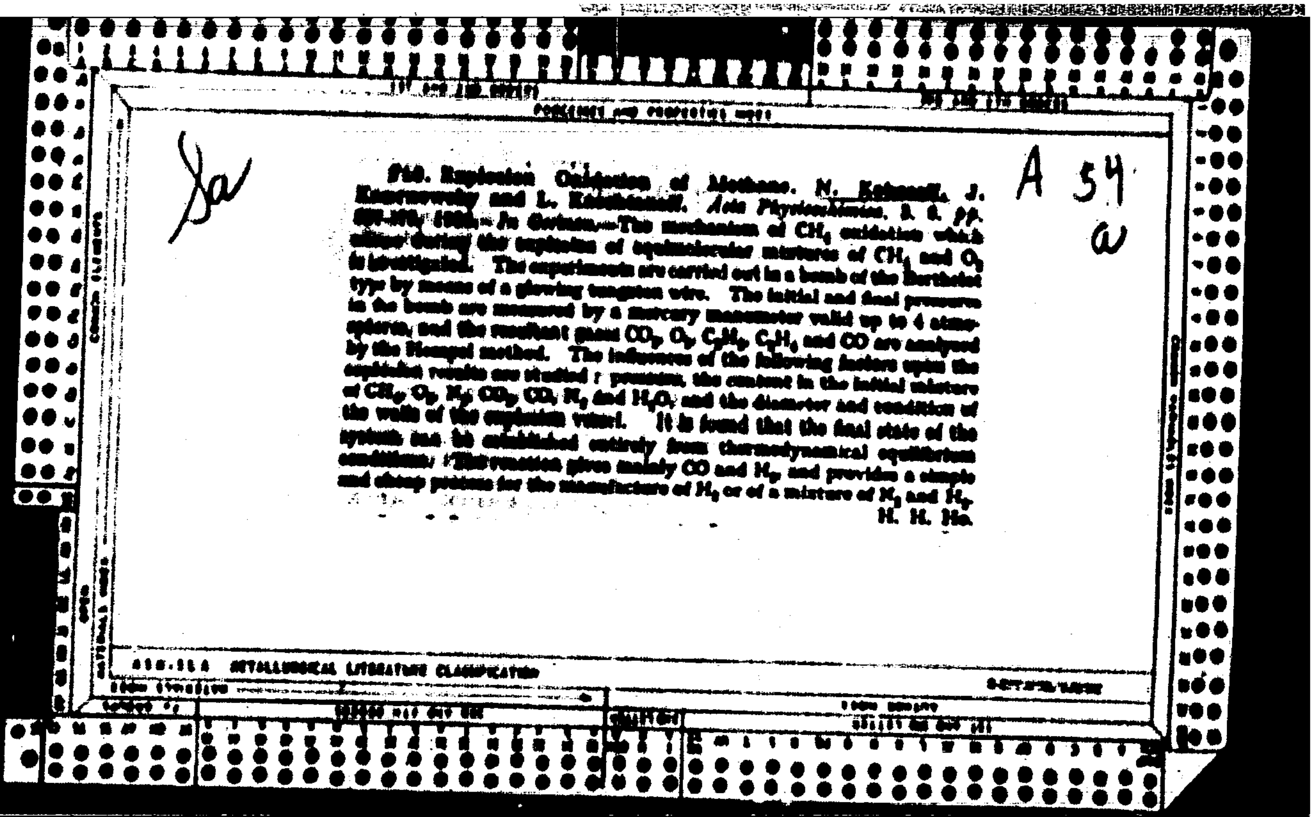
CA

2

The hydrogenation of aluminum nitride by active hydrogen. M. I. Kobozev, B. V. Erofeev and V. M. Sirvina. [illegible] U. R. S. S. [N. S.], 2, [illegible] (1935)(in German).—Al nitride (made by passing NH_3 over powdered Al at 800-900° and contg. 37-38% AlN) was placed in a U-shaped quartz discharge tube and H_2 or H_2 and N_2 (1:1) at 1-4 mm. pressure was passed over it while an elec. discharge of 0.05 amp. was passing through the tube. During the expt. the tube was kept in liquid air to condense the NH_3 formed. In every case NH_3 was formed and at the same time an AlH_3 was formed that was at least partly volatile even in liquid air. Because of this the N content of the impure nitride increased during the expt. in spite of the NH_3 that was formed. It also prevented the formation of a coating of Al over the AlN that would stop the formation of NH_3. The amt. of NH_3 formed varied but in some cases amounted, in an hr., to about 10% of the N_2 in the AlN. The activated H was in the at. form because the hydrogenation was most rapid when the discharge had the color of the spectrum line of H.

John E. Milbery

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



Sa

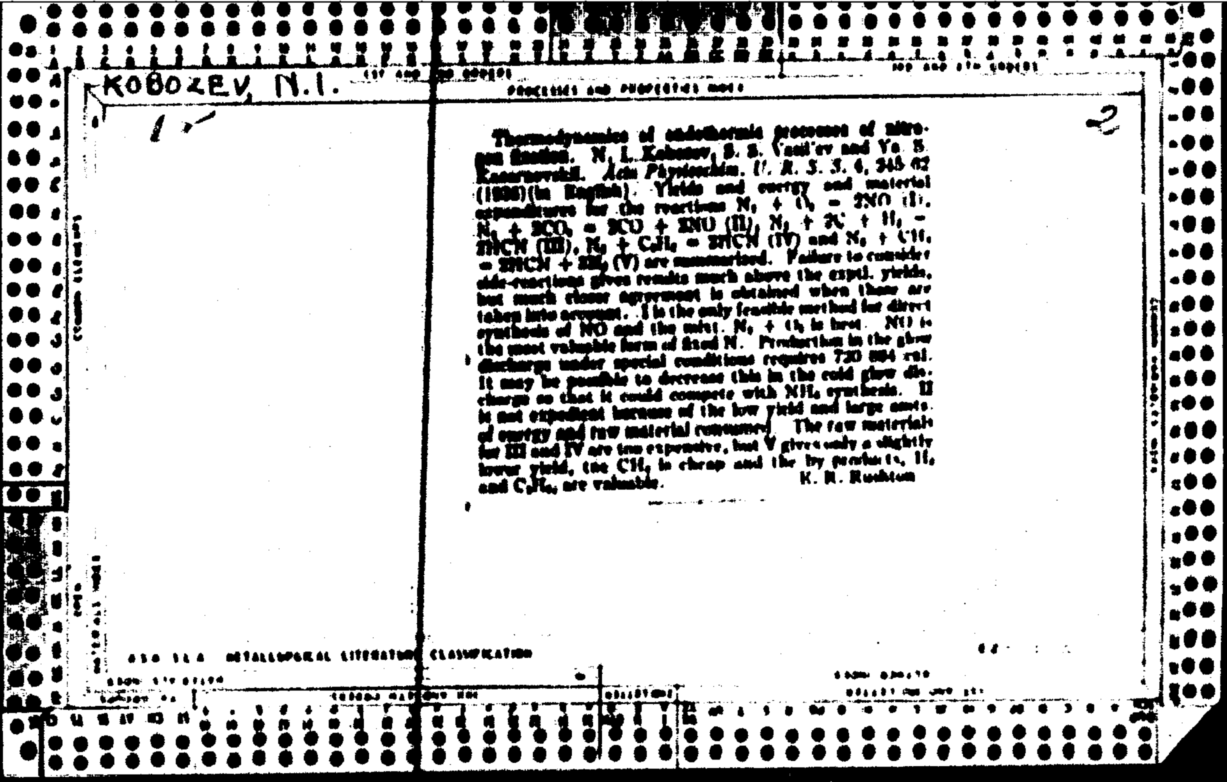
A 54

a

[illegible]. Explosion Oxidation of Methane. N. Kobozeff, J. Kazarnowsky and L. Kobozeff. *Acta Physicochimica*, [illegible], pp. [illegible], [illegible]. In German.—The mechanism of CH_4 oxidation which [illegible] during the explosion of equimolecular mixtures of CH_4 and O_2 is investigated. The experiments are carried out in a bomb of the Berthelot type by means of a glowing tungsten wire. The initial and final pressure in the bomb are measured by a mercury manometer valid up to 4 atmospheres, and the resultant gases CO_2, O_2, C_2H_4, C_2H_6 and CO are analysed by the Hempel method. The influences of the following factors upon the explosion results are studied: pressure, the content in the initial mixture of CH_4, O_2, N_2, CO_2, CO, H_2 and H_2O, and the diameter and condition of the walls of the explosion vessel. It is found that the final state of the system can be established entirely from thermodynamical equilibrium conditions. The reaction gives mainly CO and H_2, and provides a simple and cheap process for the manufacture of H_2 or of a mixture of N_2 and H_2.

H. H. Ho.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



KOBOZEV, N.I.

1

2

PROCESSES AND PROPERTIES INDEX

Thermodynamics of endothermic processes of nitrogen fixation. N. I. Kobozev, S. S. Vasil'ev and Ya. B. Kazarnovskii. *Acta Physicochim. U. R. S. S.* 4, 245-62 (1936)(in English). Yields and energy and material expenditures for the reactions $N_2 + O_2 = 2NO$ (I), $N_2 + 2CO_2 = 2CO + 2NO$ (II), $N_2 + 2C + H_2 = 2HCN$ (III), $N_2 + C_2H_2 = 2HCN$ (IV) and $N_2 + 2CH_4 = 2HCN + 3H_2$ (V) are summarized. Failure to consider side-reactions gives results much above the exptl. yields, but much closer agreement is obtained when these are taken into account. I is the only feasible method for direct synthesis of NO and the mixt. $N_2 + O_2$ is best. NO is the most valuable form of fixed N. Production in the glow discharge under special conditions requires 720 000 cal. It may be possible to decrease this in the cold glow discharge so that it could compete with NH_3 synthesis. II is not expedient because of the low yield and large amts. of energy and raw material consumed. The raw materials for III and IV are too expensive, but V gives only a slightly lower yield, the CH_4 is cheap and the by-products, H_2 and C_2H_2, are valuable. K. R. Rushton

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

BC

A-1

Activating effect of poisons in electrocatalysis. N. I. [illegible] and V. V. MONBLANOVA (Acta Physicochim. U.R.S.S., 1936, [illegible], [illegible]).—The effects of traces of $HgCl_2$, As_2O_3, and H_2S on the electrocatalytic reduction of C_5H_5N to piperidine have been studied. $HgCl_2$ and As_2O_3 had an accelerating action which, however, was temporary in the case of As_2O_3. With H_2S the results were indefinite, but in no case was a retarding effect noticed. C. R. H.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

CA

2

Mechanism of the inhibiting effect of promoters on the reduction of iron ammonia catalysts. N. I. Kobozev. *Acta Physicochim. U.R.S.S.* 4, [illegible]-40(1936)(in German).—A theoretical discussion of the results of Nakamura (C. A. 30, [illegible]) and Dubrovskaya and Kobozev (following abstr.). H. H. Rowley

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

Ca

7

The adsorption properties of promoted iron oxide in relation to the distribution of the promoter in the oxide form of ammonia catalysts. A. [illegible] and N. I. Kobozev. *Acta Physicochim. U. R. S. S.* 6, 841-60 (1937) (in German).—The adsorption isotherms of O_2 on pure Fe_2O_3 and on Fe_2O_3 which contained 10% Al_2O_3 were detd. at −180° and +400°. X-ray photographs of Fe_2O_3 samples heated to various temps. showed that the adsorbing power of Fe_2O_3 decreased as the crystals became larger. The kinetics of O_2 desorption from promoted and unpromoted Fe_2O_3 studied at various temps. showed that the activation energy of desorption is independent of the presence of a promoter and averages 10,300 cal. Thus, even in the case of the promoted Fe_2O_3, the adsorption centers are the Fe_2O_3 mols. It was found that the addn. of 10% Al_2O_3 to Fe_2O_3 lowers the sp. adsorption of O_2. This proves that the dissolved Al_2O_3 is strongly adsorbed on the surface of the Fe_2O_3 crystals. From the data found, the equil. const. between the dissolved and adsorbed Al_2O_3 was calcd. and the following equation derived where a is the degree of shielding of the Fe_2O_3 surface by adsorbed Al_2O_3, c is the percentage by wt. of Al_2O_3 and l is the av. length of one

and Mn 0.46% was subjected to dilatometric, microscopic, magnetic and hardness exams. Specimens quenched from 1200° were entirely austenitic. If reheated to 700-800° pptn. of carbides took place and upon slow cooling below 140° martensite was formed. Specimens which were cooled rapidly from 1200° to 800° or less or were quenched from 1200° and reheated to 600° or less and held at that temp. for 20 hrs. do not form martensite on cooling. Martensite forms only after pptn. of carbides.

H. W. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

8a

A 33

V

1230. Kinetics of Reactions in Electrical Discharges. S. S. Wassiljew, N. I. Kobosew and E. N. Eremin. Acta Physicochimica U.R.S.S., [illegible] In German.—It is shown that the principles of chemical kinetics may be applied to reactions in the discharge. The kinetic schemes of the following reactions are determined and compared with the experimental data: Oxidation of nitrogen in the glow discharge, formation of ozone in the silent discharge, formation of atomic hydrogen, cracking of methane in the glow discharge. It is shown that the conditions of energy distribution during electrical activation are distinguished fundamentally from the conditions of thermal activation. In the above cases the kinetic constants are found to be invariant with respect to the change of velocity of passage of the gas through the discharge; they depend, however, on a whole series of other factors and above all on the work of discharge. It is also shown that when the parameter of specific energy (the ratio of the work of discharge to the velocity of flow of the gas through the discharge) is introduced, it is possible to ascertain the influence of the work of discharge upon the velocity of the electrical activation processes. The paper is replete with mathematical analysis, experimental data, diagrams and bibliography. H. H. Ha.

ASO-SLA METALLURGICAL LITERATURE CLASSIFICATION

KOBOZOV, N. I. /11

Use of the Skin Effect in Investigating Thin Metal Layers. U. [illegible] and N. I. Kobosev (*Acta Physicochimica U.R.S.S.*, 1936, 5, (2), 243-[illegible] (in German); and *Zhurnal Fizicheskoi Khimii* (*J. Phys. Chem.*), 1936, 8, (2), 208-225 (in Russian)).—Electrolytic films of iron on platinum and silver were studied by the method of high-frequency resistance measurement based on the skin effect. The change in high-frequency resistance depends on the change in the magnetic permeability (μ) of the films. The variation of μ with the thickness of the layer, the current density during electrolysis, and time of ageing after deposition are discussed in the light of Becker's theory of film structure (*Z. Physik*, 1930, 62, 253) and W. [illegible] and W. F. [illegible]'s data (*Met. Abs.* (*J. Inst. Metals*), 1932, 50, 500). The method may be used for studying the kinetics of layer crystallization; thus in the formation of iron-platinum alloy on annealing the upper limit of the diffusion rate was found to be 10^{-6} cm./second. Deposition of a zinc film on iron by electrolysis is accompanied by diffusion of zinc into the iron.—N. A.

[illegible] Resistance of Liquid Metals in a Magnetic Field. I. Kikoin and

PROCESSES AND PROPERTIES INDEX

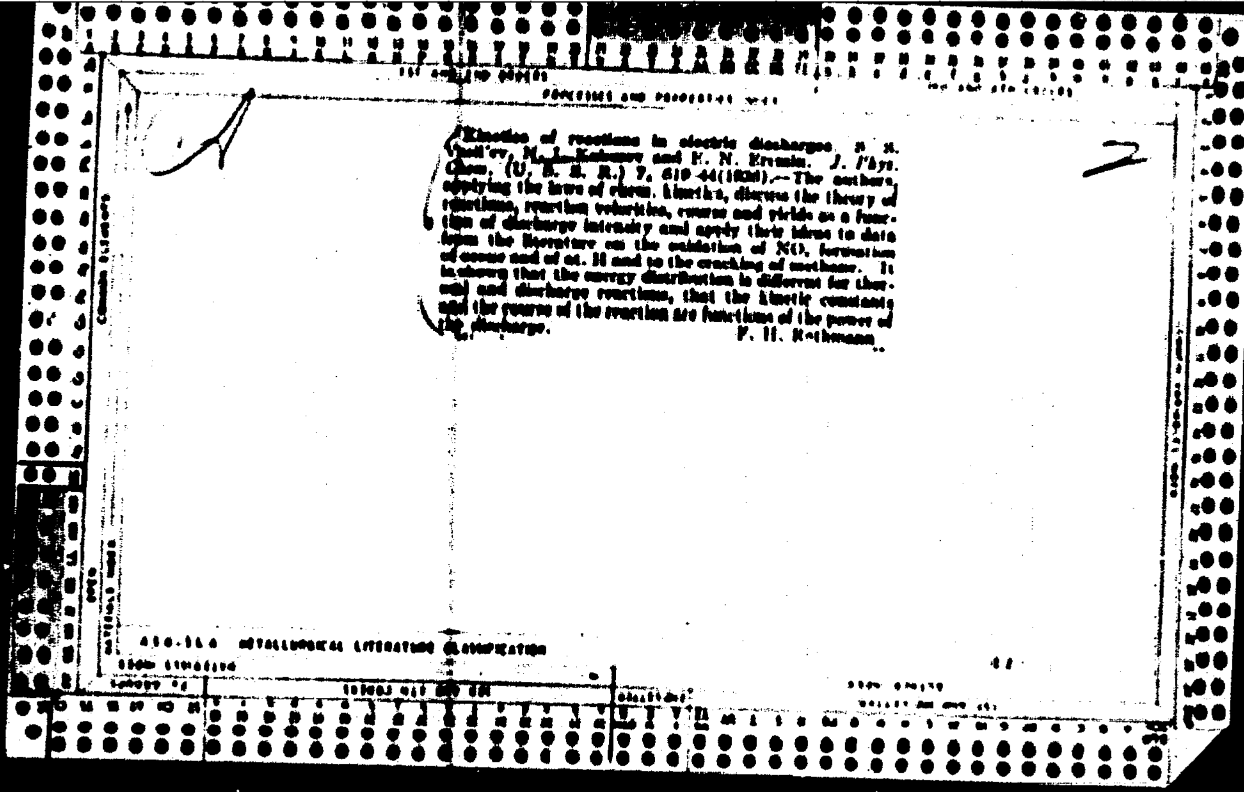
BC

H-1

Dependence of catalytic activity on the amount of promoter. O. Bloch and N. L. Kobozev (Acta Physicochim. U.R.S.S., 1936, 5, 417—[illegible]).—The decomp. at 30° of H_2O_2 catalysed by mixtures of Fe_2O_3 and Al_2O_3 has been studied. With increase of Al_2O_3 up to approx. 2 wt.-% the catalytic activity increases, but further addition of Al_2O_3 reduces the activity. The Al_2O_3 owes its promoting action to the formation of Fe_2O_3,Al_2O_3 at the surface of the catalyst, the activity of the complex being 3-7 times that of Fe_2O_3.

C. R. H.

ASD-SLA METALLURGICAL LITERATURE CLASSIFICATION



[redacted]

PROCESSES AND PROPERTIES INDEX

A

2

Kinetics of reactions in electric discharges. S. S. Vasil'ev, N. I. Kobozev and E. N. Eremin. J. Phys. Chem. (U. S. S. R.) 7, 619-44 (1936).—The authors, applying the laws of chem. kinetics, discuss the theory of reactions, reaction velocities, course and yields as a function of discharge intensity and apply their ideas to data from the literature on the oxidation of NO, formation of ozone and of at. H and to the cracking of methane. It is shown that the energy distribution is different for thermal and discharge reactions, that the kinetic constants and the course of the reaction are functions of the power of the discharge.

F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

CA

4

Activating influence of poisons in electrocatalysis. M. I. [illegible] and V. V. [illegible]. *J. Phys. Chem.* (U. S. S. R.) [illegible] *Acta Physicochim. U. R. S. S.* 4, [illegible] (in German).—Pyridine (I) was reduced to piperidine (II) by electrolytic cathode reduction on a Ni cathode in [illegible] in the presence of colloidal catalyst poisons. The yield of II in the absence of poisons is a linear function of c. d. In presence of 1×10^{-4} to 1×10^{-3} mole per l. [illegible] c. d., $HgCl_2$ doubles and triples the yield of II for a given c. d., the relative effect [illegible] current density. [illegible] the cathode potential is increased by about 0.3–0.4 v. For small currents the [illegible] decreases after a while (10 min. at 10^{-4}, 40 min. at 10^{-3} molal). In the case of As_2O_3 the percentage yield may be about 15% for 10^{-4} mol. As_2O_3 per l. at [illegible] no II whatever is produced. [illegible] are much less marked. F. H. R

METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

a

18

The mechanism of the retarding effect of promoters on the reduction of iron-ammonia catalysts. N. I. Kobozev. J. Phys. Chem. (U. S. S. R.) 8, 220-33(1936); cf. C. A. 30, 7007⁴.—Data are given for the retarding effects of K_2O, BeO, KF and Al_2O_3 on the reduction of Fe_3O_4 by H_2 and of MgO on that of FeO. Promoter action of the catalyst results when the added substance is surface-active and reduces the rate of reduction of the iron oxide.

F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

ca

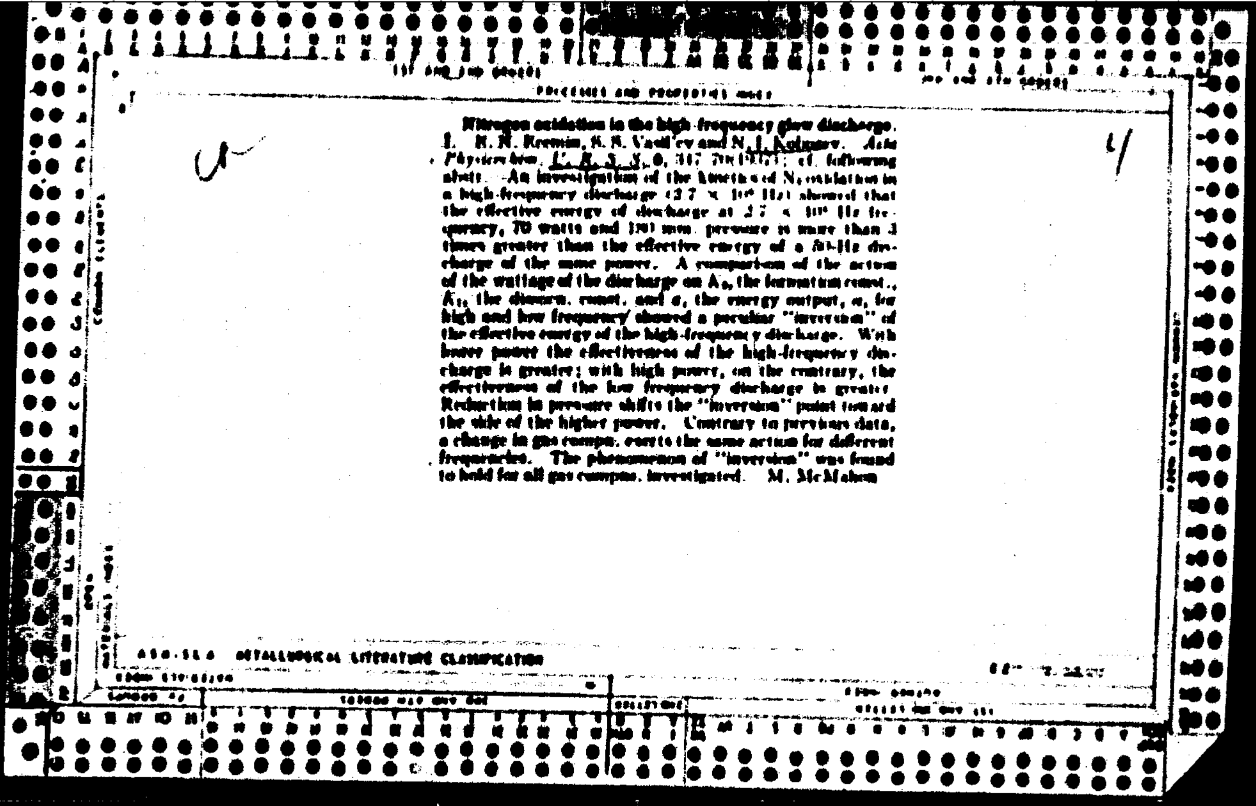
PROCESSES AND PROPERTIES INDEX

2

The true nature of the relation of the catalytic activity to the composition of the promoter. O. I. [illegible] and N. [illegible] Kobozev. *J. Phys. Chem.* (U. S. S. R.) 8, [illegible] (19[illegible]).—The function of Al_2O_3 in Fe_2O_3-lattice catalysts is discussed.

F. H. Rathmann

METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

U 4

Nitrogen oxidation in the high-frequency glow discharge. I. N. N. Kremin, S. S. Vasil'ev and N. I. Kobozev. *Acta Physicochim. U.R.S.S.* 6, 317 [illegible]; cf. following abstr.—An investigation of the kinetics of N_2 oxidation in a high-frequency discharge (2.7 × 10⁶ Hz) showed that the effective energy of discharge at 2.7 × 10⁶ Hz frequency, 70 watts and 150 mm. pressure is more than 3 times greater than the effective energy of a 50-Hz discharge of the same power. A comparison of the action of the wattage of the discharge on K_a, the formation const., K_d, the decompn. const., and ϕ, the energy output, α, for high and low frequency showed a peculiar "inversion" of the effective energy of the high-frequency discharge. With lower power the effectiveness of the high-frequency discharge is greater; with high power, on the contrary, the effectiveness of the low frequency discharge is greater. Reduction in pressure shifts the "inversion" point toward the side of the higher power. Contrary to previous data, a change in gas compn. exerts the same action for different frequencies. The phenomenon of "inversion" was found to hold for all gas compns. investigated. M. McMahon

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

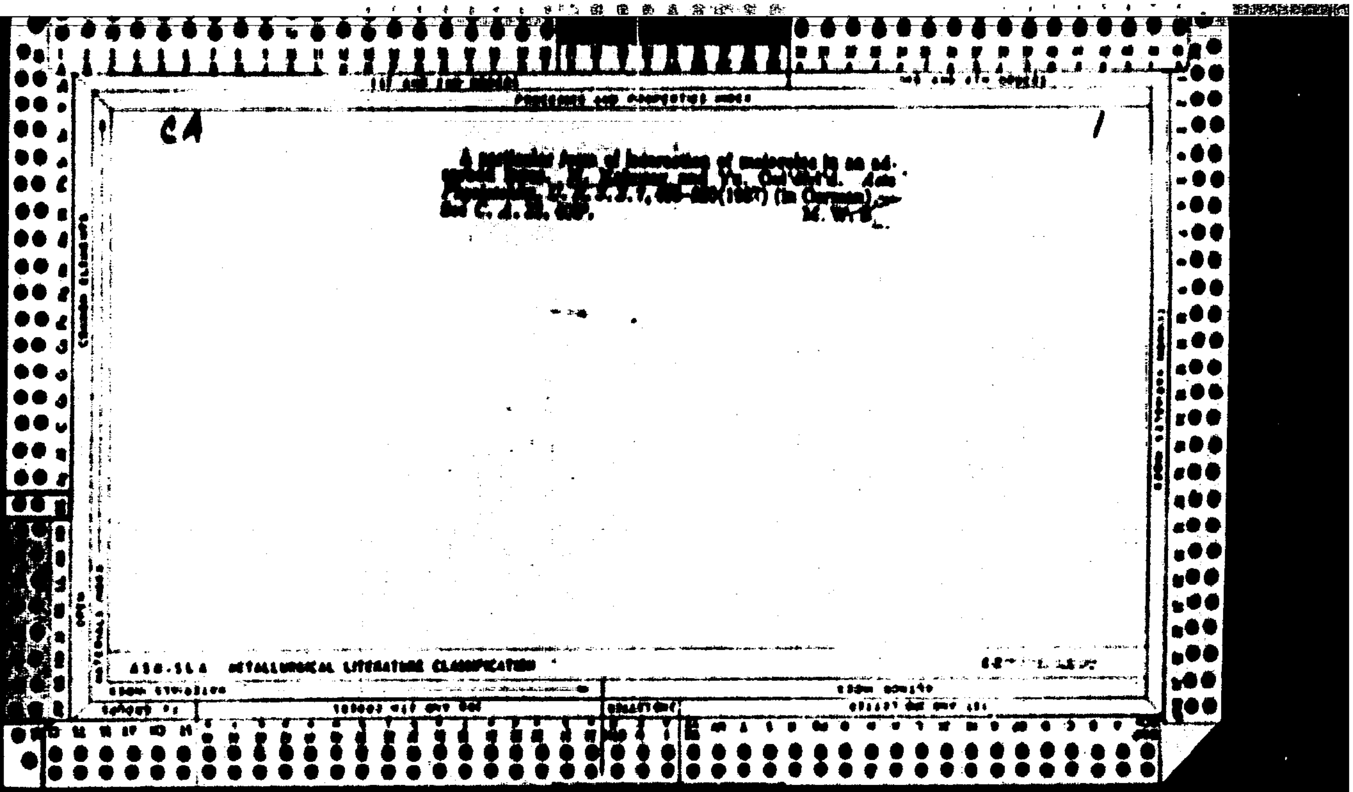
ca

4

Nitrogen oxidation in a high frequency glow discharge II. E. N. Eremin, S. S. Vasil'ev and N. I. Kobozev. *J. Phys. Chem.* (U. S. S. R.) 10, 48-61; *Acta Physicochim.* U. R. S. S. 6, 311-34(1937); cf. preceding abstr. —At from 70 to 180 mm. pressure and 70 w., a high-frequency (3.7 × 10^6 Hz) discharge is 3 times as efficient as a 50-Hz discharge. Above 90 w., the low-frequency discharge is the more effective. A comparison of the effects of 3.7 ×, 5 ×, 7 × and 10 × 10^6 Hz frequencies shows that the effect is the same in all cases and hence not due to chem. resonance effects. No difference in effect was observed when either internal or external electrodes were used. At higher wattages the max. yield is obtained at higher relative concns. of O_2. Electron temp. as detd. from the spectra of the discharges is higher at 70 w. high frequency than at low frequency and is higher at low wattage than at high wattage, and higher at low pressure than at high pressure.

F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

CA 1

A particular form of interaction of molecules in an adsorbed [illegible] ... Acta Physicochim. U.R.S.S. 7, [illegible] (1937) (in German). Cf. C. A. 31, [illegible].

M. W. [illegible]

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

BC

a-1

Production of oxidic catalysts by evaporation of [illegible] evaporated [illegible] and N. I. [illegible] U.R.S.S., 1937, 7, [illegible] of CuO formed (I) from 50° to 600°, and of CuO powder (II) from 150° to 400°, have been [illegible] for the oxidation of CO to [illegible] of both [illegible] of the observed [illegible] is valid for (I) but not for (II) [illegible] of (I) increases with [illegible] that of (II). X-Ray [illegible] before and after the [illegible] their structure is unchanged, the crystal size of (I) has been diminished considerably, and this is confirmed by photomicrographic tests. (I) adsorbs twice as much air as (II) at the temp. of liquid air. W. R. A.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

Influence of the current density on the yield of acetylene in electrical cracking of methane. S. S. Vasil'ev, N. I. Kobozev and E. N. Eremin. Khim. Tverdogo Topliva 8, 75 (1937). — A criticism of the above paper. A. A. Podgornyi

METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

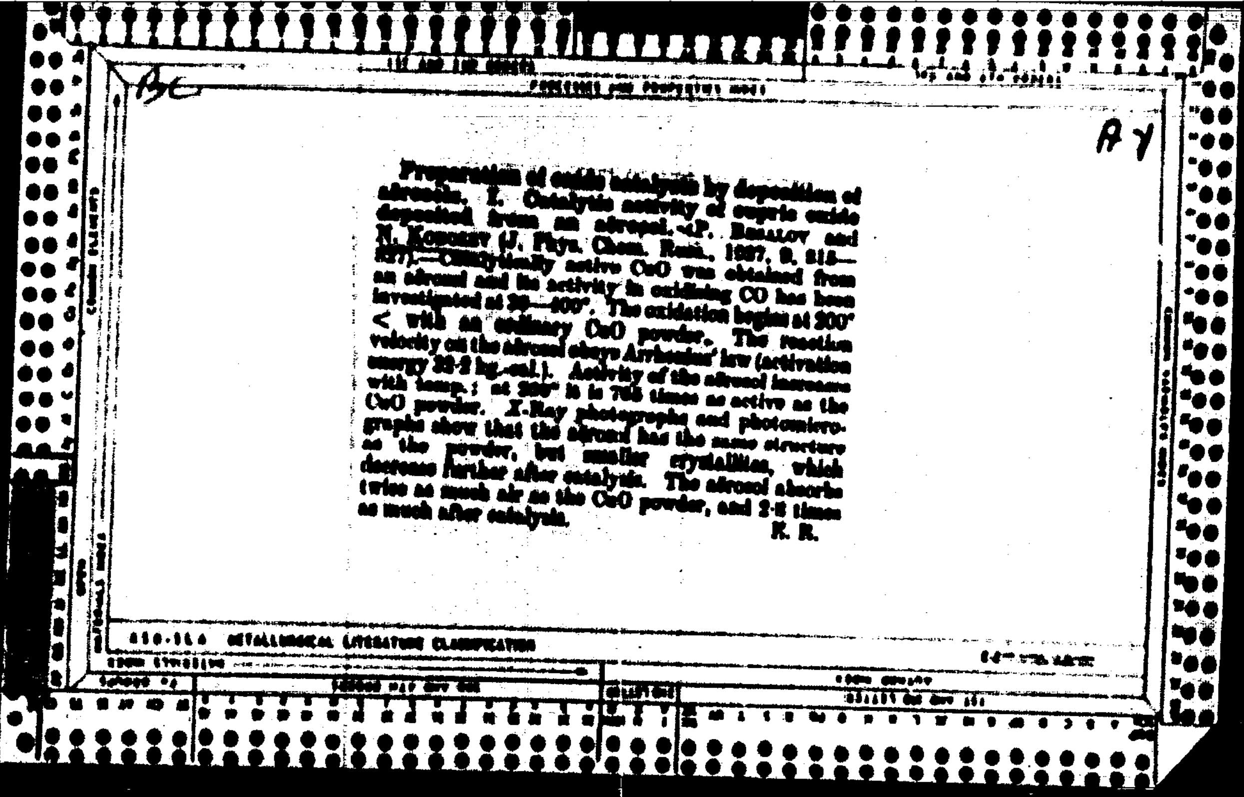
Bc

A-1

Preparation of oxide catalysts by deposition of aërosols. II. Intermediate compounds in the catalytic oxidation of carbon monoxide on ferric oxide. K. Ivanov and N. Kobozev (J. Phys. Chem. Russ., 1937, 9, 1—17).—The reaction $2CO + O_2 = 2CO_2$ is of zero order on a Fe_2O_3 aërosol at 400°, and of the first order at 500—550°. It is of the first order on ordinary Fe_2O_3 powders at all temp. The activation energy is the same in both cases (9·16 kg.-cal.). Strong sorption of CO (up to 1·3 mols. per mol. of Fe_2O_3) occurs during the reaction. The activation energy of sorption is 6·45 kg.-cal. on the Fe_2O_3 powder and 2·04 kg.-cal. on the aërosol. Results can be explained by the assumption of the existence of intermediate compounds $(Fe_2O_3)_x(CO)_y$, with $x : y > 2 : 3$.

E. R.

ASD-SLA METALLURGICAL LITERATURE CLASSIFICATION



Preparation of oxide catalysts by deposition of aërosols. I. Catalytic activity of cupric oxide deposited from an aërosol.—P. Basalov and N. Kobozev (J. Phys. Chem. Russ., 1937, 9, 815—827).—Catalytically active CuO was obtained from an aërosol and its activity in oxidising CO has been investigated at 20—400°. The oxidation begins at 200° < with an ordinary CuO powder. The reaction velocity on the aërosol obeys Arrhenius' law (activation energy 22·2 kg.-cal.). Activity of the aërosol increases with temp.; at 200° it is 700 times as active as the CuO powder. X-Ray photographs and photomicrographs show that the aërosol has the same structure as the powder, but smaller crystallites, which decrease further after catalysis. The aërosol absorbs twice as much air as the CuO powder, and 2·5 times as much after catalysis.

R. R.

CA

2

Preparation of oxide catalysts by precipitation of aerogels. II. The formation of interphase compounds during the catalytic oxidation of carbon monoxide on iron oxide. K. Ivanov and M. Kobozev. *J. Phys. Chem. (U. S. S. R.)* 10, 1-17(1937).—On a pptd. Fe_2O_3 aerosol catalyst at 300-400° the CO → CO_2 oxidation obeys a nearly zero-order kinetic equation, while on powder at 130° to 400° it obeys a first-order equation. On both catalysts the activation energy is $E = 5180$ cal. while K_0 in $K = \log K_0 - E/4.57T$ is 4.14 for aerosol and 3.08 for the powder. X-ray and photomicrographic studies of both catalysts show that during the catalysis an intense process of crystal structure reconstruction takes place so that the crystal grain size is completely altered. The cubic aerosol crystals of 10^{-6} cm. change to rhombic of 10^{-4}, while the rhombic Fe_2O_3 powder of 10^{-4} cm. grain size recrystallizes in the same system to a size of 10^{-6} cm. The effect of heating the powder to 1100° is the same as the process of catalytic reaction. CO is so strongly adsorbed by Fe_2O_3 that definite stoichiometric interphase compd. formation of an oxycarbonyl type must be assumed. The adsorption may also be considered as an activated adsorption with $E = 4480$ cal. for the powder and 3040 cal. for the aerosol. The mechanism of the CO → CO_2 oxidation itself is assumed to involve the $(Fe_2O_3)(CO)_x$ adsorption phase as a detr. link. F. H. Rathmann

METALLURGICAL LITERATURE CLASSIFICATION

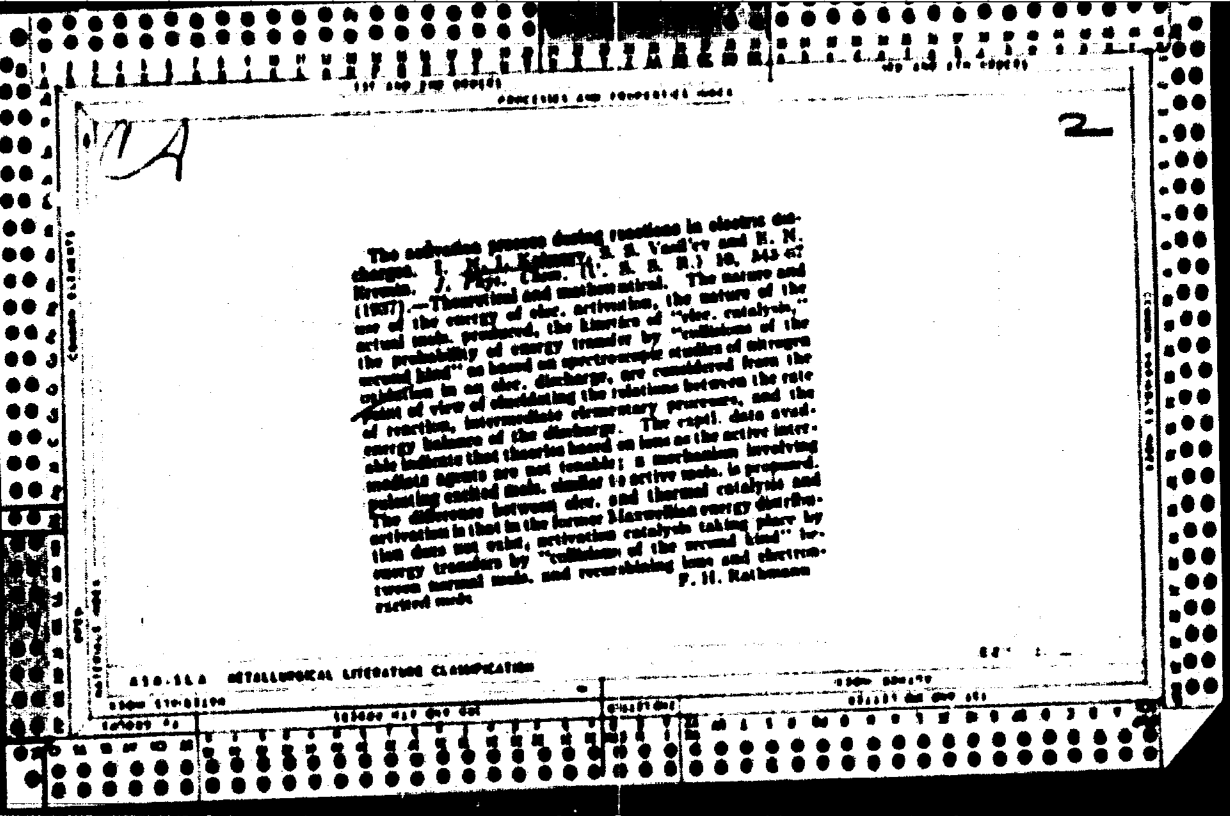
CA

2

PROCESSES AND PROPERTIES INDEX

A particular form of interaction of molecules in an adsorbed layer. N. Kobozev and Yu. Gol'dfel'd. *J. Phys. Chem.* (U. S. S. R.) 10, 261-78(1937).—Theoretical-math. It is assumed that the most typical case is that occurring when the adsorption potential around the adsorbed mol. is lowered. The resulting polarization of the surface results in repulsive forces greater than the polarization-interaction of the mols., and in gen. deviations from the Volmer equation for the ideal state of a two-dimensional gas, [illegible] chem. potentials rapidly rising with the extent of surface covering, distortions of the adsorption isotherms with slower rise of adsorption relative to concn., and in deviation of adsorption from the unimol. law and a lowering of the energy of activation the more the surface is covered. Exptl. data on the desorption of propylene from Cu at 220-280°K. confirm these predictions as against the theory of active centers. F. H. Rathmann

A1S-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

1A

2

The activation process during reactions in electric discharges. I. N. I. Kobozev, S. S. Vasil'ev and E. N. Eremin. J. Phys. Chem. (U.S.S.R.) 10, 343-67 (1937).—Theoretical and mathematical. The nature and use of the energy of elec. activation, the nature of the actual mols. produced, the kinetics of "elec. catalysis," the probability of energy transfer by "collisions of the second kind" as based on spectroscopic studies of nitrogen oxidation in an elec. discharge, are considered from the point of view of elucidating the relations between the rate of reaction, intermediate elementary processes, and the energy balance of the discharge. The exptl. data available indicate that theories based on ions as the active intermediate agents are not tenable; a mechanism involving pulsating excited mols. similar to active mols. is proposed. The difference between elec. and thermal catalysis and activation is that in the former Maxwellian energy distribution does not exist, activation catalysis taking place by energy transfers by "collisions of the second kind" between normal mols. and recombining ions and electron-excited mols.
F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

KOBOZEV, N.I.

PROCESSES AND PROPERTIES INDEX

4

The electrolytic oxidation of ammonia to ammonium nitrate. N. I. Kobozev, T. V. Montianova and A. L. Sheerum. *J. Chem. Ind.* (U.S.S.R.) 14, 1367 13 (1937). NH_3 is best oxidized on an Fe anode in a 2-compartment cell. The anolyte is a stirred 10% soln. of $(NH_4)_2CO_3$ + 1% $Cu(OH)_2$ as a catalyst. The cathode is 10% KOH soln. A 2-mm. asbestos diaphragm gives best results. The c. d. has little effect on the reaction. NH_3 is passed into the anode compartment during the reaction to reduce evolution of CO_2 and keep the p_H at about 8.43. About 75% of the NH_3 is oxidized to NH_4NO_3.

H. M. Leicester

✓

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

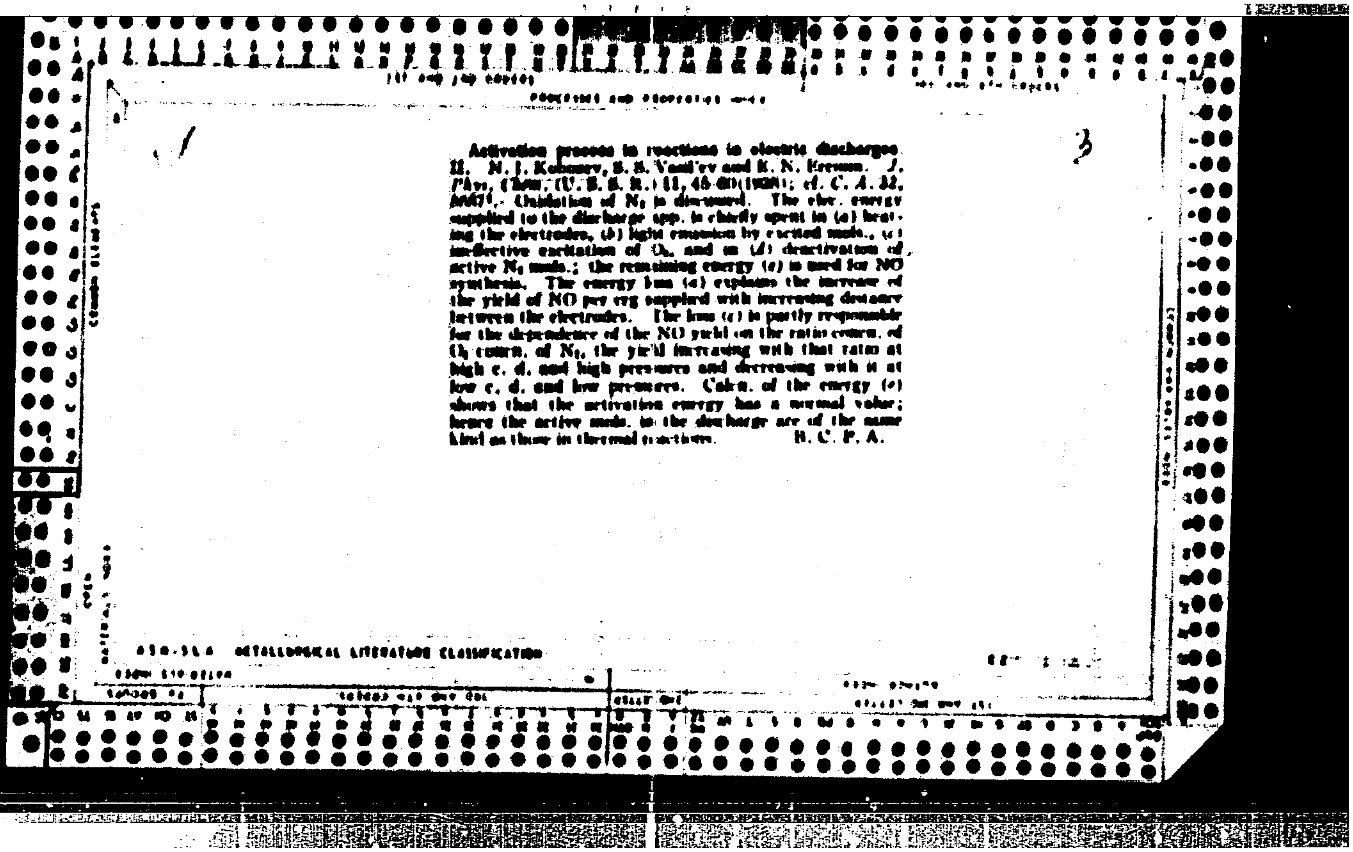
ca

2

A theory of the formation of catalytically active "ensembles" on surfaces. I. N. I. Kobozev. *Acta Physicochim. U. R. S. S.* 9, 805-44(1938)(in English).—Assuming that the active layer of the catalytic activity is an amorphous adsorbed phase organized into at. ensembles obeying the laws of d. fluctuation, K. develops a theory that explains the optimum activity for definite concn., dispersity, and temp. of prepn. and for the effects of promoters and the order of introduction of the reacting substances. The cryst. carrier detn. only the no., but not the properties, of the ensembles. An equation is given for the max. activities of two catalysts. This equation helps to account for the change in the order of catalytic reactions. Cf. Kobozev and Nekrassov, *C. A.* 24, 1560. II. An application of the theory to the synthesis of ammonia and to the catalytic and electrocatalytic hydrogenation of the ethylene bond. N. I. Kobozev and L. L. Klyachko-Gurvich. *Ibid.* 10, 1-64(1939)(in English).—On the basis of their own exptl. data as well as that from other authors and using the equation previously derived (cf. preceding abstr.) K. and K.-G. calc. the av. no. of atoms in active ensembles to be 3 Fe for the reaction $N_2 + 3H_2 = 2NH_3$ (cf. K.-G. and K.); 3 Pt for $2H_2 + O_2 = 2H_2O$ (cf. Danilov and Kaabatkov, *C. A.* 30, [illegible] and 6410?); 2Pd for fumaric acid hydrogenation (cf. [illegible] and Zimmermann, *C. A.* 24, 2037); 4Pt or 4 Ni for $C_2H_4 + H_2 = C_2H_6$ (cf. Danilov, *C. A.* 27, 5656); 3 Fe or 3 Pt for the electrocatalytic hydrogenation of cinnamic acid (according to Menshikova, Kobozev and Philippovich) in the presence of traces of $HgCl_2$ and K_3AsO_3, catalyst poisons as activators. For reactions of H_2 with diatomic mols., the ensembles contain 2 atoms, for addn. to the C=C bond they probably contain 2-4 atoms. The promoting action of K_2O in synthetic ammonia catalysts is explained as a result of the pre-existing three-atom iron ensembles in Fe_3O_4, that of Al_2O_3 to a protecting action against melting or evapn. of the ensembles.

F. H. Rathmann

ASA-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

Activation process in reactions in electric discharges. II. N. I. Kobozev, S. S. Vasil'ev and E. N. Eremin. *J. Phys. Chem.* (U. S. S. R.) 11, 45-60 (1938); cf. *C. A.* 32, 8071.—Oxidation of N_2 is discussed. The elec. energy supplied to the discharge app. is chiefly spent in (*a*) heating the electrodes, (*b*) light emission by excited mols., (*c*) ineffective excitation of O_2, and in (*d*) deactivation of active N_2 mols.; the remaining energy (*e*) is used for NO synthesis. The energy loss (*a*) explains the increase of the yield of NO per erg supplied with increasing distance between the electrodes. The loss (*c*) is partly responsible for the dependence of the NO yield on the ratio concn. of O_2 concn. of N_2, the yield increasing with that ratio at high c. d. and high pressures and decreasing with it at low c. d. and low pressures. Calcn. of the energy (*e*) shows that the activation energy has a normal value; hence the active mols. in the discharge are of the same kind as those in thermal reactions. H. C. P. A.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

3

A correction to the article "Activation process during reactions in electric discharges." N. I. Kobozev, S. S. Vasil'ev and E. N. Eremin. J. Phys. Chem. (U. S. S. R.) 11, [illegible] (1938); cf. C. A. 32, [illegible]. The entry of the spectrum appearing during the oxidation of N should be corrected to read: "To the emission energy of 1 e. v. corresponds the wave length 12,340 A. The continuous spectrum found during the elec. oxidation of N is distributed at 200 mm. Hg into the region of [illegible]-[illegible] A. wave lengths." After a further discussion K., V. and E. come to the conclusion that the difference between the full activation energy of N mols., calcd. from the wave lengths of the continuous spectrum, and the energy transferred during the collisions of "the second kind" can be regarded as the thermal energy of activation whose quantity lies in the limits from 4.77-3.5 = 1.17 e. v. = 27,000 cal./mol. to [illegible]-[illegible] = 0.21 e. v. = 4850 cal. [illegible]

W. R. Henn

METALLURGICAL LITERATURE CLASSIFICATION

Kinetics of reaction with the participation of solid substances. II. Investigation of the kinetics of reduction of iron nitrides by hydrogen. B. V. [illegible], [illegible] A. [illegible] and [illegible]. J. Phys. Chem. (U.S.S.R.) 31, [illegible] (1957); cf. C. A. 51, [illegible].—Data on the hydrogenation by H_2 or [illegible] at temps. from 300 to 500° of 7 different iron nitrides corresponding roughly to the compns. Fe_4N and Fe_2N variously treated (as with $Fe(CO)_5$, etc.) are given. [illegible] the temps., reaction is [illegible] shows N/A, N/p or $N/t = f(A, \tau, t)$ [illegible] (N = amt. of substance reacting, [illegible] consts.). The [illegible] on the faces of initial reaction; for [illegible] simultaneously on the edges of all different crystals or simultaneously on the edges of the crystals; for [illegible] simultaneously when N/p = const.; and for [illegible] simultaneously at distinct points at the [illegible] of the crystals. In the reduction of the nitrides of iron (1) (Fe_4N, unpromoted), (4) (Fe_4N promoted by 2.5% K_2O), and (7) ([illegible] Al_2O_3), (6) Fe_4N promoted by 3.1% Al_2O_3 + 2.4% K_2O) by H_2 and of (1) by a 3:1 N_2-H_2 mixt., the evaluation of the exptl. data by the theoretically derived equations indicates that the reaction is initiated on the crystal edges. In (2) (Fe_4N + 1.4% Al_2O_3) and (3) ([illegible] promoted) the reduction seems to begin at individual points on the [illegible] crystal edges. For (5) (Fe_4N + [illegible] Al_2O_3) the course of the N/p curves indicates that [illegible] on the crystal faces. From these data it is [illegible] that certain as yet uncontrollable factors affect the reaction mechanism of promoted catalysts. Cf. Emmett and Love, C. A. [illegible] III. Investigation of the kinetics of reduction of [illegible] Ibid. [illegible] (1958).—With the same [illegible] used in the preceding abstr., the [illegible] and the linear rate of [illegible] of initiation of the reaction [illegible] were detd. While Al_2O_3 shows no specific [illegible] effect on the hydrogenation process, K_2O shows a strongly neg. effect. The pos. catalytic effect of K_2O in Al_2O_3-K_2O promoters in NH_3 synthesis is due to a reduction by the K_2O of the otherwise excessive H_2 adsorption. The energy of activation is the same for the crystal faces, edges and polyfacial angles, and is about 17,000 cals. The [illegible] catalytic effect of the solid products is due only to their eliminating certain steric hindrance effects. The order of reactivity of the N atoms decreases in the order of polyfacial angle, edge and facial atoms. IV. Thermal decomposition of mercury oxides. B. V. [illegible] and K. I. Trusova. Ibid. [illegible].—Exptl. data are given on the thermal decompn. of mercuric oxide at 440-480° alone and in the presence of Na amalgam or Na_2O_2. The decompn. begins on the crystal edges and is autocatalytic with an energy of activation of 57,000 cals. while the [illegible] rate of differently prepd. samples varies by a factor of 20. While [illegible] mercury obtained by the action of Na amalgam or of Na_2O_2 on HgO catalyzes the reaction [illegible] apparently by its effect on the atoms of the HgO, added mercury has no effect. The results indicate that the Volmer theory of topochemical chem. reactions is not applicable.

F. H. Rathmann

METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

BC

a-1

Volume and surface processes in the oxidation of nitrogen in glow discharge. I. R. A. Kuzovatkova and N. I. Kobozev (J. Phys. Chem. Russ., 1939, 13, [illegible]).—At a pressure of 4 mm. Hg the rate of oxidation of dry N_2 by O_2 shows a max. at 80% N_2. H_2O decreases the rate between 40 and 90% of N_2 and increases it at other $[N_2]$; 2% of H_2O is as active as 1%. CH_4 inhibits the reaction >, and NH_3 and H_2 <, H_2O. An increase of the solid surface (quartz, glass, or mica) accelerates the oxidation, especially in the presence of H_2O. It is supposed that NO is produced partly on the walls, this part of the reaction being inhibited by dipole mols., and partly in space. H_2O or NH_3 does not affect the latter part since they do not alter the emission spectrum of the discharge. J. J. B.

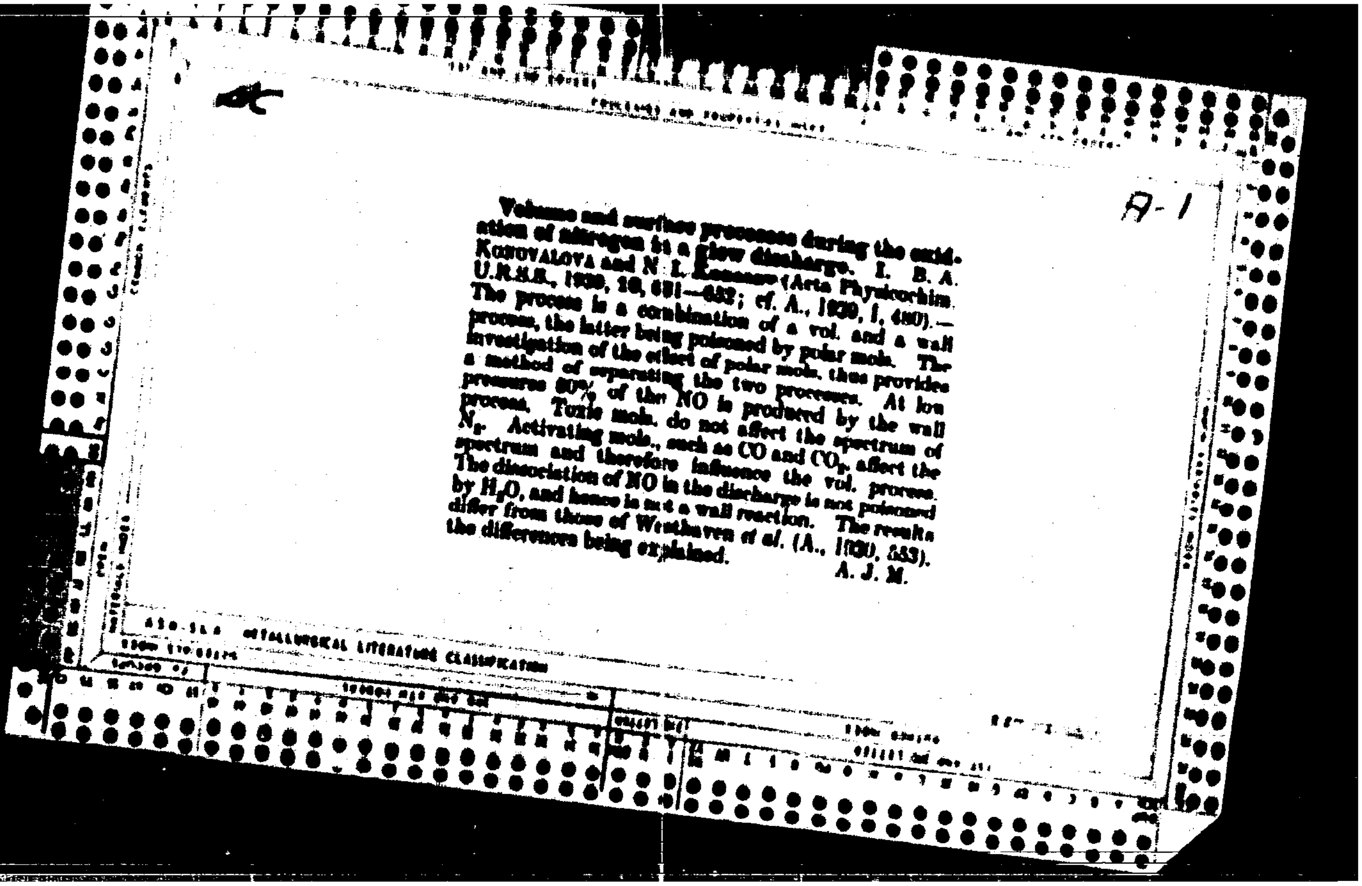
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

A-1

Formation of catalytically active "ensembles" on surfaces. II. Application of theory to synthesis of ammonia and to catalytic and electrocatalytic hydrogenation of the ethylene bond. N. I. Kobozev and L. L. Klyachko-Gurvitch (Acta Physicochim. U.R.S.S., 1939, 10, 1—34; cf. A., 1939, I, 371).—For the synthesis of NH_3 on Fe the no. of atoms in an active "ensemble" is calc. to be 3; the same is true of Pt in the oxidation of H_2 by O_2. In the reduction of fumaric acid by H_2 on Pt, and in the cathodic reduction of $CHPh:CH\cdot CO_2H$ (Fe–Pt cathode), the active aggregates contain 2, and in the hydrogenation of C_2H_4 on Pt–Ni, 4 atoms. In no case does the no. of atoms reach the no. in the face of a unit cell of the cryst. metal. The mechanism of the reactions studied is discussed. F. L. U.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



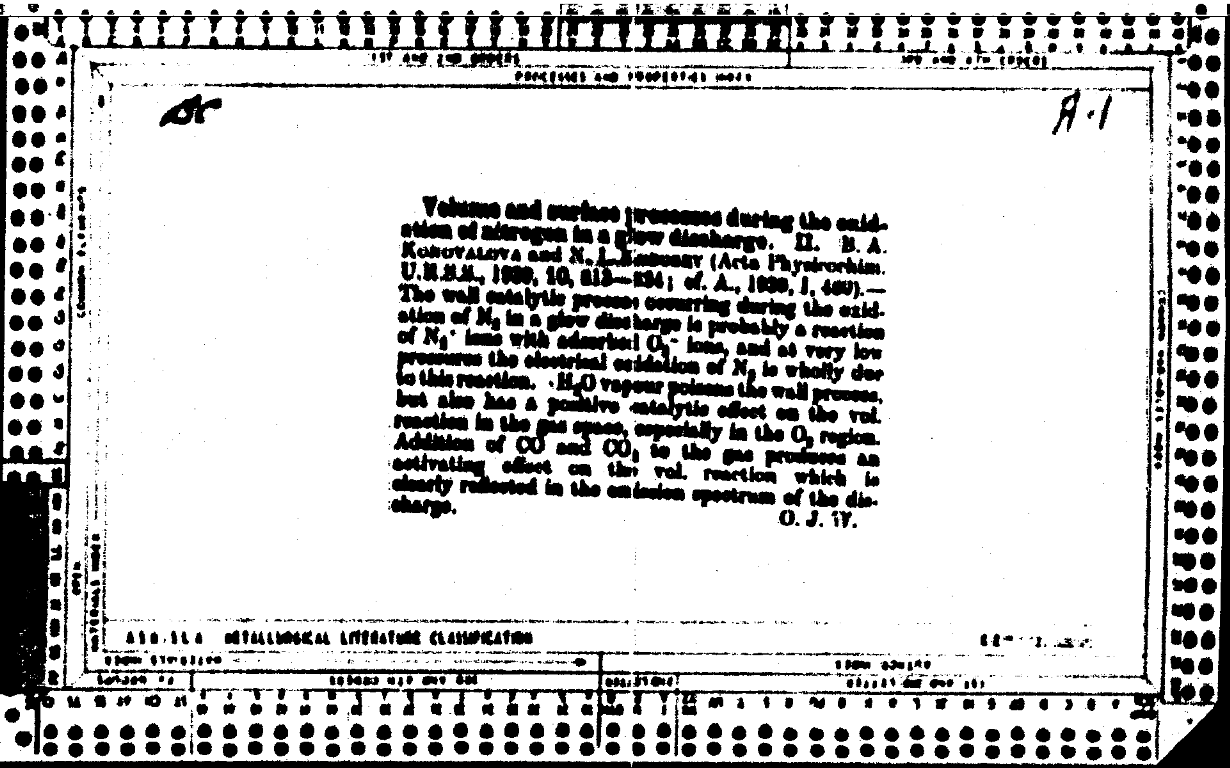
PROCESSES AND PROPERTIES INDEX

A-1

Volume and surface processes during the oxidation of nitrogen in a glow discharge. L. B. A. KONOVALOVA and N. I. [illegible] (Acta Physicochim. U.R.S.S., 1939, 10, 681—682; cf. A., 1939, I, 480).—The process is a combination of a vol. and a wall process, the latter being poisoned by polar mols. The investigation of the effect of polar mols. thus provides a method of separating the two processes. At low pressures 80% of the NO is produced by the wall process. Toxic mols. do not affect the spectrum of N_2. Activating mols., such as CO and CO_2, affect the spectrum and therefore influence the vol. process. The dissociation of NO in the discharge is not poisoned by H_2O, and hence is not a wall reaction. The results differ from those of Westhaven *et al.* (A., 1930, 553), the differences being explained.

A. J. M.

ASO-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

A-1

Volume and surface processes during the oxidation of nitrogen in a glow discharge. II. B. A. KONOVALOVA and N. I. KOBOZEV (Acta Physicochim. U.R.S.S., 1939, 10, 813—834; cf. A., 1939, I, 460).—The wall catalytic process occurring during the oxidation of N_2 in a glow discharge is probably a reaction of N_2^+ ions with adsorbed O_2^- ions, and at very low pressures the electrical oxidation of N_2 is wholly due to this reaction. H_2O vapour poisons the wall process, but also has a positive catalytic effect on the vol. reaction in the gas space, especially in the O_2 region. Addition of CO and CO_2 to the gas produces an activating effect on the vol. reaction which is clearly reflected in the emission spectrum of the discharge.

O. J. W.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

CA

4

Activation process and the nature of the active centers in electrocatalytic hydrogenation. V. V. Monblanova, N. I. Kobozev and P. Filippovich. *Acta Physicochim. U. R. S. S.* 11, 317-42 (1939) (in English).—See C. A. 34, 1239.
F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

[illegible]

"A Theory of the Formation of Catalytic Active Groupings on Surfaces --II. The Application of the Theory to the Synthesis of Ammonia and the Catalytic and Electrocatalytic Hydrogenation of the Ethylene Bond"; Zhur. Fiz Khim., 12, No. 1, 1939. Moscow State University, Laboratory of Inorganic Catalysis. Rcd. 29 May 1938.

Report U-1613, 3 Jan. 1952

PROCESSES AND PROPERTIES INDEX

BC

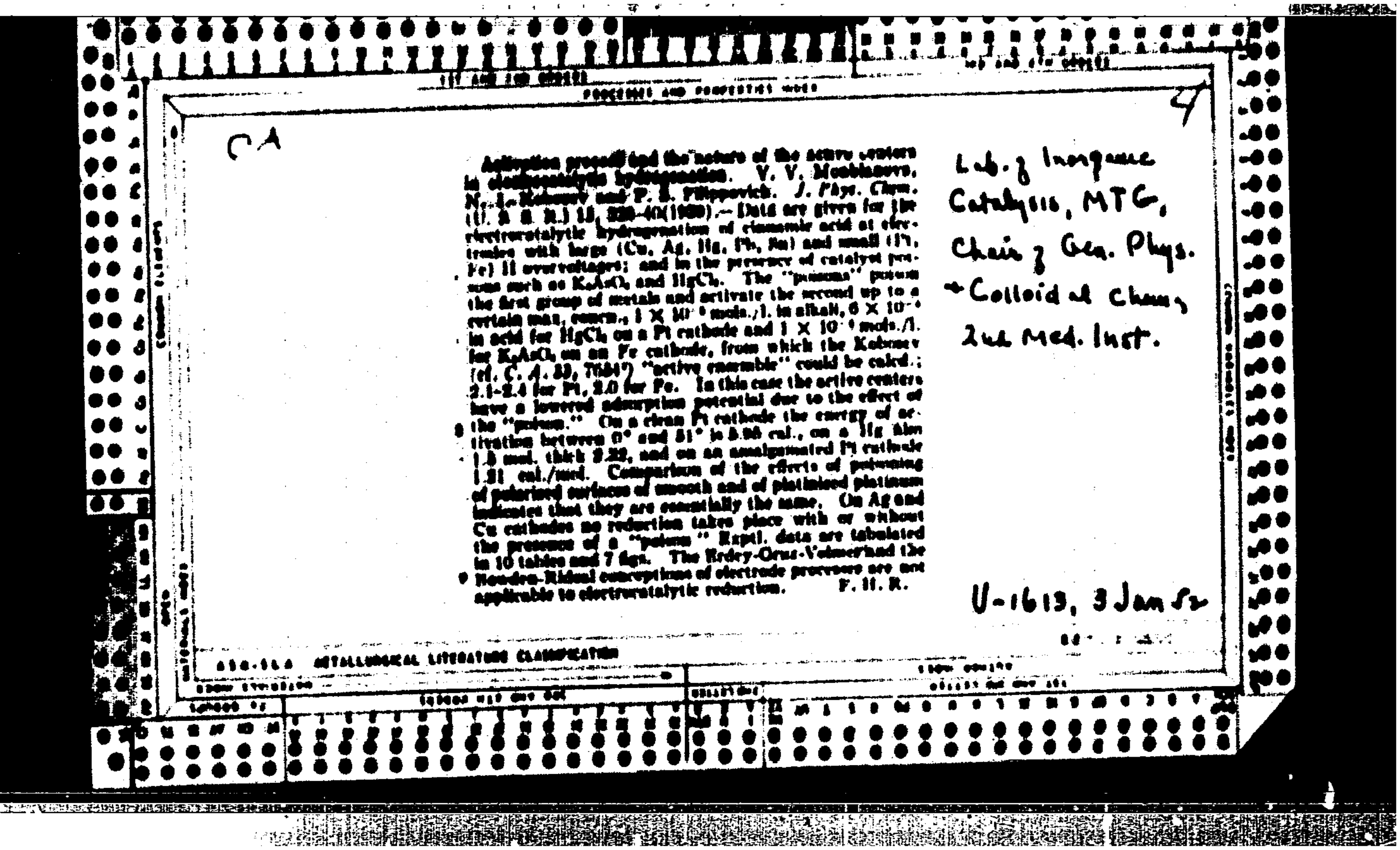
A-1

Volume and surface processes in the oxidation of nitrogen in the glow discharge. II. R. A. KONOVALOVA and N. I. KOBOZEV (J. Phys. Chem. Russ., 1939, 13, 286—300).—The part of the formation of NO taking place at the surface is presumably due to a reaction between N_2^+ and adsorbed O_2^- ions. The relation between the rate of this surface reaction and the size of the reaction vessel is similar to that between the size of the vessel and the rate of recombination of ions as determined by the min. discharge potential. In mixtures containing much O_2, H_2O and NH_3 increase the yield of NO; this is presumably due to oxidation of N_2 by H_2O and, respectively, to oxidation of NH_3. CO and CO_2 also raise the yield of NO. (Cf. A., 1939 I, 480.)

J. J. B.

Lab. Inorganic catalysis Moscow State U.

ASA-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

CA

4

Activation process and the nature of the active centers in electrocatalytic hydrogenation. V. V. Moshkova, N. I. Kobozev and P. I. Filippovich. *J. Phys. Chem.* (U. S. S. R.) 13, 328-40(1939).—Data are given for the electrocatalytic hydrogenation of cinnamic acid at electrodes with large (Cu, Ag, Hg, Pb, Sn) and small (Pt, Fe) H overvoltages; and in the presence of catalyst poisons such as K_3AsO_3 and $HgCl_2$. The "poisons" poison the first group of metals and activate the second up to a certain max. concn., 1 × 10^{-4} mols./l. in alkali, 6 × 10^{-4} in acid for $HgCl_2$ on a Pt cathode and 1 × 10^{-4} mols./l. for K_3AsO_3 on an Fe cathode, from which the Kobozev (cf. C. A. 33, 7684) "active ensemble" could be calcd.; 2.1-2.4 for Pt, 2.0 for Fe. In this case the active centers have a lowered adsorption potential due to the effect of the "poison." On a clean Pt cathode the energy of activation between 0° and 51° is 5.98 cal., on a Hg film 1.5 mol. thick 2.22, and on an amalgamated Pt cathode 1.31 cal./mol. Comparison of the effects of poisoning of polarized surfaces of smooth and of platinized platinum indicates that they are essentially the same. On Ag and Cu cathodes no reduction takes place with or without the presence of a "poison." Exptl. data are tabulated in 10 tables and 7 figs. The Erdey-Gruz-Volmer and the Bowden-Rideal conceptions of electrode processes are not applicable to electrocatalytic reduction. F. H. R.

Lab. of Inorganic Catalysis, MTG, Chair of Gen. Phys. + Colloidal Chem, 2nd Med. Inst.

U-1613, 3 Jan 52

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

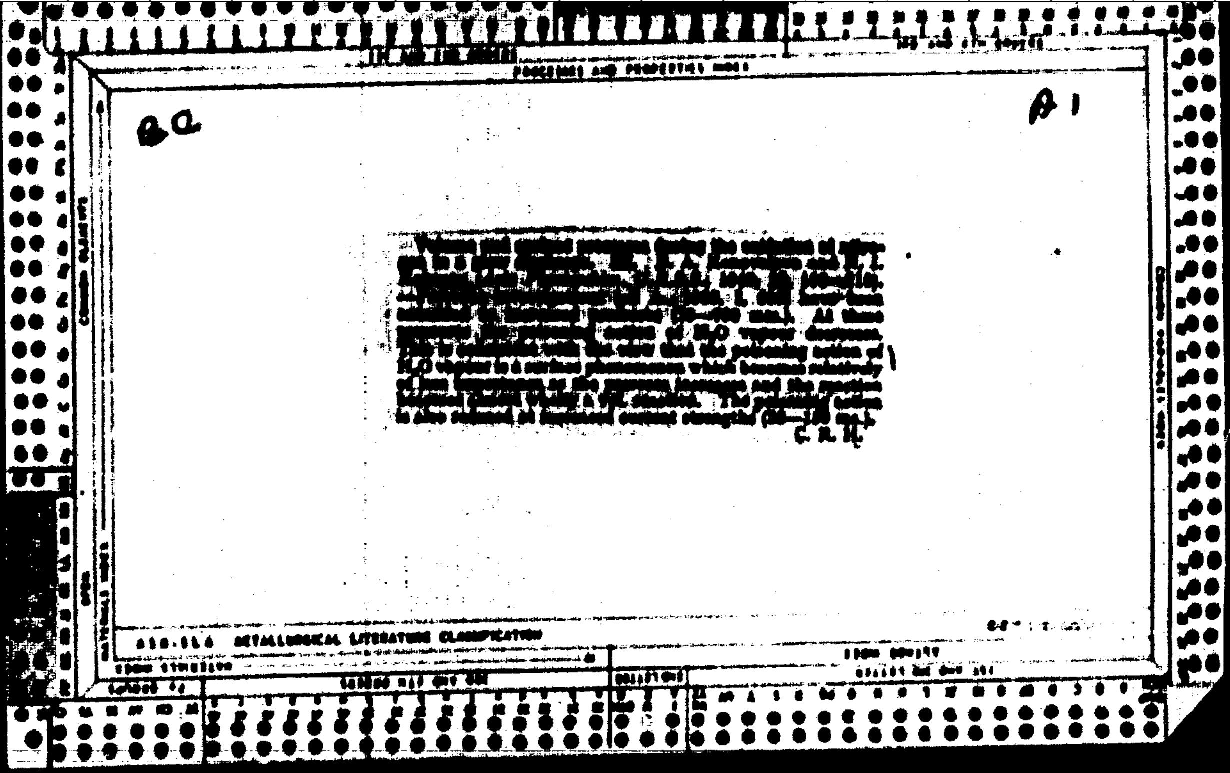
PROCESSES AND PROPERTIES INDEX

Cf

18

Regenerating the iron catalyst for the synthesis of ammonia. M. I. Kaganov and L. L. Klyachko-Gurvich. Russ. 56,234, Jan. 31, 1940. The spent catalyst is treated with iron carbonyl at temps. sufficiently high for the decompn. of carbonyl to metal and CO to form an active layer.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

BA

A1

[illegible] of H_2O vapor decreases [illegible] the poisoning action of H_2O vapor is a surface phenomenon which becomes relatively [illegible] and the reaction [illegible]

C. R. K.

METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

CA

2

Theory of the formation of catalytically active ensembles on surfaces. IV. Application of the theory to the poisoning of catalysts. N. I. Kobozev. *Acta Physicochim. U. R. S. S.* 11, [illegible] (19[illegible]0) (in German); cf. *C. A.* [illegible].—Math. Assuming that the mols. of a catalyst poison can act only on the activity of a single ensemble independently of processes occurring in neighboring ensembles, i. e., a statistical rather than a thermodynamic distribution of poison mols., K. obtains the equation $A = A_0e^{-g/S}$ for the reduction of the initial activity A_0 by the amt. of poison g, where S is the no. of migration areas. The theory is able to explain many experimentally observed catalysis-poisoning phenomena. Calcns. are given for the NH_3 reaction on Fe, hydrogenation of the ethylenic bond on Pt, Pd, etc. The values of S for a given poisoned catalyst as detd. for various reactions thereon are the same, and the values of S for different metals run parallel with their melting points.

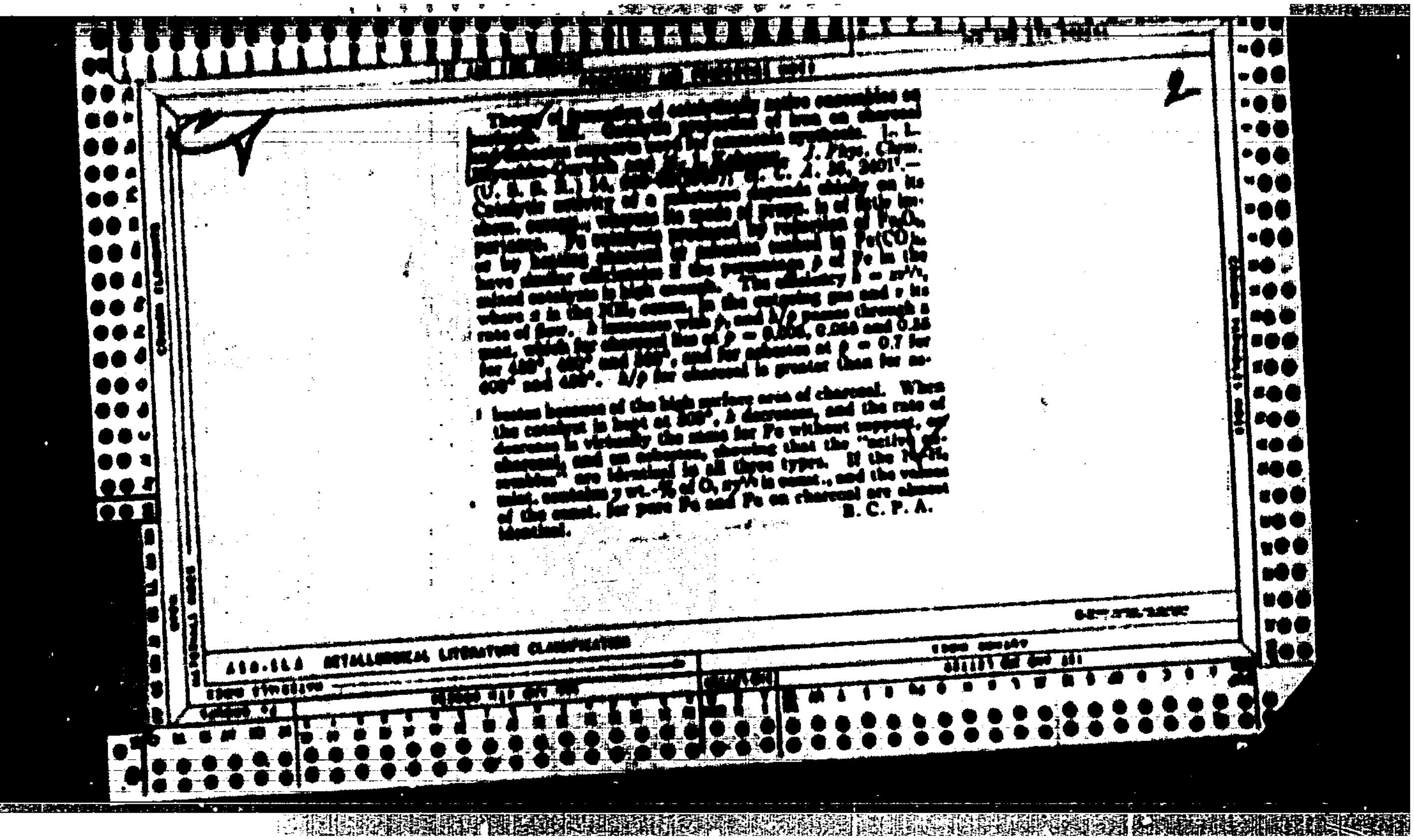
F. H. Rathmann

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

A-1

RC

Volume and surface processes in the oxidation of nitrogen in the glow discharge. III. [illegible] A. [illegible] and N. I. [illegible] ([illegible] 34, [illegible]; cf. A., [illegible]).—Oxidation of N_2 by O_2 in a glow discharge is retarded by H_2O vapour. It is assumed that the reaction velocity v_1 in presence of H_2O is that of the reaction in space, and the difference v_2 between the rate in absence of H_2O and v_1 is the velocity of the surface reaction. The reaction vessel was of quartz. At [illegible] v_1 [illegible] 100 ma. and 215 mm. Hg [illegible] H_2O 10%. The v_1 showed a max. at N_2 [illegible] O_2 [illegible] and v_2 at [illegible]. In air v_1 gradually [illegible] ratio v_1 : (v_1 + v_2) [illegible] with [O_2] : [N_2], [illegible] increases with pressure ([illegible] mm. Hg), and v_2 is max. near 215 mm. and falls at high pressure to zero or to negative vals. The lowering of v_2 at high pressure is presumably due to a reduced speed of diffusion of [illegible] clusters to the walls. In air at 215 mm. v_1 has identical vals. for 0·44%—3·10% of H_2O, but [NO] in the discharge tube is lowered when [H_2O] rises. In air at 215 mm. both v_1 and v_2 increase when the current increases ([illegible]—150 ma.) but the rise of v_1 is 3 times as steep as that of v_2. The easy poisoning of the N_2 oxidation shows that it is of a non-thermal nature. J. J. B.



2

The [illegible] of catalytically active ensembles of [illegible] of iron on charcoal [illegible] of ammonia synthesis. I. L. [illegible] J. Phys. Chem. (U. S. S. R.) [illegible] C. A. 35, 2401.— [illegible] chiefly on its catalytic activity [illegible] Fe₂O₃, [illegible] Fe(CO)₅ [illegible] Fe in the [illegible] have similar [illegible] The efficiency $\xi = xv/\lambda$, mixed catalysts is high enough. [illegible] where x is the NH₃ concn. in the outgoing gas and v the rate of flow. λ increases with p, and λ/p passes through a max., which for charcoal lies at p = 0.004, 0.036 and 0.35 for 450°, 400° and 350°, and for asbestos at p = 0.7 for 400° and 450°. λ/p for charcoal is greater than for asbestos because of the high surface area of charcoal. When the catalyst is kept at 500°, λ decreases, and the rate of decrease is virtually the same for Fe without support, on charcoal, and on asbestos, showing that the "active ensembles" are identical in all three types. If the N₂-H₂ mixt. contains 2 wt.-% of O, xv/λ is const., and the values of the const. for pure Fe and Fe on charcoal are almost identical.

B. C. P. A.

AIA-ILA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

Cy

2

Transition stages in catalysis. IV. Kinetics and thermodynamics of the transition stages of the homogeneous catalytic decomposition of hydrogen peroxide. N. I. Kobozev and E. E. Gal'braikh. *J. Phys. Chem.* (U. S. S. R.) 14, 1550-66(1940).—The rate v of decompn. of H_2O_2 in presence of $K_2Cr_2O_7$ is proportional to $K_2Cr_2O_7$ concn. between 0.002 and 0.020 M. At 25° it changes during one expt. according to the first order, but at 0° the unimol. coeff. increases, and at 56° (vapor of acetone) decreases in the course of an expt.; at 56° the reaction appears to be of the second order. This behavior can be accounted for if $Cr_2O_9^{--}$ is the intermediate product, and v is proportional to $Cr_2O_9^{--}$ concn.; then $v = kK[Cr_2O_7^{--}][H_2O_2]^2/(1 + K[H_2O_2]^2)$, K being the equil. const. of $2H_2O_2 + Cr_2O_7^{--} \rightleftarrows Cr_2O_9^{--} + 2H_2O$. From the temp. coeff. of K the heat of the reaction $Cr_2O_7 \rightarrow Cr_2O_9$ is calcd. as 3700 g.-cal. HNO_3 (0.001-0.008 N) reduces v at first, and strongly increases it near the end of the decompn. of H_2O_2, so that a max. value of v is reached. When v begins to rise, the cond. of the soln. rises also. The max. value of v occurs at a higher degree of decompn. when the temp. is lower. In acid soln. the ion $HCr_2O_9^{--}$ is the catalyst; its heat of formation from H^+, $Cr_2O_7^{--}$, and $2H_2O_2$ is calcd. to be 17,000 g.-cal. $HCr_2O_9^{--}$ is about 5 times as efficient as a catalyst as is $Cr_2O_9^{--}$. Contrary to an assumption by Eyring, the entropies of the intermediate products are very different from those of the final products. B. C. P. A.

ASA-SLA METALLURGICAL LITERATURE CLASSIFICATION

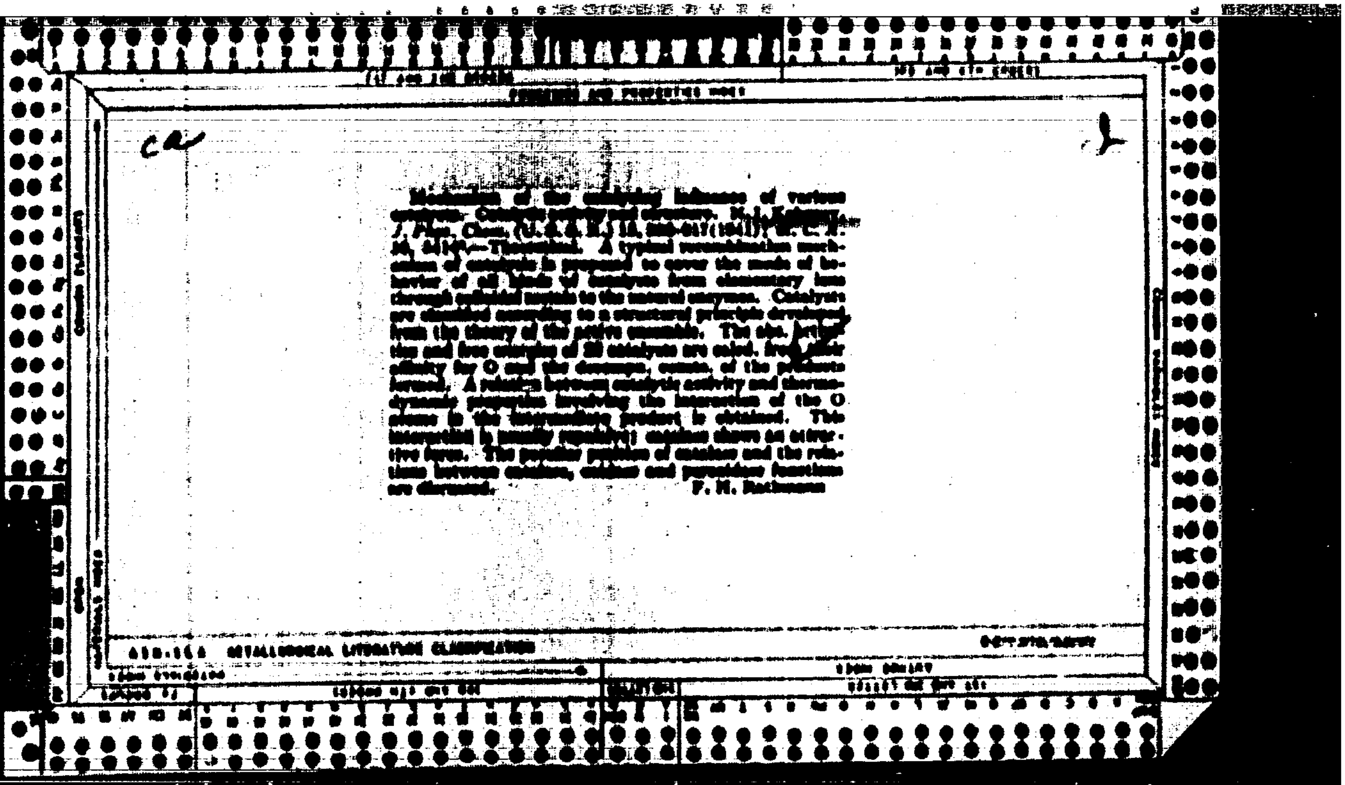
Pr. 16

[illegible]

[illegible] study of the effect of [illegible] interactions on the adsorption kinetics. I. [illegible] II. Adsorption kinetics. [illegible] (J. Phys. Chem. Russ., 1941, 15, 561—574, 575—[illegible]).—I. Adsorption isotherms at 0° between 10^{-4} and 10^{-2} mm. Hg of H_2, CO, C_2H_4, and propylene on Cu, and of NH_3 on Fe, are measured. They do not comply with Langmuir's equation and can be accounted for by assuming that an adsorbed mol. lowers the adsorption potential U around it. The adsorption of CO on Cu containing $(CN)_2$ (i.e., 0·05—0·08 c.c. per g. of Cu) is not only < that on pure Cu but the deviation of the adsorption isotherm from Langmuir's equation is increased. If $(CN)_2$ were just blocking the adsorbing surface this deviation would have been unchanged or reduced; its increase shows that adsorbed poison mols. strongly lower the U of their neighbour mols. When the surface area of Cu is reduced by recrystallisation at 300°, the amount adsorbed (s) is less but the shape of the isotherm does not change.

II. The rate v (c.c. per sec.) of desorption of CO, H_2, propylene, and $(CN)_2$ from Cu, and of NH_3 from Fe, is measured at −60° to 100°. It rapidly decreases when s diminishes, and the ratio v/s decreases as well, showing that U is the higher the smaller is s. The increase of v/s with s is less marked at higher temp. $(CN)_2$ raises v/s and its increase with s for desorption of CO from Cu; this shows that the U of CO is lowered by the near-by mols. of $(CN)_2$.

J. J. B.



PROCESSES AND PROPERTIES INDEX

CA

Mechanism of the catalytic influence of various catalysts. Catalytic activity and structure. N. I. Kobozev. J. Phys. Chem. (U. S. S. R.) 15, [illegible](1941); cf. C. A. 36, [illegible].—Theoretical. A typical recombination mechanism of catalysis is proposed to cover the mode of behavior of all kinds of catalysts from elementary ions through colloidal metals to the natural enzymes. Catalysts are classified according to a structural principle developed from the theory of the active ensemble. The abs. activities and free energies of 33 catalysts are calcd. from their affinity for O and the decompn. consts. of the products formed. A relation between catalytic activity and thermodynamic properties involving the interaction of the O atoms in the intermediary product is obtained. This interaction is usually repulsive; [illegible] shows an attractive force. The peculiar position of catalase and the relations between catalase, oxidase and peroxidase functions are discussed.

F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

[redacted]

PROCESSES AND PROPERTIES INDEX

CA

30

Detection of aldol-α-naphthylamine in rubber objects. M. M. Kalmanova. *Lab. Prakt.* (U. S. S. R.) 16, No. 6, 20 (1941).—Add 100 cc. of 1% AcOH to 5 g. of rubber (in the form of rubber rings) in a flask, cover with a watch glass, boil for 30 min., to 5-10 cc. of the AcOH ext., add 1 cc. of sulfanilic acid soln. + 1 cc. of 0.01% $NaNO_2$ (freshly prepd.) and observe the color after 5 min. In the presence of aldol-α-naphthylamine, the color of the ext. changes to pink, owing to the formation of the azo dye. A control expt. must be made without the ext. For rubber objects which are not subjected to heat-treatment during the production process (rubber stoppers), the following method is used: ext. 5 g. of the rubber object with 100 cc. of 1-2% AcOH for 24 hrs. and test the ext. for aldol-α-naphthylamine as before. W. R. Henn

[redacted]

METALLURGICAL LITERATURE CLASSIFICATION

Kinetics and energetics of the high-temperature cracking of methane to acetylene. N. I. Kobozev and L. I. Kastanov (*Compt. rend. Acad. Sci. U.R.S.S.*, 1941, [illegible]).—Equations are given for the kinetics of the various dehydrogenation reactions occurring in the cracking of CH_4 to C_2H_2 at high temp. The equilibrium consts. are obtained. The high-temp. reactions, in contrast to those occurring at lower temp., do not take place at the walls.

A. I. M.

PROCESSES AND PROPERTIES INDEX

Ba

II 1

[illegible]

ASO-SLA METALLURGICAL LITERATURE CLASSIFICATION

Activation characteristics of the thermal cracking of methane. N. I. Kobozev and E. N. Frumin (*Compt. rend. Acad. Sci. U.R.S.S.*, 1941, [illegible], 323—330).—The kinetics of the cracking of CH_4 at low pressure, and when mixed with H_2, have been investigated. Decrease of pressure accelerates the cracking processes $2CH_4 \rightarrow C_2H_4 + 2H_2$ and $C_2H_4 \rightarrow C_2H_2 + H_2$. Dilution of CH_4 fourfold has approx. the same effect as a nine-fold decrease of pressure. The kinetic consts. obey the Arrhenius equation over a wide temp. range. N. I. M.

PROCESSES AND PROPERTIES INDEX

K

F

2463. IS QUENCHING NECESSARY IN THERMAL CRACKING OF METHANE TO ACETYLENE? Kobosev, N. I. (Compt. Rend. Acad. Sci. U.R.S.S., 1943, 39, (7), 261-264).

Tests have been made on the influence of rapid and slow cooling of the reaction gases upon the yiedls of acetylene and ethylene in the cracking of methane-containing gases. The experiments were carried on in quartz, porcelain and carbon tubes in a platinum and in a Tammann stove at temperatures varying from 990 to 2000°C. The results of the experiments are given in a table. The data obtained show that when applied to the cracking of methane quenching is not only unnecessary, but, as a rule, even harmful. It is expedient to allow "after-cracking" after the gas has passed the heating zone. In this way one may increase the yield of unsaturates (and, thereby, cut down energy consumption) to 50%. In one test only cooling proved useful owing, probably, to a low rate of gas movement not consistent with the high temperature of the cracking process. Substitution of air cooling for special water cooling has no influence whatever upon the total yield of un-

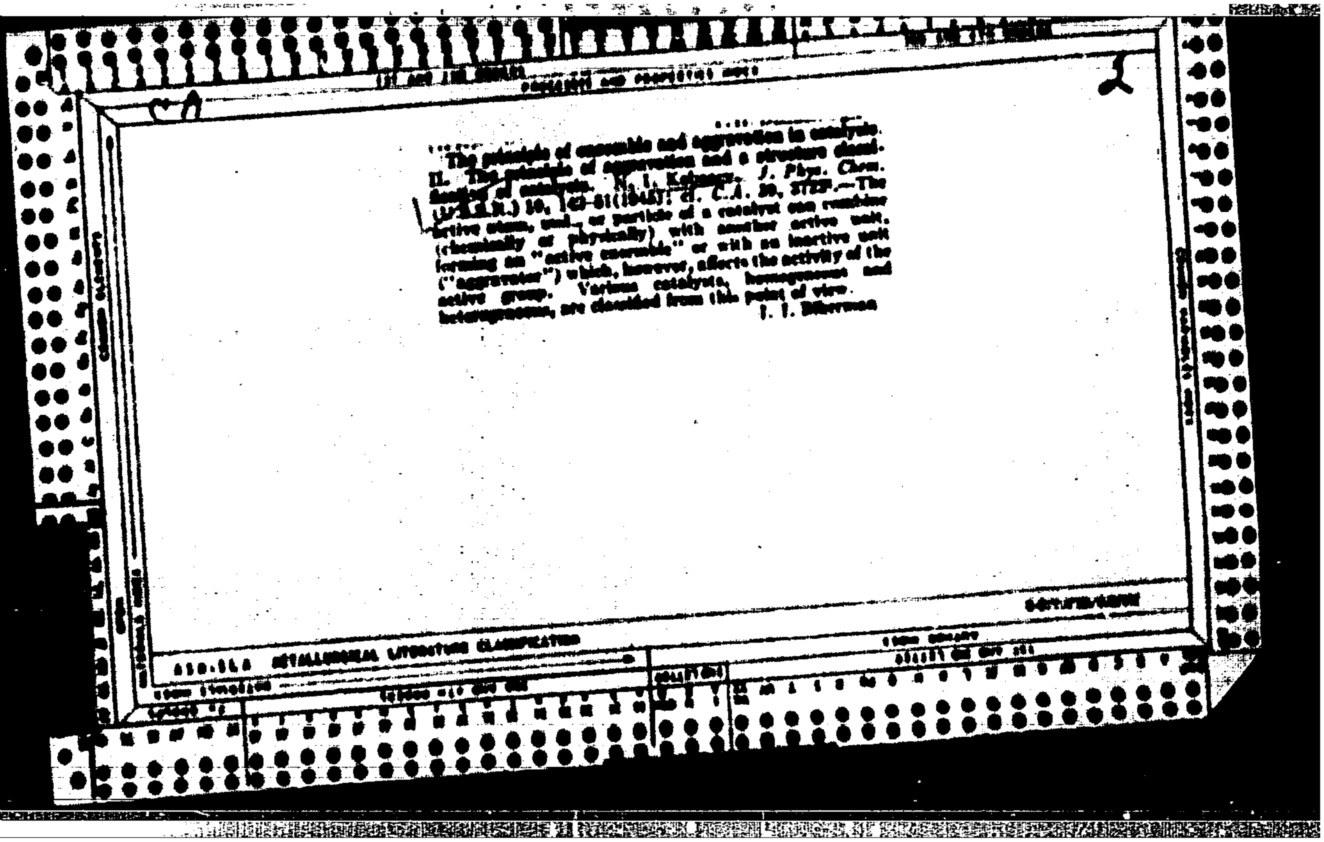
METALLURGICAL LITERATURE CLASSIFICATION

saturates (10.8% and 11.1%), but merely changes the ethylene- acetylene ratio in favour of the latter.

2

[illegible] Kobozev. [illegible] *J. Phys. Chem.* [illegible] (1939); cf. *C.A.* [illegible] [illegible] active [illegible] change of atoms [illegible] active atoms in a cell is equal [illegible] given reaction, this cell is [illegible] too small or too large, this cell is inactive. The no. of active cells depends on the [illegible] of the surface by catalytically active atoms [illegible] and on the size of the cell, which can be calcd. from [illegible] values of the specific activity of the catalyst (i.e., the activity divided by the degree of coverage). The sp. activity usually passes through a max. at a small degree of coverage; from the position of the max. [illegible] can be calcd. It is 3 for Fe on charcoal [illegible] for NH_3 synthesis, [illegible] for Mo on charcoal for NH_3 synthesis, [illegible] for hydrogenation of [illegible] ethylene derivs., 2 for [illegible] on SiO_2 for hydrogenation of cinnamic acid, [illegible] for electrolytic hydrogenation [illegible] for the same reaction, [illegible] hydrogenation of toluene; for decompn. of H_2O_2 in water it is 3 for Fe^{+++}, 1 for Cu^{++}, 2 for Ag^{+}, and 1 [illegible] all on charcoal, and 1 and 7 (two max. of catalytic activity) for Ni^{++} on SiO_2 gel; for oxidation of Na_2SO_3 in water it is 1 for Ag^{+}, Cu^{++}, and Fe^{+++} on charcoal, 2 for Ni^{++} on charcoal, and 3 and 4 for Ni^{++} on SiO_2 gel; it is 1 for Fe on charcoal for oxidation of amino acids. The area of a cell on charcoal is 37 to 330 × 10^{-16} sq. cm., and on SiO_2 gel [illegible] × 10^{-16} sq. cm.; two different reactions using one sample of charcoal give for the area of its cells values within 30%. Since the "ensemble" consists of 2 atoms for hydrogenation of both aliphatic and aromatic substances, the mechanisms of these reactions must be analogous. The effect on H_2O_2 of charcoal contg. 0.1% of [illegible] is independent of the age of the catalyst, but the activity of charcoal contg. [illegible] of [illegible] decreases with time [illegible]. The activity of "ensembles" contg. more than 1 atom is almost independent of the support, but when single atoms are active, the support is very important. The increase of activity of an ion by attaching it to a large inactive body is called "aggravation." J. J. B.

ASA-SLA METALLURGICAL LITERATURE CLASSIFICATION



CA

2

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

The principle of ensemble and aggravation in catalysis. II. The principle of aggravation and a structure classification of catalysts. N. I. Kobozev. *J. Phys. Chem.* (U.S.S.R.) 19, [illegible](1945); cf. *C.A.* 39, [illegible].—The active atom, unit, or particle of a catalyst can combine (chemically or physically) with another active unit, forming an "active ensemble" or with an inactive unit ("aggravator") which, however, affects the activity of the active group. Various catalysts, homogeneous and heterogeneous, are classified from this point of view.

I. I. Bikerman

ASD-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

ca

10

Catalase function of hemin. E. I. Nikolaev and N. I. Kobozev (Moscow Univ.). *J. Phys. Chem.* (U.S.S.R.) 19, [illegible] (1945). — The rate r of decompn. of aq. H_2O_2 by hemin, dissolved in air, [illegible] is proportional to the [illegible] of hemin between [illegible] and 8 × 10 [illegible] g./cc. [illegible] in the concn. of H_2O_2 between 0.02 and 0.4 g. equiv./l. When charcoal (C) is introduced into the hemin-H_2O_2 soln., r is raised but the rise is the smaller the greater is the ratio, ρ, of hemin:C. This shows that single mols. of hemin on C are the active units of the catalyst. When ρ is high, addn. of C lowers the efficiency compared with that in the absence of C. The efficiency of hemin on C decreases with time the more rapidly the higher is ρ; e.g., r/c of 0.8 mg. of hemin + 0.1 g. of C drops by about 80% within 1 hr. This decrease of efficiency is absent when 0.1 g. of C contains less than 0.1 mg. of hemin. Conclusion: The surface of charcoal consists of migration cells about 8 × 10 [illegible] sq. cm. large (cf. C.A. 39, [illegible]).

J. J. Bikerman

METALLURGICAL LITERATURE CLASSIFICATION

CA

2

[illegible] gel. L. A. Nikolaev and [illegible] J. Phys. Chem. [illegible] Cr^{+++} [illegible] $\times 10^{-3}$ [illegible] Cr^{+++} [illegible] The oxidation of Cr [illegible] in the absence of H_2O_2 Cr^{+++} is only very slowly oxidized by H_2O_2. J. J. B.

(CA. 40:11 - 10 June 46)

METALLURGICAL LITERATURE CLASSIFICATION

KOBOZEV, N. I.

Experimental studies of the intermediate stages of catalysis. IV. The kinetics and thermodynamics of intermediate stages in homogeneous catalytic decomposition of hydrogen peroxide. N. I. Kobozev and A. Galbreikh (Lomonosov State Univ., Moscow). *Acta Physicochim. U.R.S.S.* 20, 479-502(1945); cf. *C.A.* 21, 3820; 27, 6020.—Previous work on catalysis of H_2O_2 decompn. by molybdate and chromate is summarized. New data are given for rate of decompn. *V* of H_2O_2 in neutral solns. of 0.001-0.004 *M* dichromate at temps. from 0° to 50°. *V* is given by the expression $k(Cr_2O_7^{--})K(H_2O_2)^2/(1 + K(H_2O_2)^2)$, where chem. formulas in parentheses indicate total analytical molar concns. This is precisely the formula expected for unimol. decompn. of a complex in equil. with 1 mol. of $Cr_2O_7^{--}$ and 2 mols. of H_2O_2, when H_2O_2 is in excess. *K* is the equil. const. for formation and *k* the unimol. rate const. for decompn. of the complex $Cr_2O_9^{--}$. *K* corresponds to $\Delta F = -2700$ cal., independent of *T*, and shows that $\Delta S = 0$; *k* varies exponentially with $1/T$, and shows an activation energy of 15,700 cal. Similar analysis of previous data results in a table of thermodynamic and kinetic consts. for the possible complex ions MoO_8^{--}, WO_8^{--}, $Cr_2O_9^{--}$, and $HCr_2O_9^{-}$. The values for the different complexes are of the same order of magnitude except for $HCr_2O_9^{-}$, which is thermodynamically more stable but decomps. faster as a result of an abnormally high frequency factor, which probably indicates a chain reaction. These intermediate compds. are very different from the "activated complexes" of Eyring since their entropies are not close to the entropy of the final reaction products.

A. C. Allen

C.A.

2

The [illegible] properties of cobalt and nickel ions. [illegible] Univ., Moscow). [illegible] (J. Gen. Chem.) 20, 165-[illegible] (1950).—CoSO₄ and NiSO₄ [illegible] in [illegible] soln. or adsorbed on carriers, Al_2O_3, [illegible], or charcoal, do not greatly [illegible] Co^{++} and Ni^{++} [illegible] are a little more active. The [illegible] passes through [illegible] when [illegible] From this it is concluded [illegible] (cf. C.A. 35, [illegible]) [illegible] The activity of the [illegible] in 20 min. [illegible] J. J. Bikerman [illegible] cathode hydrogen. [illegible]

Phys Chem [illegible]

[illegible] LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

A-1

BC

"Ensemble" and "aggravation" principles in catalysis. I. Fluorescence analysis of [illegible] N. I. Kobozev, [illegible] J. Physical Chem. U.R.S.S., 1944, 19, [illegible]; and J. [illegible] — The structure of a catalyst deposited in a dil. layer on an inert [illegible] investigated by fluorescence analysis on [illegible] of a mosaic of cells separated [illegible]. The variation with concn. in the frequency of [illegible] of groups of 1, 2, . . . n atoms within one cell is calc. [illegible] with a complex composed of a definite no. of atoms, a max. of activity will occur at the concn. at which this complex is most frequent. Analysis of experimental data of catalysis by a no. of catalysts in low concn. on inactive supports reveals max. of activity of the type anticipated. Metallic catalysts appear to be active in groups of from 2 to 4 atoms. This type of activity is called "ensemble" activity and is independent of the nature of the surface on which adsorption takes place. Haemin and the [illegible] active ions of Fe, Cu, and Mn show max. activity for the single atom or mol. Activity of this type is regarded as "aggravation" activity and it is considered that the inert surface or group to which the active ion or mol. is bound specifically "aggravates" its catalytic effect. O. D. S.

Lab. for Catalysis + Electrochem. of Gases, Moscow State U.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PA 54T37

KOBOSEV, N.

USSR/Chemistry - Catalysis May/Jun 19[illegible]
Chemistry - Aggravation and Ensemble Principles

"The Ensemble and Aggravation Principles in Catalysis: II, The Aggravation Principle and Structural Classification of Catalysts," N. Kobosev, Lab for Catalysis and Electrochem Gases, Moscow State U imeni Lomonosov, 15 pp

"Acta Physicochimica URSS" Vol XXI, No 5

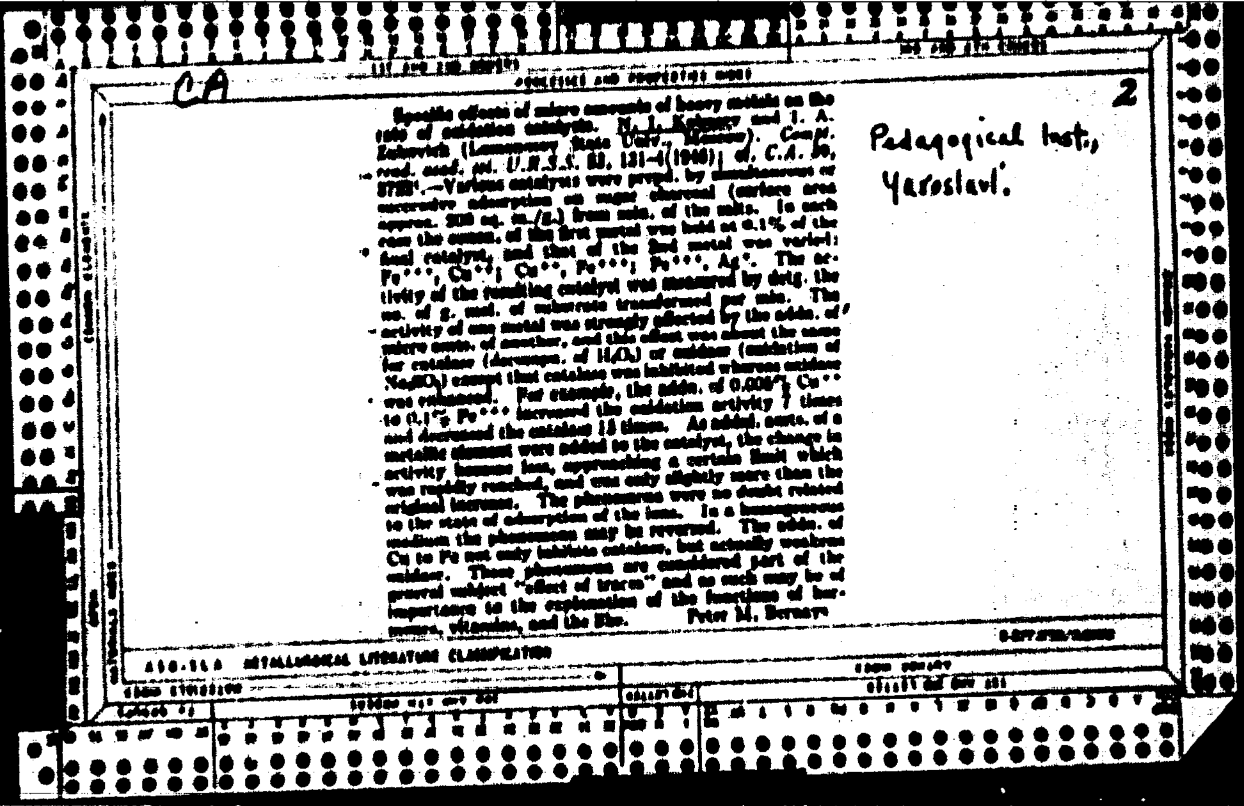
Outline of development of structural classification of catalysts formulated by author in 1941. Principle, underlying classification, is degree of complexity of structure of active center. Designed to replace existing system based upon composite [illegible] classification. Received, 13 Jul 19[illegible].

54T37

2

[illegible] action of various catalysts. The catalytic [illegible] and structure. N. I. Kobozev (Moscow State Univ.). Acta Physicochim. U.R.S.S. 21, [illegible]-518 (1946)(in English).—The action of catalase and of other catalysts capable of speeding up the evolution of O_2 from H_2O_2 is analyzed on the basis of 3 reactions (a) $F + H_2O_2 = F.O + H_2O$, (b) $F + 2H_2O_2 = F^{O}_{O} + 2H_2O$; and (c) $F^{O}_{O} = F + O_2$, where F is the catalyst. (a) and (b) are considered as rapid-equil. or steady-state systems having equil. consts. K_1 and K_2, resp. Reaction (c) is postulated as the slow step with a velocity const. k. Methods are shown for so plotting rate data as to yield values for K_1, K_2, and k. The deduced true activities per active center at 0° in relative units for the various catalysts were: MoO_4^{--}, CrO_4^{--}, WO_4^{--}, and I, 0.1; Fe^{+++}, 1.0; $Cr_2O_7^{--}$, 11.0; Fe^{+++} on charcoal, 100; hemin, 30 to 600; hemin on charcoal, 800; catalase, 5 × [illegible]; Fe_2O_3 and MnO_2, [illegible]; and Pt-black sol, [illegible]. The const. k_0 in the equation $k = k_0e^{-q/RT}$, where q is the energy of activation of reaction (c), is equal to ~ [illegible] throughout the series; this shows that the enhanced activity of the more complex catalysts must be attributed primarily to a lowering of the activation energy. K calcd. from K_1 and K_2, ΔF_1 for reaction (a) and ΔF_2 for reaction (b). A plot of log k against $\Delta F_2 - \Delta F_1$ causes data for all catalysts to fall on 2 straight lines, one for the supported catalysts including catalase, hemin on charcoal, and $FeCl_3$ on charcoal, and the other for the homogeneous catalysts including hemin, Fe^{+++}, and MoO_4^{--} in soln. The increasing activity for each series corresponds to decreasing repulsion between the O atoms in F^{O}_{O}; for catalase, $\Delta F_2 - \Delta F_1$ is neg. corresponding to attraction rather than repulsion between the O atoms. A picture of the intermediate complex holding the 2 O atoms is deduced in which thermodynamic repulsion between the O atoms decreases as the total amt. of supporting material to which the active centers are attached increases. The interrelation of catalase, peroxidase, and oxidase functions is also discussed. F. H. B.

ASD-SLA METALLURGICAL LITERATURE CLASSIFICATION



CA

PROCESSES AND PROPERTIES INDEX

2

Specific effects of micro amounts of heavy metals on the rate of oxidation catalysts. N. I. Kobozev and I. A. Zubovich (Lomonosov State Univ., Moscow). Compt. rend. acad. sci. U.R.S.S. 53, 131-4 (1946); cf. C.A. 40, 5755.—Various catalysts were prepd. by simultaneous or successive adsorption on sugar charcoal (surface area approx. 200 sq. m./g.) from soln. of the salts. In each case the concn. of the first metal was held at 0.1% of the final catalyst, and that of the 2nd metal was varied: Fe^{+++}, Cu^{++}; Cu^{++}, Fe^{+++}; Fe^{+++}, Ag^{+}. The activity of the resulting catalyst was measured by detg. the no. of g. mol. of substrate transformed per min. The activity of one metal was strongly affected by the addn. of micro amts. of another, and this effect was about the same for catalase (decompn. of H_2O_2) or oxidase (oxidation of Na_2SO_3) except that catalase was inhibited whereas oxidase was enhanced. For example, the addn. of 0.006% Cu^{++} to 0.1% Fe^{+++} increased the oxidation activity 7 times and decreased the catalase 15 times. As addnl. amts. of a metallic element were added to the catalyst, the change in activity became less, approaching a certain limit which was rapidly reached, and was only slightly more than the original increase. The phenomena were no doubt related to the state of adsorption of the ions. In a homogeneous medium the phenomena may be reversed. The addn. of Cu to Fe not only inhibits catalase, but actually weakens oxidase. These phenomena are considered part of the general subject "effect of traces" and as such may be of importance to the explanation of the functions of hormones, vitamins, and the like. Peter M. Bernays

Pedagogical Inst., Yaroslavl'.

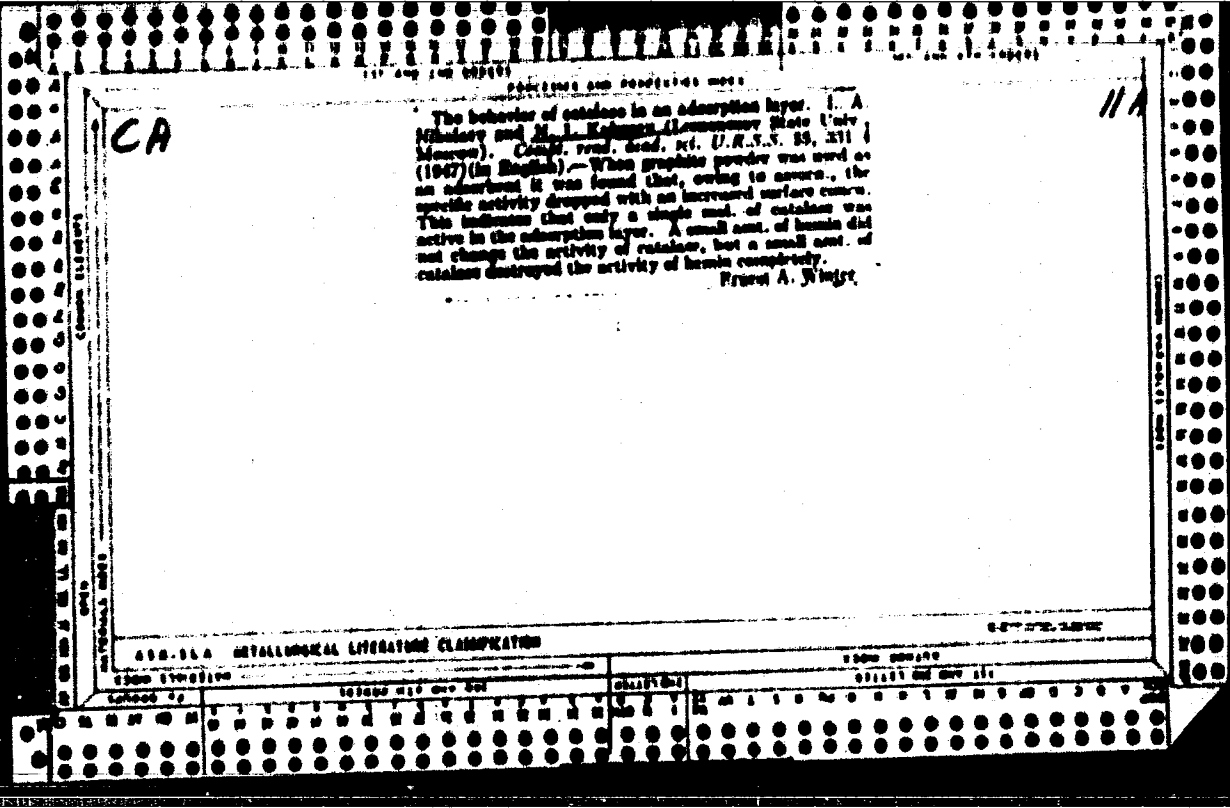
ASD-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

27

Investigation of Ion-Organic Catalysis by a Method Based on the Theory of Active Aggregation. I. Investigation of the Catalytic Hydration of Acetylene According to the Kucherov Method. II. Investigation of Catalytic Polymerization of Acetylene to Vinyl Derivatives. (In Russian.) N. I. Kobozev and others. *Journal of Physical Chemistry* (U.S.S.R.), v. 21, no. 1, 1947, p. 65-96.

METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

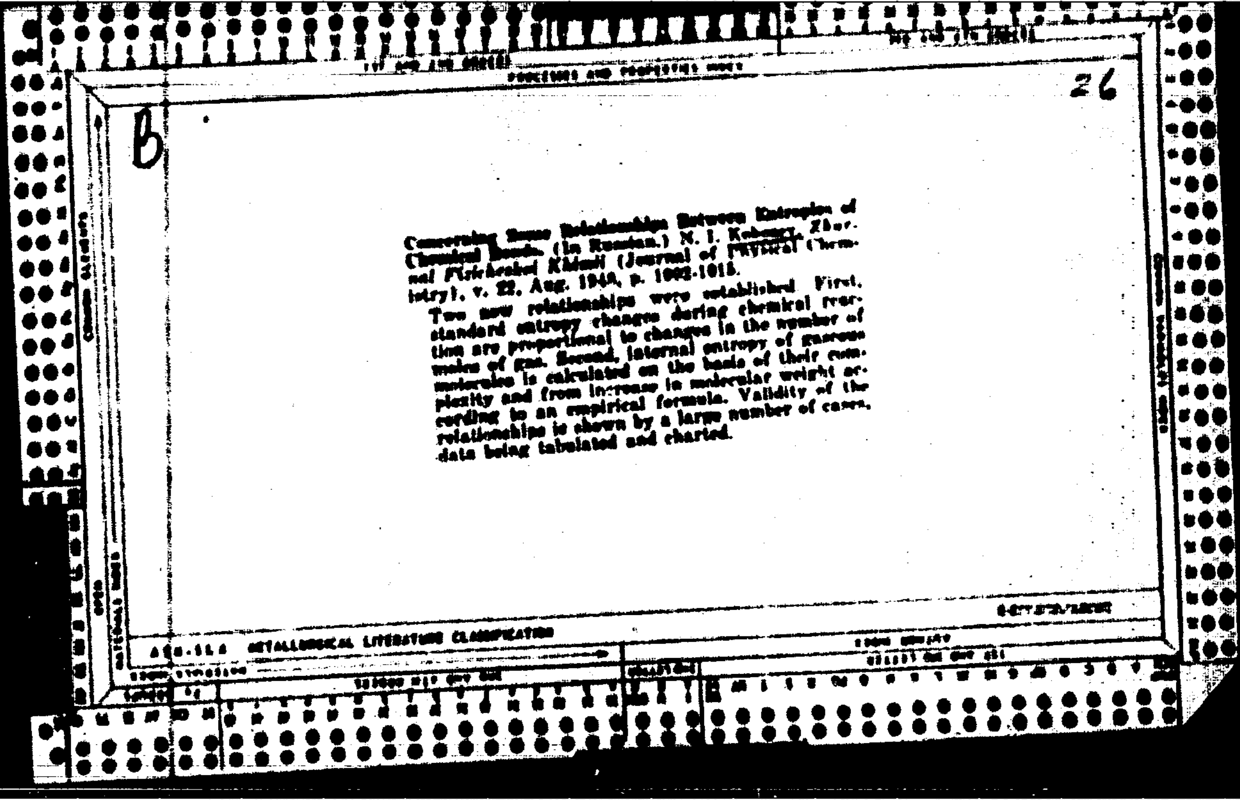
CA

11A

The behavior of catalase in an adsorption layer. I. A. Myasnikov and N. I. Kobozev (Lomonosov State Univ., Moscow). Compt. rend. acad. sci. U.R.S.S. 55, 311 (1947)(in English).—When graphite powder was used as an adsorbent it was found that, owing to aggregation, the specific activity dropped with an increased surface concn. This indicates that only a single mol. of catalase was active in the adsorption layer. A small amt. of hemin did not change the activity of catalase, but a small amt. of catalase destroyed the activity of hemin completely.

Ernest A. Wright

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

B

26

Concerning Some Relationships Between Entropies of Chemical Bonds. (In Russian.) N. I. Kobozev. Zhurnal Fizicheskoi Khimii (Journal of Physical Chemistry), v. 22, Aug. 1948, p. 1003-1015.

Two new relationships were established. First, standard entropy changes during chemical reaction are proportional to changes in the number of moles of gas. Second, internal entropy of gaseous molecules is calculated on the basis of their complexity and from increase in molecular weight according to an empirical formula. Validity of the relationships is shown by a large number of cases, data being tabulated and charted.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

KOBOZEV, N. I.

N. I. Kobozev and V. V. Monblanova, A letter to the Editor. P. 1511.

Refers to previous publications by the writers (J. Phys. Chem. (USSR) 20, 653 (1946) and Z. Elektrochem. 8, 592 (1930) and letter concerning it by Bagotzkii and others (Doklady Acad. Sci. (USSR) 53, 5 (1946) and J. Phys. Chem. (USSR) 21, 241 (1947).

Lab. of Catalysis and Gas Electrochemistry
Moscow Lomonosov State University
Chair of Chemistry of the Second Moscow Medical Inst.
June 13, 1948

SO: Journal of Physical Chemistry (USSR) 22, No. 12 (1948)

[illegible]

USSR/Medicine - Biology Jan 1948

"Elements of the General Theory of Vector-Brownian Processes, and the Laws of Biological Kinematics," N. I. Kobozev, 30 pp

"Byullet Mosk Obshch Ispyt Pri, Otdel Biolo" Vol LIII, No 1

Describes experiments conducted to solve two problems: 1) relationship between vector and Brownian components in trajectories; and 2) make trajectories "Brownian" by taking vector potential inherent in organisms, in this case insects. Editors note that this work, in parts, closely follows material published by E. Schrodinger in his book "Life From the Standpoint of Physics."

61T66

CA

2

Active ensembles of platinum in oxidation-reduction and hydrogenation processes. N. I. Kobozev and N. A. Reshetovskaya. Zhur. Fiz. Khim. 23, 388-406(1949); cf. C.A. 38, 2???.—A chloroplatinate was deposited on active C or Al_2O_3 and used as catalyst. From the variation of the catalytic activity A with the degree of covering α the no. n of Pt atoms in the active "ensemble" and the area S of the "migration cell" were calcd. In decompn. of H_2O_2 n was 1 and 4-6 (on C and Al_2O_3), in oxidation of H_2 1 (on C and Al_2O_3) and 3 (on Al_2O_3), in hydrogenation of maleic acid and PhOH 2 and 6 (on C), and in reduction of p-nitrophenol (I) and picric acid (II) 1 and 3 (on C). When the catalyst was prepd. by depositing $[C_6H_5.CH:CH.CH:CH.PtCl_2].H_2O$ on C, the curve "A/α against α" decreased monotonously when α increased; this simulates n = 1 in hydrogenation of maleic acid, PhOH, I, and II. Because the starting substance contains 2 atoms of Pt in the mol., the true n = 2, and the discrepancy in the instances of I and II is attributed to different chem. affinity of monomeric and dimeric Pt. S ranged from 4 × 10^{-14} to 30 × 10^{-14} sq. cm. and was characteristic for the support. J. J. Bikerman

Lab Catalysis in Gas Electrolyt [illegible]

METALLURGICAL LITERATURE CLASSIFICATION

KOBOZEV, N. I.

"Structure of Disperse Catalyst and Carriers in the Light of the Theory of Active Combinations," Zhur. Fiz. Khim, 23, No. 12, 1949. Moscow OL St U im M. V. Lomonosov, Lab Catalysis and Gas Electrochem, Moscow. -c1949-.

KOBOZEV, N. I.

"Synthesis and decomposition of ammonia in electrical discharges II. Sensitized synthesis of ammonia in a glow discharge," Yu. V. Filippov, V. P. Lebedev, V. V. Zalaman and N. I. Kobozev (Lomonosov State Univ., Moscow). Zhur. Fiz. Khim, 24, 1009-15 (1950)

For abstract of article see card for Yu. V. Filippov.

CA

11A

The problem of the micro dose in chemistry and in biology (growth substances as activators of catalytic systems). I. A. Zubovich and N. I. Kobozev (Moscow Univ.). Biokhimiya 16, 13-20(1951); cf. C.A. 43, [illegible].—The im- adsorption catalysts consisted of 1% Fe+++, Cu++, and Ag+, deposited on sugar C. The catalase activity (H_2O_2 decompn.) was first measured. After the deposition of various concns. of org. acids or phytohormones, the activity of the catalyst was again detd. A comparison of these 2 activities showed the accelerating or inhibiting effect of micro doses of org. substances on the activity of adsorption catalysts. Small amts. of growth substances (0.0005-0.005%) activated the catalysts, whereas larger doses (0.01-0.1%) inactivated them. As is known, the same type of action is shown by the phytohormones in stimulating and in inhibiting plant growth. The av. activating effect by phytohormones on the Cu, Ag, and Fe catalysts was 29, 22, and 11%, resp. Fatty and aromatic acids were inactive. Aliphatic hydroxy acids (glycolic, lactic) sharply inactivated the catalysts. Salicylic acid activated the Ag catalyst, but was without effect on the Fe catalyst. The activation of adsorption catalysts by phytohormones could be very accurately measured, and the results were always reproducible, thus providing a phys-chem. method of characterization of phytohormones. H. Priestley

1951

N. I. Kobozev. Some remarks concerning the article by D. V. Sokol'skii and K. I. Stender: "The role of the carrier in heterogeneous catalysis." P. 375

M. V. Lomonosov Moscow State Univ. Lab. of Catalysis & Gas Electrochem., Oct. 17, 1950

SO: Journal of Physical Chemistry, Vol. 25, No. 3 (March 1951)

CA 4

Theoretical errors in the works of A. N. Frumkin, Z. A. Iofa, and V. S. Bagotskii [on theory of hydrogen overvoltage]. N. I. Kobozev. Zhur. Fiz. Khim. 25, 1111-16 (1951).—The theory of H overvoltage of K. and Nekrasov (*C.A.* 30, 1530) is defended. Attempts are made to show that the arguments raised against it by Frumkin's school (Bagotskii, *et al.*, *C.A.* 41, 2701h, 6478e) are theoretically unsound because they purport to disprove a reaction mechanism (stationary state) by thermodynamic calcns. (equil. state).

Michel Boudart

KOBOZEV, N. I.

Overvoltage

Adsorption theory of hydrogen overvoltage. 1. Overvoltage and energy of M-H bond. Zhur.fiz.khim. 26 no.1. '52.

<u>Monthly List of Russian Accessions</u>, Library of Congress, September 1952. UNCLASSIFIED.

KOBOZEV, N. I.

USSR/Chemistry - Catalysts Jan 52

"Problem of the Paramagnetic State of Catalytically Active Iron Layers (Errors in S. L. Kiperman and M. I. Temkina's Article 'Investigation of the Magnetic properties of Iron-Carbon Catalysts')," V. B. Evdokimov, I. N. Ozeretskovskiy, N. I. Kobozev, Moscow State U inemi M. V. Lomonosov

"Zhur Fis Khim" Vol XXVI, No 1, pp 135-144

Sufficiently dil layers of Fe on carbon are completely paramagnetic, i.e., the Fe is atomic rather than cryst. Catalytic activity of ammonia Fe catalysts, etc., is due to atomic "ensembles" rather than Fe or any other element in the cryst state. There is a sharply lowered ferromagnetism in comparison with ordinary iron even in highly concd Fe layers on carbon. Diln of the Fe adsorption layer on carbon leads to a strong increase of paramagnetism due to Fe atoms. The same phenomenon was observed with adsorbed $Ni(NO_3)_2$. Increase of magnetic susceptibility and ferromagnetism in the samples after oxidation were observed.

PA 211T44