

LAVROVSKIY K.F.

LEVIN, M.Ye.; MALININ, G.A.; MANDRAZHITSKIY, M.N.; SINITSYN, V.P., kand.
tekh. nauk; FEDOROV, V.I.; LAVROVSKIY, K.F., red.; HATAPOV, M.I.,
tekh. red.

[Defense against means of mass destruction] Zashchita ot sredstv
massovogo porazhenia. Pod obshchei red. V.P. Sinitsyna i G.A.
Malinina. Moskva, Gos. uchebno-pedagog. izd-vo M-va prosv. RSFSR,
1958. 181 p.

(Civil defense)

(MIRA 11:9)

LAVROVSKIY, K.F. (Moskva).

New books of the State Training and Pedagogical Literature Publishing
House to be published in 1958. Fiz. v shkole 18 no.2:88-89 Mr-Ap
'58. (MIRA 11:2)

(Bibliography--Physics) (Bibliography--Technology)

VORONTSOV-VEL'YAMINOV, Boris Aleksandrovich, prof.; LAVROVSKIY, K.F.,
red.; TSIRUL'NITSKIY, N.P., tekhn. red.

[Astronomy; textbook for grade 10 high-school students] Astro-
nomia; uchebnik dlia X klassa srednei shkoly. Izd.12 Moskv,
Uchpedgiz, 1958. 143 p. (MIRA 15:7)
(Astronomy)

PROCESSING AND PROPERTIES INDEX

22

Ca

Corrosion of petroleum distillation equipment by sulfur containing crude oil and methods for its prevention. K. P. Lavrovskii and S. I. Vol'ison. *Neftovosk 6/62*, No. 2, 38-46. Corrosion can be prevented by the use of steels contg. Cr, Mo, W, V, etc. A steel with a 4.6% of Cr and in particular with an addnl. 0.5% of Mo is resistant to corrosion. This alloy should be used in tube stills, return bends, fittings and pumps. The towers ~~operated~~ at elevated temps. should be provided with ~~stacks~~ of alloys with 0.15% C and 13.20% Cr. The tubes should be calcined by the diffusion method and should be properly secured to return bends. The use of electrodeposited metals, resins and cements needs further investigation. Eighteen references. A. A. Buchting.

ASB-514 METALLURGICAL LITERATURE CLASSIFICATION

SEARCHED BY UNIT 734

SERIALIZED

INDEXED ONE UNIT 451

LAVROVSKIY, K. P.

PA 27T22

USSR/Engineering
Petroleum -- Cracking
Petroleum Industry

Dec 1946

"Catalytic Pressure Cracking in the Fluid Phase," K.
P. Lavrovskiy, Ye. V. Nozdrina, Yu. L. Fish, 10 pp

"Iz Ak Nauk, Otd Tekh Nauk" No 11

The article develops a method of catalytic pressure cracking of oil products in the liquid and liquid-steam phase in the presence of suspended synthetic contacts. It was shown that in catalytic pressure cracking, completely saturated liquid products are formed in the splitting, the benzene fractions of which are distinguished by their properties.

ID

27T22

LAVROVSKIY, K. P.

PA 27T23

USSR/Engineering

Dec 1946

Fuels, Automotive
Petroleum - Cracking

"The Catalytic Alkylation of Hydrocarbons as a Method of Motor Fuel Production," K. P. Lavrovskiy, A. A. Mikhnovskaya, 14 pp

"Iz Ak Nauk, Otd Tekh Nauk" No 11

The article goes through the production of synthetic cracking alumosilicate catalyzers having high alkylation properties, and discusses the conditions of alkylation of the benzene propane-propylene fractions of cracked gas and the determination of the physical and chemical parameters of the heterogeneous catalyzation process of condensation of benzene with olefin.

ID

27T23

LAVROVSKIY, K.P.
YUSHKEVICH-GAVERDOVSKAYA, M.V., LAVROVSKIY, K.P., MIKHNOVSKAYA, A.A., ZINOV'YEVA, Z.M.,
AND YAKIMCHKINA, V.I.

"Contact Transformations of Hexene and Cyclohexene Over an Aluminosilicate Catalyst."
Vestnik Moskovskogo Universiteta, no. 11, 1948

PA 27/4915

USSR/Chemistry - Aniline, Alkylation of Jan 49
Chemistry - n-Butene

"Catalytic Alkylation of Aniline With n-Butene,"
K. Lavrovskiy, A. Mikhovskaya, I. Olen'chenko, 3 pp

"Dok Ak NaukSSSR" Vol LXIV, No 3

Concludes: (1) Synthetic aminosulfates, used for
catalytic cracking, are active catalyzers in the
alkylation of aromatic amines. (2) During subject
alkylation, amines form with a substitution group
in the nucleus. Alkylation is accompanied by
cracking, destructive alkylation and ring formation
with n-toluidine forming as the chief product of

27/4915

USSR/Chemistry - Aniline, Alkylation Jan 49
of (Contd)

reaction. (3) Synthetic aminosulfates cause a
Hofmann regrouping of the substituted aromatic
amines. Submitted 24 Nov 48.

27/4915

LAVROVSKIY, B.

CA

Cracking of ethane and of propane under conditions of rapid heat exchange. K. P. Lavrovskii and A. M. Brodskii. *Doklady Akad. Nauk S.S.S.R.* 72, 745-8 (1950). — Achievement of satisfactory yields of C_2H_4 and C_3H_6 from C_2H_6 and C_3H_8 requires rapid heating up of the gas followed by rapid cooling. These conditions are realized technologically, under approx. atm. pressure, by passing the gas through a column of preliminary heated alkali sand or corundum of 0.05 cm. effective grain diam., and cooling the outgoing gas by injection of water. Expts. were run in vertical quartz tubes of 3.2 cm. diam., filled with corundum, 120 g./1-2 g. C_2H_6 , at 850° and at 1000°, with the contact times τ varied from 0.02 to 0.2 sec. (at 850°) and 0.005-0.03 sec. (at 1000°); the products were analyzed for H_2 , C_2H_4 , C_2H_2 , C_3H_6 , C_3H_4 , C_4H_6 , C_4H_8 , and C. The yield of C_2H_4 from C_2H_6 and from C_3H_8 at 850° passes through a flat max. in the range $\tau \sim 0.05-0.07$; from C_2H_6 at 1000°, there is a more pronounced max., at about $\tau \sim 0.015$ sec. With C_2H_6 , the ratio of the vol. % of the gas absorbed in 93% H_2SO_4 and the % of C_2H_4 was const., 0.05 at 850° and 0.065 at 1000°. With C_3H_8 at 850°, the vol. ratio C_2H_4/C_3H_6 decreases with increasing τ ,

rapidly from $\tau = 0.02$ to 0.05, much slower with further increasing τ . The amts. of C_2H_4 and C_3H_6 were insignificant and fell with increasing τ . Liquid products amounted to not over 5% at long τ and fell to 2% at $\tau \sim 0.01$ sec. The results prove that the dehydrogenation reactions $C_2H_6 \rightarrow C_2H_4 + H_2$ and $C_3H_8 \rightarrow C_3H_6 + H_2$ take place more rapidly than the C-C bond rupture reactions, $C_2H_6 \rightarrow C_2H_2 + 1/2 C_2H_4$ ($\rightarrow 2C + 3 H_2$) and $C_3H_8 \rightarrow C_3H_4 + C_2H_6$ ($\rightarrow 3C + 4 H_2$), even though the latter are favored energetically. This is in conflict with the Rice-Herzfeld chain mechanism (C.A. 28, 1652). In the temp. range 800-1200°, the amt. of olefins formed varies with the temp. according to a law of the type $A \times 10^{-2/\tau}$; for C_2H_6 , $A = 7.8 \times 10^3$ (°C.), $A = 29$ in wt. %. The C (coke) formed is not a primary product of direct decomp. into the elements, but is of secondary origin. This is confirmed by the fact that the coke always contains some 4-6% H_2 , and that significant amts. of coke are formed also when C_2H_6 is passed under the same conditions. N. Thon

LAVROVSKI, K. P.

4

The catalytic cracking of cyclic hydrocarbons at high pressures. K. P. Lavrovskii, Yu. I. Elish, and N. N. Nisimovich. *Dokl. Akad. Nauk S.S.S.R.* 1, 116-32 (1952).—The catalytic cracking of cyclic hydrocarbons at high pressures with an Al silicate catalyst was studied. The following hydrocarbons were cracked under these conditions: butylbenzene, butylcyclohexane, isopropylcyclohexane, isopropylbenzene, Tetralin, and Decalin. The aromatic hydrocarbons were found to be more stable under the exptl. conditions. The fluid catalyzates do not contain significant amts. of unsatd. compds. The mechanism of the catalytic action of the Al silicate is discussed.
J. Rovtar Leach

LAVROVSKIY, K. P.

4

The problem of the rectification of hydrocarbon gas. K. P. Lavrovskij, A. M. Brodskij, and E. L. Zaltsva. *Doklady Akad. Nauk S.S.S.R.*, 90, 75-8 (1953). The kinetics of the desorption from activated C of ethylene, propylene, and a mixt. of butylenes and ethylene-propylene mixts. have been studied to see if the difference in desorption rates could be used in the separ. of the cracking gas C₂-C₃ fraction. N₂ at 395 ± 5° was passed through a U tube contg. activated C said. with the particular olefin. The amt. of desorbed gas was measured by weighing and analyzing the exit gas. The rate of N₂ flow (approx. 20 m./sec.) was such that the time required for the adsorbed gas to attain the N₂ temp. was small compared to the desorption time. It was found that ethylene is desorbed much faster than propylene or butylene. By using kinetic considerations the equation $a = Te + (A_0 - Te)e^{-\beta/l}$ is derived. Here T is the const. from the Freundlich adsorption isotherm ($a = Tc^{1/n}$), n is the no. of components in the system, a_0 and c are const. of the system, l is time, β is the kinetic coeff., and a is the const. in the adsorbed phase. With this equation it is possible to calc. the amt. of gas desorbed for a given time under given conditions. From the exptl. data the values found for β/l are: ethylene 2.9 sec.⁻¹, propylene 0.575 sec.⁻¹, and butylene 10.52 sec.⁻¹. Joseph B. Levy

Chemical Abst.
Vol. 48 No. 8
Apr. 25, 1954
Petroleum, Lubricants, and Asphalt

4
Rapid stream cracking of liquid hydrocarbons. K. P. Lavrovskii, A. M. Broiseli, and G. A. Garunov (Petroleum Inst. Acad. Sci. U.S.S.R., Moscow). *Doklady Akad. Nauk S.S.S.R.* 92, 687-70 (1953).—Rapid-flow cracking of heavy petroleum products is best done at about 700° with contact of 0.1 sec. with rapid cooling and heating. The distillate fractions contain considerable amts. of unsaturates and S compds. Reforming of these substances yields a high-quality stable fuel; the fraction of catalyzate which b. 205-380° is best for hydrogenation over a stationary catalyst. A math. analysis of the heat transfer in rapid-flow cracking is made, and it is shown that for Re greater than 100 the following formula applies: $\theta = d^{0.17} \gamma / 1.44 v^{0.11} (1 - \gamma)$, where γ is porosity of the heat carrier, d is the particle diam. of heat carrier, v is the linear flow rate, a is the av. transfer coeff., and θ is the time for heating. For Re under 100 the formulation is $\theta = d^2(1 - \gamma)/12av$.
G. M. Kosolapoff

10-14-54
SAP

Full translation W-30516

LAVROVSKIY, K.P.; BRODSKIY, A.M.

Reprocessing of gaseous paraffins under conditions of high-speed
cracking. Trudy Inst.nefti 4:176-198 '54. (MLRA 8:1)

1. Chlen-korrespondent Akademii nauk SSSR (for Lavrovskiy)
(Paraffins) (Cracking process)

LAVROVSKIY, K. P. and BRODSKIY, A. M.

"A Physico-Chemical Investigation of High-Speed Contact Cracking" paper presented at
Fourth World Petroleum Congress, Dec '55

So: D407195
A-50226, 27 June 55

LAVROVSKIY, K.P.; MAKAROV, D.V.

[Combination method of deep hydrogenation of residual petroleum products] Kombinirovannyi metod glubokoi gidrogenizatsii ostatkovykh nefteproduktor; doklady na IV Mezhdunarodnom neftianom kongresse v Rime. Moskva, Izd-vo Akademii nauk SSSR, 1955. 15p.
(Hydrogenation) (Petroleum) (MLRA 8:10)

LAVROVSKIY, K.P.; BRODSKIY, A.M.

[Physico-chemical investigation of high-speed contact cracking]
Fiziko-khimicheskoe issledovanie vysokoskorostnogo krekinga;
doklady na IV Mezhdunarodnom neftianom kongresse v Rime.Moskva
Izd-vo Akademii nauk SSSR, 1955. 22 p. (MLRA 8:10)
(Cracking process)

LAVROVSKIY, K. P.

FU The combination method of deep hydrogenation of residual petroleum products. K. P. Lavrovskii and D. V. Makarov. Repts. 4th World Petroleum Congr., Rome 1955, 5-10 (in Russian, Engl. translation 11-16).—Hydrogenation of heavy oils with

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... active ...
J. B. ...
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APPROVED FOR RELEASE: 06/20/2000

CIA-RDP86-00513R000928830006-5"

Physicochemical investigation of high-speed catalytic cracking. K. P. Lavrovskii and A. M. Brodskii. *Repts. 4th World Petroleum Cong., Rome 1955, 5-14* (in Russian, Engl. translation 16-23).—In the cracking of high-mol. compds. such as heavy crude oils and low-boiling hydrocarbons, products contg. more olefins and less aromatic hydrocarbons would be obtained if condensation reactions with resulting asphalt and coke formation could be controlled. Since the rate of coke formation is slow compared with the rate of the destructive reactions, advantage can be taken of the temp. effect on the rate of coke formation. By selecting short residence times in the heating zone and by recycling, it is possible to raise the reaction temp. which greatly increases the reaction rate and lowers coke yield. At 750-850° in the case of high-mol. paraffins and 1000-1200° for lower paraffins, the max. reaction time needed for max. yields drops to 0.01 sec. and continues to fall exponentially as the temp. rises. The time required for max. yields for heavy feedstocks was found to be 0.1 sec., and for the cracking of C_7H_{16} at 1000° was 0.012 sec. These conditions can be met by the use of a powd. heat-transfer medium. The reaction time is a function of the diam. of the particles of the heat-transfer medium which provides a means of reaction control.

J. B. Morrissey

gm

LAVROVSKI, K.P.

✓ 1813. Kinetics of the coking of petroleum asphaltene. A. M. Brodskii, K. P. Lavrovskii, and E. D. Filstova. *Izv. Akad. Nauk. S.S.S.R., Otdel. Tekh. Nauk*, 1955, (1), 141-4.
Asphaltic residue (25%) obtained by C_6H_6 de-asphalting of 50% bottoms from Romashinsk crude was purified by twice re-precipitating (with intermediate soln in C_6H_6) from C_6H_6 , yielding material with C.H. (Con) 87.5%. This was dissolved (20 and 37 p.p.m., concn determined by optical density) in thiophene-free C_6H_6 (verified to be inert under test conditions). Soln was passed through quartz tube at ca 700° C and asphaltene content of condensate measured. Results indicate that gas-phase coking of asphaltene is bimolecular reaction, reaction rate increased by 1.7 times on temp rise from 715° to 755° C. Mol. wt. of 1300 was assumed; activation energy of reaction calc as ca 21 k.cal/mol.

V. B.

(2)

FD-2934

USSR/Geology - Petroleum

Card 1/1 Pub. 41-15/17

Author : Lavrovskiy, K. P. and Rozental' A. L., Moscow

Title : Kinetics of the regeneration of synthetic bead catalysts.

Periodical : Izv. AN SSSR, Otd. Tekh. Nauk 6, 140-148, June 1955

Abstract : Describes the mechanics of the experimental procedure and analyzes the data received, the purpose of the experiment being to determine the kinetics of the removal of carbon from the working surfaces of the synthetic bead catalysts used in petroleum refineries. The carbon is removed by oxidation and combustion. Diagrams, graphs, tables and formulae. Six references, 4 USSR

Institution :

Submitted : April 24, 1954

LAUROVSKIY, K.P.

USSR/Chemistry - Catalysis

Card 1/1 Pub. 22 - 27/52

Authors : Lavrovskiy, K. P., Memb. Corresp., Acad. of Sc., USSR; and
Kol'banovskiy, Iu. A.

Title : The mechanism of heterogeneous catalysis over oxide catalysts

Periodical : Dok. AN SSSR 101/4, 687-688, Apr 1, 1955

Abstract : Scientific data are presented regarding the mechanism of heterogeneous catalysis (catalytic isomerization, hydrogenation, etc) accomplished by means of oxide catalysts: CrO, ZnO, VO containing polyvalent cations and WS, MoS₂, NiS catalysts. The existence on the surface of oxide catalysts of ion and radical type compounds is explained. It is shown that products synthesized over metallic catalysts should have a lesser content of branched hydrocarbons than the products synthesized over oxide catalysts. Five USSR references (1934-1954). Table.

Institution : Acad. of Sc., USSR, Petroleum Institute

Submitted : December 11, 1954

LAVROVSKIY, K. P. and KOLBANOVSKIY, Yu. A.

"Methods of Utilizing Atomic Energy in the Chemical Technology of Petroleum,"
Khim. i Tekh. Topliva, No.1, pp. 7-17, 1956

Translation 1071265

LAVROVSKIY, K.P.

Regularities in the course of chemical reactions in a "boiling" layer. K. P. Lavrovskii and A. L. Rozenfal. *Khim. i Tekhn. Topika* 1956, No. 2, 27-9; cf. Bodenstein and Wegner, *Z.A.* 2, 1222; Matheson, et al., *C.A.* 43, 2615. The authors give general terms for systems in which particles circulate within the limits of the app., usually also with use of "boiling" or "bubbling" layers or beds of material. The particles suspended in a rising stream of gas. The Russian term in America is "fluidization"). The particles circulate within the limits of the vol. of the app., usually

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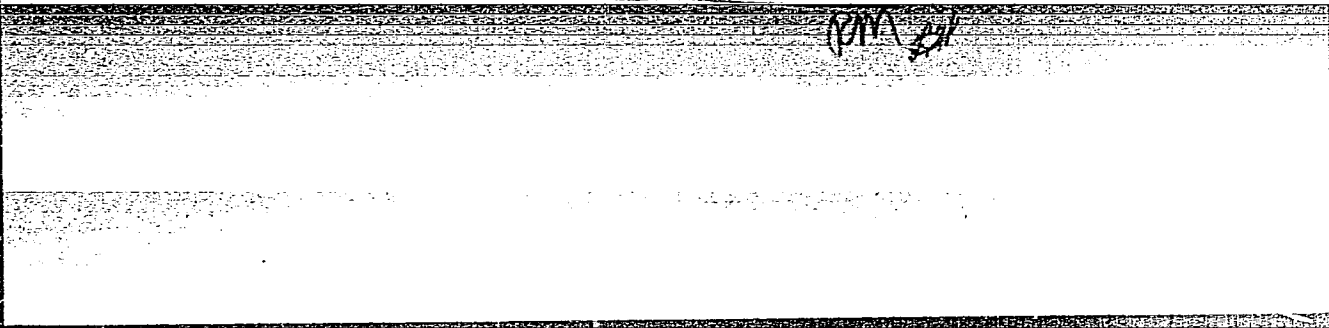
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SECRET

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APPROVED FOR RELEASE: 06/20/2000

CIA-RDP86-00513R000928830006-5"

Mixing of gas in a boiling layer. K. P. Lavrovskii and
A. L. Rozhenko. *Khim. i Tekhnol. Topium* 1956, No. 3, 17-
21. By using the exptl data of Gilliland *et al.* (C.A. 47,
8422c) equations for optimum gas flow in petroleum cracking
processes were developed.
A. P. Kotel'ny

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made

JM

BRODSKIY, A.M.; KALINENKO, R.A.; LAVROVSKIY, K.P.

Adsorptive analysis and separation of hydrocarbon gases. Khim. i
tekh. topl. no.8:18-22 Ag '56. (MIRA 9:10)

1. Institut nefiti Akademii nauk SSSR.
(Hydrocarbons)

LAVROVSKIY, K. P.

USSR/Physical Chemistry - Kinetics. Combustion.
Explosives. Topochemistry. Catalysis

B-9

Abs Jour : Referat Zhur - Khimiya, No 2, 1957, 3844

Author : Lavrovskiy K.P., Kolbanovskiy Yu.A.

Inst : Institute of Petroleum, Academy of Sciences UESR

Title : The Role of Ionization Potential in Electron Catalysis
at Metals

Orig Pub : Tr. In-ta nefti AN SSSR, 1956, 8, 92-93

Abstract : The authors consider the film of adsorbed gas at the surface of a metal catalyst as a semi-conductor and assume that for the same reaction of hydrogen transfer, the ratio of energy of activation values E at Pt and Pd must be approximately equal to the ratio of ionization potentials (U) of these metals. From the known values of E_{in} , the dehydrogenation of piperidine and cyclohexane, hydrogenation of methyl acetylene and cyclopropane and the oxidation of iso-octane at Pt, the values of E of these

Card 1/2.

- 139 -

LAVROVSKIY, K.P.

Category: USSR

B-9

Abs Jour: Zh--Kh, No 3, 1957, 7581

Author : Lavrovskiy, K. P. and Rozentel, A. L.

Inst : Petroleum Institute of the Academy of Sciences USSR

Title : The Mechanism of Chemical Reactions in Fluidized Beds

Orig Pub: Tr. In-ta Nefti AN SSSR, 1956, Vol 8, 94-98

Abstract: The basic principles of reactions occurring in "boiling layers (i. e. in systems consisting of a gas and moving dust-like particles of catalyst or some other substance) have been investigated and the effect of mixing on the distribution of the reactants concentrations over the length of the bed has been determined. It has been shown that for n -order heterogeneous reactions in which no change of volume occurs increasing the dispersion, all other factors being equal, will lower the conversion; the depressing effect is the greater

Card : 1/2

-32-

Category: USSR

B-9

Abs Jour: Zh--Kh, No 3, 1957, 7581

the higher n . Under conditions of catalyst poisoning, increasing the dispersion will increase the conversion. When a number of parallel reactions occur in the fluidized bed, increasing the dispersion will lead to an equalization of the product distribution by the inhibition of the faster reactions,

Card : 2/2

-33-

... sulphide, goes to a reactor, in which it reduces iron ore to iron, iron sulphide, and possibly sulphur compounds of iron. The reduced ore and hot steam are fed into the hydrogen generator, where ferrosulfuric oxide and hydrogen are formed, and also hydrogen sulphide. The ferrosulfuric oxide, with the gases from the reducer, goes to a tank in which oxidation of the sulphur compounds of iron and completion of oxidation of the reducing gases takes place. The heated ore goes to the reducer, thus completing the cycle. The reactions take place in a fluidized bed with pulverized ore. The conditions at the different stages of the process are examined. The experimental plant produced 1 cu.m/h of hydrogen. Temperatures were 750 to 800 in the reducer, 800 to 850 in the heater, and 500 to 550 in the gas cooler. With desulfurized ore, impurities in the hydrogen did not exceed 0.1%.

for data

LAVROVSKIY, K.P.

USSR/Chemical Technology, Chemical Products and Their I-14
Application--Treatment of natural gases and
petroleum. Motor fuels. Lubricants.

Abs Jour: Ref Zhur-Khimiya, No 3, 1957, 9308

Author : Lavrovskiy, K. P., Makarov, D. V., and Nazarova, L.M.
Inst : Petroleum Institute of the Academy of Sciences USSR
Title : The Combined Deep-Seated Hydrogenation Method

Orig Pub: Tr. In-ta nefti AN SSSR, 1956, Vol 8, 145-154

Abstract: The combined deep-seated hydrogenation of residual oils from Romashkin crude has been investigated in pilot plant installations of the continuous type. The charge stock (d_4^{20} 0.965, 10.3% boiling below 350°, 17.8% boiling between 350 and 400°) is mixed with 2% carbon-base Fe-catalyst and subjected to a single-pass hydrogenation in a tubular reactor at 470° and 350 atm; the reactor throughput is 2.5 kg/liter/hour. A contact time of 3 min is used. The hydrogenate obtained in 90% yields is subjected

Card 1/3

USSR/Chemical Technology. Chemical Products and Their I-14
Application--Treatment of natural gases and
petroleum. Motor fuels. Lubricants.

Abs Jour: Ref Zhur-Khimiya, No 3, 1957, 9308

Abstract: in the output of useful products, lowers the H_2
requirements, and leads to the production of a
desulfurized motor fuel of high quality requiring
no further treatment; the yield of the latter is
79.5% calculated on the residual oil charge. The
flow sheet and equipment used in combined deep-
seated hydrogenation are considerably simpler
than those of industrial installations using
fluidized catalyst beds.

Card 3/3

LAVROVSKIY, K.P.

USSR/Chemical Technology - Chemical Products and Their I-8
Application. Treatment of Natural Gases and Petroleum.
Motor and Jet Fuels. Lubricants.

Abs Jour : Ref Zhur - Khimiya, No 1, 1958, 2545

Author : Lavrovskiy, K.P., Brodskiy, A.M.

Inst : -

Title : The Importance of Thermocontact Processes in the Furtherance and Chemization of Petroleum Processing.

Orig Pub : Khim. nauka i prom-st', 1957, 2, No 2, 189-196

Abstract : Description of the composition of outflowing gases and of the quality of liquid products obtained on high-speed contact cracking (SCC) of various petroleum products, in an enlarged laboratory unit. As the heat transfer agent were utilized petroleum coke particles 300-500 μ in size. SCC was conducted using as the raw material Romashkinskiy mazut, the temperature of the added coke being 940 $^{\circ}$, the temperature at the egress from the reactor 640 $^{\circ}$ and the raw

Card 1/2

USSR/Chemical Technology - Chemical Products and Their Application. Treatment of Natural Gases and Petroleum. Motor and Jet Fuels. Lubricants. I-8

Abs Jour : Ref Zhur- Khimiya, No 1, 1958, 2545

material feed of 550 ml/minute. In the cracking of Tuymazinskiy mazut these values were, respectively, 960°, 640° and 740 ml per minute, and in cracking of gasoline head distillate -- 930, 760 and 320 ml/minute. Cracking of ethane was carried out at 1000° and a duration of the reaction of 0.012 second. Gases of SCC contain large amounts of unsaturated hydrocarbons, and the liquid products obtained on cracking of gasoline head distillate, -- a considerable amount of lower aromatic hydrocarbons. On cracking of ethane at 1050° a 10-12% yield of C_2H_2 was obtained, on the basis of the raw material, while at 1150° and with dilution of the raw material this yield was of 20-22%. A characterization of the SCC process and of its technological embodiments is provided.

Card 2/2

LAVROVSKIY, K. P.

BRODSKIY, A.I.; KALINENKO, R.A.; LAVROVSKIY, K.P.

The application of adsorption method of analysis and separation of hydrocarbon gases during kinetic study using labeled atoms. Probl. kin. i kat. 9:399-404 '57. (MIRA 11:3)

(Gases--Spectra) (Carbon--Isotopes)

LAVROVSKY, K. P.

Interaction of iron oxides with methane in fluidized beds ¹⁹ ⁷ ⁵ ^{HEC}
...
siderite ore, with the product 71.0% Fe, which contained
... W. Al. Sternberg

Handwritten initials: M, H, G, 006

LAVROVSKIY, K. P.

AUTHORS: Brodskiy, A. M. , Kalinenko, R. A. , ^{20-5-19/48} Lavrovskiy, K. P. , Corresponding Member AN USSR, and Titov, V. B.

TITLE: Kinetic Laws in the High-Temperature Cracking of Ethane (O kineticheskikh zakonomernostyakh vysokotemperaturnogo krekinga etana)

PERIODICAL: Doklady AN SSSR, 1957, Vol. 116, Nr 5, pp. 789 - 792 (USSR)

ABSTRACT: In this paper the investigation of the total kinetics of this cracking between 800 and 900° is described. The increase of temperature and the corresponding rapid shortening of the reaction period from 0,5 to 0,005 seconds demand a special experimental method. The experiment was divided into 2 parts: 1.) the cracking itself and 2.) analysis of the products. In the case of the latter a chromatographical method worked out by the authors was used (reference 3), where this method failed because of the small quantity of the single gases (e.g. isobutane), the method of radioactive indicators was used. In addition to that, a small quantity of methane, marked with C¹⁴, was added to the initial ethane. Figure 1 gives the arrangement of the basic elements of the experimental device. During the experiments a "boiling layer" (reference 2) was produced in the reactor. After a quick cooling of the cracking products after the output from the boiling layer CO₂ of room temperature and in

Card 1/3

20-5-19/48

Kinetic Laws in the High-Temperature Cracking of Ethane

a weight relation of 3 : 12 to the reaction mixture was introduced into the reactor from above. The basic composition of the waste gas at 3 temperatures is given by table 1. The given reaction duration $t = \frac{V \epsilon}{v F}$, V = the volume of the boiling layer, v = the

average linear velocity of the current with regard to temperature extension, ϵ = the share of the free volume, and F = the cross section of the reactor. The conservation equation (1) for ethane is transcribed in the following way which is easy for the graphic re-

$$y = \frac{[C_2H_6]_t}{[C_2H_6]_0} = 1 + kt \quad (2) \quad \text{Table 2 gives the dependence}$$

$y(t)$ for all 3 investigated temperatures. The value k was at 770° 0,54, 7 at 838°, and 31 at 890°. The precision of the k value is very high as it is shown by figure 2. In table 3 the dependence $\ln k$ on $\frac{1}{T}$ is given. This shows that the value $E = -\frac{d \ln k}{d \frac{1}{T}}$

does not remain constant with the increase of T and increases from 68 Cal obtained at lower temperatures to $82,0 \pm 3$ Cal. This proves on the one hand the alteration of the reaction mechanism, in which the share of the chain process obviously decreases (reference 5); on the other hand the found value is approximated to the value of the cracking energy of the C - C - binding in the ethane which was

Kinetic Laws in the High-Temperature Cracking of Ethane

20-5-19/48

measured in the previous paper (reference 6). By means of the authors' method it was found that in the ethane cracking products in tenth % quantities divinyl, butylene, and only traces of isobutane, finally propylene and propane, a fact which was never defined exactly in the references. Figure 2 furthermore shows that the known self-inhibition effect is not expressed up to high degrees of transformation. This can be explained by the connection between the self-inhibition at lower temperature and the influence of the walls. There are 3 figures, 1 table, and 7 references, 4 of which are Slavic.

ASSOCIATION: Petroleum Institute AN USSR
(Institut nefti Akademii nauk SSSR)

SUBMITTED: May 25, 1957

AVAILABLE: Library of Congress

Card 3/3

LAVROVSKIY K. P.

AUTHORS:

Brodskiy, A. M., Kalinenko, R. A., Lavrovskiy, 20-6-26/47
K. P., Corresponding Member of the AN USSR, Titov, V. B.

TITLE:

The Significance of Chain Reactions in the High-Temperature
Cracking of Ethane (O znachenii tsepykh reaktsiy pri
vysokotemperaturnom krekinge etana)

PERIODICAL:

Doklady AN SSSR, 1957, Vol. 117, Nr 6, pp. 1013-1016 (USSR)

ABSTRACT:

The present paper investigates the portion of chain reactions in the cracking of ethane in the temperature interval 770-900°C. This problem is at present intensively investigated for low temperatures (references 1, 2, 3, 8). But the mechanism of the cracking and of the pyrolyses is not to be considered as finally determined, especially not at the high temperatures used in engineering. For solving this problem the authors made measurements of the activities of the different products obtained in the cracking of a mixture of ethane with methane (labelled with C¹⁴). The method of these tests was already described in an earlier work (reference 5). The data obtained for the temperatures 770, 840 and 890°C are illustrated in a diagram. The tests discussed here were performed in the case of complete or almost complete intermixture in the "boiling" layer, which permits the reduction of the problem under review

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The Significance of Chain Reactions in the High-Temperature
Cracking of Ethane 20-6-26/47

to the solution of a system of algebraic equations. The author additionally includes 5 elementary processes in the examination. Then the expressions for the dependence of the concentrations of the various active products on time, obtained due to a special analysis, are given. A provisional estimation already shows that the portion of chain reactions in the total process of cracking within the frame of the generally used scheme in the case investigated here is very small. Detailed numerical data on this are given. There are 1 table, and 9 references, 5 of which are Slavic.

ASSOCIATION: Petroleum Institute AN USSR (Institut nefti Akademii
nauk SSSR)

SUBMITTED: July 18, 1957

AVAILABLE: Library of Congress

Card 2/2

LAVROVSKIY, K. P.

65-1-13/14

AUTHORS: Lavrovskiy, K. P. and Brodskiy, A. M.

TITLE: On the High Velocity Process of Thermal Conversion of Hydrocarbons. (K voprosu o vysokoskorostnom protsesse termicheskoy pererabotki uglevodorodov).

PERIODICAL: Khimiya i Tekhnologiya Topliv i Masel, 1958, Nr.1. pp.64-68. (USSR).

ABSTRACT: Reply to a criticism by P. I. Luk'yanov which was published in this journal (1957, No.9, p.53) on a previous publication by the authors in DAN SSSR, 1953, vol.92, No.5, in Izd.AN SSSR, 1955 and the 4th World Petroleum Congress, Section III, Rome, 1955.

The authors defend the correctness of their formula for the evaluation of the order of time required for the heating up of a moving layer of vapours on contact with a heat transfer medium under conditions of high velocity cracking. They also criticise the form of publication of the criticism of their paper by the Editorial Office. There is 1 figure and 8 references.

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The editorial office of the journal, in an Editorial Notice (p.68) explains that in view of the refusal of

On the High Velocity Process of Thermal Conversion of Hydrocarbons.

the original authors to acknowledge errors, their paper was sent to a specialist in the field of design of reactors for chemical processes.

Pp.69-71. Comments by A. N. Planovskiy and D. I. Orochko on the paper of K. P. Lavrovskiy and A. M. Brodskiy, and criticism of the mathematical treatment of the problem. There are 7 References: 6 Russian, 1 English.

AVAILABLE. Library of Congress.

Card 2/2

LAVROVSKIY, K.P.

KAMINSKAYA, O.V.; LAVROVSKIY, K.P.; BRODSKIY, A.M.

Obtaining acetylene by high-speed catalytic cracking of propane.
Khim i tekhn. topl. i masel 3 no.3:17 Mr '58. (MIRA 11:3)

1. Institut nefti AN SSSR.
(Acetylene) (Propane) (Cracking process)

LAVROVSKIY, K. P., BRODSKIY, A. M. KOLBANOVSKIY, Y. A., POLAK, L. S.,
TOPCHIIYEV, A. V. and others.

"Studying the Radiation Chemistry of Petroleum Hydrocarbons and
the Application of Nuclear Radiation in the Oil Processing Industry
and in Oil-Chemical Synthesis."

Report submitted at the Fifth World Petroleum Congress, 30 May -
5th June 1959. New York.

LAVROVSKIY, K. P., AMERIK, B. K., BOTNIKOV, Y. A., SKOBLO, A. I.
ALIYEV, A. S., BRODSKY, A. M., KAMINER, S. B., OVSYANNIKOV, P. V.,
KORNEYEV, N. I., SUKHANOV, V. P. RUKYANTSEV, A. N.

"Processes of Continuous Thermocontact Transformations of Crude Oil
on Coke."

Report submitted at the Fifth World Petroleum Congress, 30 May -
5 June 1959. New York.

BRODSKIY, A.M.; LAVROVSKIY, K.P.; NAYMUSHIN, N.N.; TITKOV, V.B.;
FILATOVA, Ye.D.

Chromatographic analysis of mixtures of alkylenes and diolefins.
Khim. i tekhn. topl. i masel 4 no.3:30-32 Mr '59.
(MIRA 12:4)

1. Institut nefti AN SSSR.
(Chromatographic analysis) (Olefins)

6685c

SOV/76-33-11-13/47

5(4) 5.3200

AUTHORS:

Brodskiy, A. M., Kalinenko, R. A., Lavrovskiy, K. P.,
Titov, V. B.

TITLE:

On the Mechanism of High-temperature Cracking of Ethane

PERIODICAL:

Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 11, pp 2457-2466
(USSR)

ABSTRACT:

The reaction mechanism of the cracking of hydrocarbon gases at 770-890° was studied, as in general the industrial pyrolysis of these gases takes place at these high temperatures. A special experimental method was developed by which tracer atoms and ethane are used to which approximately 2% of marked C¹⁴H₄ methane was added. The experiments were made in a continuously working apparatus (Fig 1) at approximately 90 mm Hg. The quartz reactor was filled with corundum acting as heat carrier, and the temperature was recorded by means of an EPP-09 electronic potentiometer. The results obtained (Tables 1-3) showed that at these temperatures the maximum participation of the chain-reaction process in the conversion of ethane into ethylene is 5%, and that the inherent inhibition

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66858

SOV/76-33-11-13/47

On the Mechanism of High-temperature Cracking of Ethane

characteristic of cracking at 500-650°C does not occur. The reaction proceeds according to the first order, and the activation energy is 82 ± 2 kcal/mol. The reaction-rate constant of $\text{CH}_3 + \text{C}_2\text{H}_6 \rightarrow \text{CH}_4 + \text{C}_2\text{H}_5$ points to a steric factor of the order of 10^{-3} for this reaction, while the activation energy obtained from 12 ± 2 kcal is in agreement with data from other publications. The recombination constant, obtained both by experiment and by calculation using thermodynamic data, is approximately $5 \cdot 10^2$ times smaller than that obtained at lower temperatures. The decomposition rate constant of the ethyl radical is 10^3 times smaller than it would be according to the elementary kinetic gas theory. There are 4 figures, 3 tables, and 14 references, 8 of which are Soviet.

ASSOCIATION: Akademiya nauk SSSR, Institut neftekhimicheskogo sinteza
(Academy of Sciences, USSR, Institute of Petroleum-chemical
Synthesis) ✓

Card 2/2

5(4)

AUTHORS:

Brodskiy, A. M., Kalinenko, R. A., SOV/20-124-2-28/71
Lavrovskiy, K. P., Corresponding Member, AS USSR

TITLE:

On the Isotope Effect in the Cracking of Ethane (Ob izotopnom effekte pri krekinge etana)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 2, pp 340-341 (USSR)

ABSTRACT:

The present paper deals with the intensity of the isotopic effect in the cracking of ethane marked by C^{14} . Different results obtained by previous papers are mentioned in short. The authors investigated the cracking of the mixture $C^{12}H_3 - C^{12}H_3$ and $C^{12}H_3 - C^{14}H_3$ at high temperatures. The decomposition mechanism of ethane is considerably more simple than that of propane. The experiments were carried out at a temperature of $\sim 850^\circ$ and at pressures of 50-80 torr according to an already previously (Refs 5,6) described method in a reactor with practically complete mixing. The results obtained by the experiments show the following: In a wide interval of degrees of transformation the activity of the produced ethylene does not differ from the activity of ethane

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On the Isotope Effect in the Cracking of Ethane

SOV/20-124-2-28/71

(accuracy $\sim 1\%$). The activity of methane is not equal to $A/2$ (as it would have to be in the case of lacking isotopic effect) but much lower. Here A is the activity of the ethane mixture existing when measurements were begun. A table contains the values of ethane activity in % of $A/2$ as function of the ethylene content in the cracked gas. Methane activity is lower by $\sim 10\%$ than $A/2$ and varies relatively little with progressing reaction. The value of the isotopic effect found is near that found previously (Refs 1,2) for propane. The data mentioned above all confirm (on the basis of ethane) the abnormally high value of the isotopic effect in the reaction of methane formation. The equality of the order of magnitude of the isotopic effect (with respect to methane) for C_2H_6 and C_3H_8 indicates the existence of similar ethanes in the formation of CH_4 in the two above-mentioned cases. Correction note: The provisional experiments carried out by the authors concerning the cracking of the ethane mixture $C^{12}H_3 - C^{13}H_3$ and $C^{14}H_3 - C^{15}H_3$ showed that in this case the isotopic effect (with respect to methane) is considerably

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On the Isotope Effect in the Cracking of Ethane

SOV/20-124-2-28/71

lower than in the cracking of $C^{12}H_3 - C^{14}H_3$. This confirms the above assumption that the abnormally high value of the isotopic effect in the cracking of ethane $C^{12}H_3 - C^{14}H_3$ is due to a quantum effect connected with the disturbance of symmetry. There are 1 table and 7 references, 4 of which are Soviet.

SUBMITTED: September 24, 1958

Card 3/3

5(4)

SOV/20-126-6-41/67

AUTHORS:

Brodskiy, A. M., Kalinenko, R. A., Lavrovskiy, Z. P.,
Corresponding Member, AS USSR

TITLE:

On the Relation Between the Kinetic Isotopic Effects During
 $C^{12}-C^{14}$ and $C^{14}-C^{14}$ Bond Rupture (O sootnoshenii kineticheskikh
izotopnykh effektov pri razryve svyazey $C^{12}-C^{14}$ i $C^{14}-C^{14}$)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 6, pp 1293-1295
(USSR)

ABSTRACT:

The effects mentioned in the title were investigated under
conditions of high temperature cracking by means of a mixture of
 $C^{12}H_3-C^{12}H_3$ with $C^{14}H_3-C^{14}H_3$. The results were compared with

the cracking of $C^{14}H_3-C^{12}H_3$ as described in reference 1.

This experiment was made for the reason that hydrocarbons with
only partly marked C-atoms yielded higher values for the
isotopic effect (Refs 1-3) than could be expected according to
the present theoretical opinions (Refs 4, 5). The following is
given as a possible explanation of this phenomenon:

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On the Relation Between the Kinetic Isotopic Effects SCV/20-126-6-41/67
During $C^{12}-C^{14}$ and $C^{14}-C^{14}$ Bond Rupture

hydrocarbon molecules exhibit a plane of symmetry vertical to the chain or a corresponding alternating axis. The introduction of a marked C-atom has a disturbing effect upon this symmetry, and the transition from the symmetrical to the asymmetrical molecule might entail a considerable kinetic effect. Herefrom it resulted that the symmetrical ethanes $C^{12}H_3-C^{12}H_3$ and $C^{14}H_3-C^{14}H_3$ had to differ from asymmetrical

$C^{12}H_3-C^{14}H_3$ in their effect. The experimental data (Table 1) shows that the kinetic isotopic effect amounts to $5 \pm 1\%$ in the formation of methane from $C^{14}H_3-C^{14}H_3$; it is, therefore, considerably lower than the value of $12 \pm 2\%$ of reference 1 found for asymmetrical ethane. Measurements were made under entirely equal conditions. This result shows that there is no direct proportion between the kinetic isotopic effect and the reduced mass, and confirms the assumption that the disturbance of the

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On the Relation Between the Kinetic Isotopic Effects SOV/20-126-6-41/67
During $C^{12}-C^{14}$ and $C^{14}-C^{14}$ Bond Rupture

symmetry of the molecule has an effect upon the rate of reaction. Herefrom an indirect effect of various nuclear states upon the rate of molecular cracking reactions may be concluded. The authors thank N. D. Sokolov for valuable discussions. There are 1 table and 7 references, 4 of which are Soviet.

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR
(Institute of Petroleum-Chemical Synthesis of the Academy of Sciences, USSR)

SUBMITTED: April 10, 1959

Card 3/3

S/062/60/000/008/010/012
B004/B054

AUTHORS: Brodskiy, A. M., Lavrovskiy, K. P., and Filatova, Ye. D.

TITLE: High-temperature Dehydrogenation of Ethyl Benzene

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk,
1960, No. 8, pp. 1490-1494

TEXT: The authors report on their investigations of the kinetics of dehydrogenation of ethyl benzene at temperatures between 660 and 740°C. They discuss data in publications (Refs. 2, 3), and explain contradictions by the fact that at high temperatures the styrene yield depends on the reaction period. To obtain a high styrene yield it was necessary to guarantee a short reaction period and a quick, steady heating. This was attained by means of a pseudoliquid coke powder layer. Fig. 1 shows the experimental arrangement. Heating was performed by a graphite spiral passed through by current. The ethyl benzene gasified and mixed with CO₂ or N₂ was introduced from below into the reaction tube (diameter 40 mm). 50 cm³ of coke (particle diameter 0.1 - 0.5 mm) were piled on a screen. CO₂ was admixed at the outlet of the reaction tube for a quick cooling and rarefaction of the

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High-temperature Dehydrogenation of Ethyl Benzene S/062/60/000/008/010/012
B004/B054

reaction product. The latter was collected in vessels cooled with liquid nitrogen. In the distillate, the styrene was determined by the iodine number, and the amount of the resulting benzene and toluene by fractionation. Table 1 lists the experimental results at 660, 690, 720, and 740°C and the reaction period τ . The styrene yield was 58% at 660°C, and 70-75% at higher temperatures. Benzene and toluene yields were about 1.5% at 720°C, and 8-10% at 740°C. Replacement of the coke powder by quartz powder did not change the test results. Equation (6) is written down for evaluating the experimental data: $1/(1 - \pi) = 1 + k(t/\alpha)$, (π = styrene content of the distillate, k = reaction constant, α = coefficient of volume increase of the reacting gases). The graphic representation $1/(1 - \pi) = f(\tau)$ in Fig. 2 confirms the course of a first-order reaction. Hence, the reaction constant for the four test temperatures was calculated (Table 2). Fig. 3 shows the function $\ln k = f(1/T)$. The activation energy was found to be 44 ± 2 kcal/mole. There are 3 figures, 2 tables, and 8 references: 6 Soviet and 2 US. ✓

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR
(Institute of Petroleum-chemical Synthesis of the Academy
of Sciences, USSR)

Card 2/3

High-temperature Dehydrogenation of Ethyl Benzene S/062/60/000/008/010/012
B004/B054

SUBMITTED: March 16, 1959



Card 3/3

S/195/60/001/003/002/013
B002/B058

AUTHORS: Brodskiy, A. M., Lavrovskiy, K. P., Su Vey-khan

TITLE: On the Kinetic Rules of High-temperature Cracking of Isopentane

PERIODICAL: Kinetika i kataliz, 1960, Vol. 1, No. 3, pp. 340 - 344

TEXT: The cracking of isopentane between 700 and 840°C was studied at a pressure of 110 ± 2 mm Hg. The reaction products were determined chromatographically. The following was determined for the constant of the cracking rate: 8.33 sec^{-1} at 540°C, 26 sec^{-1} at 760°C, and 95 sec^{-1} at 820°C. The activation energy is 60.5 ± 2 kcal/mole; the factor of the exponential function is 10^{14} sec^{-1} . At these temperatures, the cracking of isopentane proceeds as a first-order reaction. The self-braking of the reaction known at low temperatures was not observed at the experimental temperatures. The following summary scheme was drawn up for the decomposition mechanism: dehydrogenation of isopentane practically does

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On the Kinetic Rules of High-temperature
Cracking of Isopentane

S/195/60/001/003/002/013
B002/B058

not occur; the probability of the cracking reaction proceeding under formation of C_2 and C_3 chains is much greater than the probability of the formation of butylenes. The formation of β -butylene can be explained by the fact that during the cleavage of the C-C bond 3 or 4 hydrogen atom is more easily cracked from the secondary C atom than the primary hydrogen atom. The probability of the formation of γ -butylene is small in the cracking of isopentane, that is, if the C-C bond 1 is cleft, the hydrogen atom is cracked from the tertiary C atom and isobutylene forms. γ -butylene should be formed according to the radical chain mechanism. The relatively small amounts of γ -butylene in the cracking products indicate that the cracking reaction proceeds according to the mechanism of the molecular reaction. There are 3 figures, 1 table and 7 references: 5 Soviet, 1 British, and 1 US.

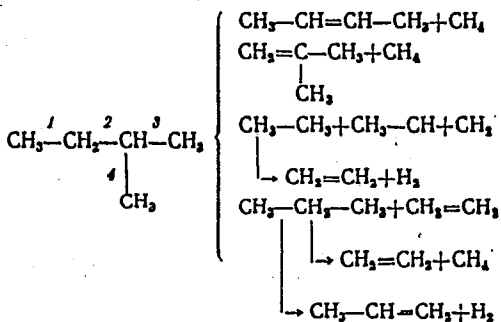
ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR (Institute of Petrochemical Synthesis AS USSR)

Card 2/3

On the Kinetic Rules of High-temperature
Cracking of Isopentane

S/195/60/001/003/002/013
B002/B058

SUBMITTED: February 23, 1960



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Card 3/3

S/195/60/001/004/011/015
BC17/B055

AUTHORS: Chzhan Chzhao - lan', Lavrovskiy, K. P., Rozental', A. A.

TITLE: Dehydration of Isopentane on Chromium-oxide/Aluminum-oxide Catalysts

PERIODICAL: Kinetika i kataliz, 1960, Vol. 1, No. 4, pp. 583-592

TEXT: The authors investigated the dehydrogenation of isopentane over fixed and fluidized beds of chromium-oxide/aluminum-oxide catalysts. Three catalysts with the following compositions were used: catalyst No. 1: 14.8% by weight Cr_2O_3 , 83.7% by weight Al_2O_3 and 1.5% by weight K_2O ; catalyst No. 2: 7% by weight Cr_2O_3 , 92.5% by weight Al_2O_3 and 0.5% by weight K_2O ; catalyst No. 3 was prepared by B. A. Kazanskiy (Ref. 3). The reaction products were analyzed by gas chromatography. The authors studied the kinetics of the dehydrogenation process in a fluidized bed under vacuum at grain sizes of the catalyst varying between 0.05 and 0.01 mm. The equilibrium constant of isopentane dehydrogenation is given in Table 1. ✓

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Dehydration of Isopentane on Chromium-oxide/
Aluminum-oxide Catalysts

S/195/60/001/004/G11/015
B017/B055

The equilibrium composition of the products at 760 and at 100 mm Hg is shown in Figs. 1 and 2. The vacuum apparatus is represented in Fig. 3. The catalysts exhibited practically equal activity. Dehydrogenation at 550°C yielded 30-31% isoamylenes and isoprene, with 46-47% of the isopentane entering into reaction, while at 520°C the yield was only 22-23% with 28% of the isopentane reacting. Table 2 shows the composition of the products formed at dehydrogenation of isopentane on the fixed catalyst. The kinetics of isopentane dehydrogenation on the fluidized and fixed catalysts in the region of small yields (up to 30%) were studied at 500, 520, and 550°C. Distribution curves of the reaction products appear in Figs. 4 and 5. Special characteristics of the dehydrogenation reaction of isopentane were discussed giving kinetic equations which allow for the homogeneity of the catalyst surface. The kinetic curves for isopentane dehydrogenation on the fixed and fluidized catalysts in the region of small yields are represented in Fig. 6. The activation energy of dehydrogenation is 44 kcal/mole. The dehydrogenation of isopentane at higher temperatures and lower pressure is described in Table 4. At 600°C, 100 mm Hg and a sojourn time of 2.2 sec, 62.3% of the isopentane reacts, and yields 20.2% isoamylenes and 15.3% isoprene. The C₅ fraction contained

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Dehydration of Isopentane on Chromium-oxide/
Aluminum-oxide Catalysts

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B017/B055

21% isoprene. The dehydrogenation of isopentane by the fluid-bed technique is recommended for the single-stage preparation of isoprene. There are 6 figures, 4 tables, and 17 references: 14 Soviet and 3 US.

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR (Institute of Petrochemical Synthesis of the AS USSR)

SUBMITTED: March 21, 1960



Card 3/3

5(4)

AUTHORS:

Brodskiy, A. M., Kalinenko, R. A.,
Lavrovskiy, K. P.

S/076/60/034/01/031/044
B004/B007

TITLE:

A Method of Investigating the Mechanism of Fast Reactions in
a Turbulent Reactor by Means of Tagged Atoms ¹⁰

PERIODICAL:

Zhurnal fizicheskoy khimii, 1960, Vol 34, Nr 1, pp 192 - 195
(USSR)

ABSTRACT:

The term turbulent reactor is applied by the authors to a reactor vessel with an intense intermixing device. After giving a survey of the methods of investigating the kinetics of reactions and mentioning the isotopic method by M.B.Neyman, the authors explain the simplification of kinetic equations attained when using tagged atoms and by intensively intermixing the reagents as a result of the falling away of concentration- and temperature gradients. The method makes it possible to deal with both single processes in the reaction and also with the total process, and may therefore be used for the purpose of judging the correctness of the scheme upon which the reaction is based. By the example of the cracking of

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A Method of Investigating the Mechanism of Fast
Reactions in a Turbulent Reactor by Means of
Tagged Atoms

S/076/60/034/01/031/044
B004/B007

C_2H_6 at 800 - 900° it is shown that by thoroughly intermixing,
linear dependence was obtained for the function $y = f(t)$
(Figs 1, 2). There are 2 figures and 6 Soviet references.



SUBMITTED: April 10, 1959

Card 2/2

S/020/60/133/005/012/019
B016/B060

AUTHORS: Lavrovskiy, K. P., Corresponding Member AS USSR,
Rozental', A. L., Chzhan Chzhao-lan'

TITLE: Study of the Reaction of Catalytic Dehydrogenation of
Isopentane

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 5,
pp. 1098-1101

TEXT: The authors studied the reaction mentioned in the title on chromium- and aluminum oxide catalysts in the temperature range between 500 and 600°C by making use of a pseudoliquid layer. Fig. 1 shows a scheme of the vacuum apparatus used for the purpose. A pseudoliquid layer formed on the passage of isopentane through the catalyst. The C₂ - C₅ hydrocarbons were chromatographically separated in a column with diisoamyl phthalate and acetonyl acetone by the method described in Ref. 5. Besides experiments made with a pseudoliquid catalyst layer the authors carried out experiments with a resting layer (Table 1). As can

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Study of the Reaction of Catalytic Dehydrogenation of Isopentane

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B016/B060

be seen therefrom, the catalysts of different compositions had a similar activity. Figs. 2 and 3 supply typical curves for the amounts of reaction products developed. The molar ratios $C_1 : C_4$ and $C_2 : C_3$ approach unity in the gases. These hydrocarbons were apparently formed by isopentane cracking. The drop in selectivity with rising temperature fairly fitted the increase in isopentane consumption for cracking. The products contained 2-methyl butene-2, 2-methyl butene-1, and 3-methyl butene-1 at a ratio of 100 : 50 : 16 at 500°C; at 520°C, this ratio was 100 : 54 : 18; at 550°C, it was 100 : 55 : 16; at 580°C, it was 100 : 56 : 14. This ratio was little dependent on pressure and on the conversion degree of isopentane, and diverged little from the ratio of equilibrium. The ratio of isoprene to the sum of the isoamylenes fitted the ratio of equilibrium. This is indicative of the high rates of the processes of isomerization and dehydrogenation of isoamylenes on oxide catalysts. For the interpretation of experimental results in the range of conversion degrees up to 30% the authors made use of equations (1) for the pseudoliquid layer, and (2) for the resting layer. Fig. 4 shows that the points established in the experiment group along the straight lines

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Study of the Reaction of Catalytic Dehydrogenation of Isopentane

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B016/B060

1 and 2. The inclination angle of these straight lines to the axis t/p is, independent of pressure, equal to constant K . In the derivation of equations (1) and (2), the authors made use of the concepts put forward in the papers of Refs. 10 and 11 dealing with the course of irreversible reactions on a homogeneous surface. These equations apply to the case where isoamylenes and isoprene are strongly adsorbed on the surface with equal adsorption coefficients. Equation (1) characterizes the conditions under which the gas is perfectly mixed. A lacking mixture was assumed in the derivation of equation (2). The authors conclude from the results obtained that the ratio of the adsorption coefficients of isoprene and isoamylenes on the chromium catalyst did not exceed 2. They conclude furthermore that the said coefficient of isoamylenes lies higher by two orders of magnitude than that of isopentane. A comparison of experimental results on a pseudoliquid and on a resting layer proves that in the former case the gas was completely intermixed while there was no mixing in the latter case. By reducing the mixing it is possible to increase the isoprene yield. The authors thank Academician B. A. Kazanskiy for his discussion. There are 4 figures, 1 table, and 11

✓c

Card 3/4

Study of the Reaction of Catalytic De-
hydrogenation of Isopentane

S/020/60/133/005/012/019
B016/B060

Soviet references.

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR
(Institute of Petroleum-chemical Synthesis of the
Academy of Sciences, USSR)

SUBMITTED: April 15, 1960

Card 4/4

5-4600

³¹⁶⁶⁹
S/607/61/003/000/002/002
E075/E185

AUTHORS: Topchiyev, A.V., ~~Lavrovskiy, K.P.~~, Polak, L.S.,
Brodskiy, A.M., and Kolbanovskiy, Yu.A.

TITLE: Investigation into the radiation chemistry of
petroleum hydrocarbons and the application of nuclear
irradiation in the petroleum refining industry and
petrochemical synthesis

SOURCE: International Petroleum Congress. 5th, New York, 1959
[Doklady] t. 3: Pererabotka nefi i gaza.
Neftekhimiya. Moscow, Gostoptekhizdat, 1961. 345-354.

TEXT: Liquid alkanes, mainly n-heptane, were subjected to
X-ray radiolysis. It was found that at room temperature the amount
of hydrogen, molecular weight and refractive index of the liquid
phase increase linearly with the irradiation. The amount of
methane increases depending on the proportion of CH₃ groups in the
molecule. UV spectra indicate the formation of polymers with
conjugated double bonds. The number of such bonds increases with
the number of CH₂ groups in the alkane molecules. It was shown
that the weight percent of the heavy residue increases

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proportionally with the increasing doses of radiation. The molecular weight of the residue ranges from 175 to 218 and specific gravity 0.76 to 0.80 g/cm³. The radiolysis of n-heptane at -196 °C (in liquid nitrogen) gave products containing a marked proportion of free radicals as demonstrated by the examination of their paramagnetic spectra. At this low temperature free atoms of hydrogen are present for a considerable time, which opens new perspectives before petrochemical industry. The yield of the products of the recombination of C₇H₁₅ radicals at the low temperatures (giving various isomers of tetradecane) is halved compared with the yield obtained at 20 °C. The yield of the products obtainable by monomolecular reactions as well as the probability of transmission of the activation energy to other molecules decreases with temperature. In the case of catene UV absorption on irradiation at -79° and -196 °C is 4 times higher than that of catene treated at room temperature which indicated a rapid increase in the formation of dienes. The formation of polymers is slower. For the small doses of radiation a direct proportionality between the yields of gases and time of

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irradiation was observed. The addition of dibenzylsulphide to the alkanes prevented their radiolysis to a large extent. In the gaseous products of the radiolysis of the solution there is no H₂S, which suggests that a transmission of activation takes place. It was found that an important role during the irradiation of the alkanes is played by the process of direct rupture of carbon-carbon bond leading to the formation of alkyl radicals and final products (odd- and even-numbered carbon hydrocarbons). A study of the radiation and thermal stability of aromatic hydrocarbons was conducted by subjecting them to nuclear reactor irradiation at high temperatures. At the same time the thermal stability was controlled at 400 °C. It was shown that the thermal stability at 400 °C and radiation stability at 330 °C and irradiation dose of 1500 microrads are approximately the same. The introduction of methyl groups into the aromatic system leads to a marked decrease in the radiation stability. An increase of irradiation temperature from 220 to 330 °C accelerates the decomposition. X

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Investigation into the radiation ...

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There are 6 figures, 5 tables and 7 references: 5 Soviet-bloc and 2 non-Soviet-bloc. The English language references read as follows:

- Ref.6: G.A. Freund. Nucleon, v.14, no.8, 62, 1956;
L.W. Fromm, K. Anderson. Nucl. Sci. Eng., 2(1), 160, 1956;
Colichman, E.L., Fish, R.F. Nucleon. v.15, no.2, 72, 1957;
E.L. Colichman, R.H. Gercke. Nucleon. v.14, no.7, 50, 1956.
- Ref.7: R.O. Bolt, S.G. Carroll. Proceedings of the International Conference on Peaceful Uses of Atomic Energy, Geneva, v.7, 8-20, 1955. United Nations, p. 550. N.Y., 1956.

Card 4/4

BRODSKIY, A.M.; ZVONOV, N.V.; LAVROVSKIY, K.P.; TITOV, V.B.

Radiation thermal conversions of petroleum fractions,
Neftekhimia 1 no.3:370-381 My-Je '61. (MIRA 16:11)

5.4300

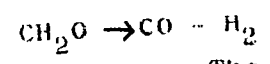
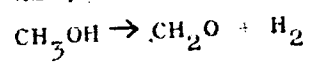
31091
S/195/61/002/004/007/008
E050/E585

AUTHORS: Brodskiy, A M., Kalinenko, R A., Lavrovskiy, K P.
and Shevelkova, L V.

TITLE: Principles of the decomposition of methanol at high
temperatures

PERIODICAL: Kinetika i kataliz, v.2, no 4, 1961, 553-561

TEXT: Previous investigations of the decomposition of
alcohols from C₂ to C₄ postulated an approximately first-order
reaction, involving rupture of C-C or C-H bonds, but the yields
and mass balances of C, H, and O have disagreed by about 50% and
the activation energy for reaction velocity has been many times
smaller than that for pressure decrease in the system. Decomposi-
tion of methanol was considered by C. J. M. Fletcher (Ref 6,
Proc. Roy. Soc., A147, 119, 1934) to be two-stage.



with similar discrepancies. The present work studied the reaction
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at temperatures from 630 to 900°C and at pressures of 25 and 45 mm Hg with quartz and corundum as heat carriers. The pressure was maintained constant by a special valve, and the output of H₂, CO and CH₄ were measured by adsorption on cooled active charcoal while the heavier gases were measured not only by condensation but also by subsequent chromatographic analysis over a charcoal column, using hydrogen as carrier gas. The concentration of CH₃OH varied with the form: $(CH_3OH)_t / (CH_3OH)_0 = 1 - kt$ (1)

where t is the time of reaction, $(CH_3OH)_0$ - the concentration CH₃OH in the initial mixture, $(CH_3OH)_t$ - the current concentration of the alcohol, α - the coefficient of volume change of the gas as a result of the cracking. There is clearly a first-order system but it is heterogeneous, having an activation energy of 14.2 kcal/mole from 644-807°C and 40 kcal/mole up to 900°C. To verify the hypothesis that surface heat conduction dominated at lower temperatures, powdered corundum was introduced into the quartz reaction. A much higher activation energy was found, and the output of CH₄ was increased fourfold and that of all hydrocarbon

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gases twofold. In all cases the reaction products had significant concentration of C_2H_6 , CH_3OCH_3 , $C_2H_5OCH_3$, $C_2H_5OC_2H_5$, CH_3CHO , CH_3COCH_3 etc., signifying extensive free radical formation

Moreover, thermodynamic data on the decomposition of methanol predict reaction velocities some two or three orders of magnitude less than observed, so one must be dealing in practice with the formation of free radicals by a highly developed chain reaction. To support this, high concentrations of ethylene were found (20-50% of ethane) and it is known that in the 654-734°C region there is insignificant cracking of methane; the only alternative plausible source is from recombination of CH_3 radicals.

V.V.Voyevodskiy is mentioned in the article for his contribution in this field. Acknowledgments are expressed to N.N.Naymushin for his assistance. There are 3 figures, 6 tables and 16 references 5 Soviet-bloc and 11 non-Soviet-bloc. The four latest English-language references read as follows: Ref.1: J.A.Barnard, H.W.D. Hughes, Trans Faraday Soc., 56, 55, 1960; Ref.2: Ibid. 56, 64, 1960; Ref.3: J.A.Barnard, Ibid. 56, 72, 1960; Ref.5: Ibid. 55, 947, 1959.

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Principles of the decomposition . . .

S/195/61/002/004/007/008

E030/E595

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR
(Institute of Petrochemical Synthesis AS USSR)

SUBMITTED: February 15 1961

Card 4/4

11.1210

25321

S/020/61/138/005/021/025
B101/B231

AUTHORS: Brodskiy, A. M., Lavrovskiy, K. P., Corresponding Member
AS USSR, and TitoV, V. B.

TITLE: Radiation-thermal cracking of liquid hydrocarbons

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 138, no. 5, 1961, 1143-1146

TEXT: The present paper deals with the joint effect of high-energy radiation and heating on gasoil fractions which boil between 200 and 350°C. Experiments were made in evacuated quartz ampuls in a BPP (VVR) reactor. The results shown in Fig. 1 disclose three sections. In section I, $\ln G$ is nearly independent of T . At a critical temperature, T_p , of about 600°K, G rises rapidly with an activation energy of 20 ± 5 kcal (section II), passing at last into thermal cracking (section III) if still higher temperatures are applied. The yield of highly molecular products begins to drop at T_p . These results are explained by superimposition of two processes. Hydrocarbon + radiation \longrightarrow \longrightarrow excited molecule \longrightarrow stable end products (1); Hydrocarbon + radiation \longrightarrow . . . \longrightarrow thermal hydrocarbon

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S/020/61/138/005/021/025
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Radiation-thermal cracking of liquid...

X

radicals → products of radical reactions (2). The processes (1) are temperature-independent, and supply a constant contribution to section I and II. The radicals of processes (2) are stable in section I and recombine again, whereas they dissociate in section II forming olefins and radicals of low molecular weight. A calculation of T_p is made at first for hydrocarbon gases. The following is put down: $k_d[R] \approx a_1 G_1 I$ (3), where

$k_d = k_d^0 \exp(-E_d/RT_p)$ is the mean value of the radical destruction constant, $[R]$ the concentration of highly molecular thermal radicals which originate as a result of reaction (2), I the intensity of the radiation dose per unit volume; a_1 is a constant of the magnitude order 1. Furthermore,

$IG_R - k_d[R] - k_T[R][\bar{R}] = 0$ (4), where $[\bar{R}]$ is the total concentration of radicals corresponding to $IG_R - k_T[\bar{R}]^2 = 0$ (5). (G_R is the radiation chemical yield of radicals according to (2), G_R the total yield of radicals).

From (4) and (5) can be deduced: $T_p = E_d / R \ln(k_d^0 b / \sqrt{k_T IG_R})$ (6). The temperature-independent constant $b = (1 - a_1 G_1 / G_R) > 0$ is ~ 1 , and can be

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neglected. Substituting $G_{\bar{R}} \sim 5$ (per 100 ev); $k_T = 10^{-11}$ cm³/mole.sec;
E = 25-30 kcal/mole results in $T_p = 600^\circ\text{K}$ in accordance with the experiment.

According to Refs. 8 and 9 (see below), the cellular effect is taken into consideration for liquid hydrocarbons, and put down

$G_{\bar{R}} I - 1/\tau_T [\bar{R}'] - k_d [\bar{R}'] = 0$ (7) and $1/\tau_D [\bar{R}'] - k_d [\bar{R}'] - k_T [\bar{R}]^2 = 0$ (8), where

$[\bar{R}']$ is the number of radicals in the unit volume being placed in a cell adjacent to such radicals as they have simultaneously originated with, $[\bar{R}'']$ the concentration of highly molecular radicals which diffused out of the cell, τ_T the time required for the diminution of $[\bar{R}']$ to the 1/e fold

owing to recombination, τ_D the diffusion period. The processes (1) can here be neglected, and obtained is $G_{olef} I = k_d [\bar{R}] = k_d ([\bar{R}'] + [\bar{R}''])$

$\approx (k_d + 1/\tau_D) G_{\bar{R}} I (1/\tau_T + k_d)^{-1}$ (9). The following holds for the passing from section I to section II: $k_d = k_d^0 \exp(-E_d/RT_p) \approx 1/\tau_D$ (10). Assuming that E = 20 kcal/mole, $k_d^0 = 10^{13}$ sec⁻¹, $1/\tau_D = D/d^2$, where d is the cell

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2532A
Radiation-thermal cracking of liquid...

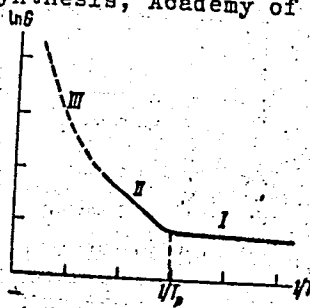
S/020/61/138/005/021/025
B1Q1/B231

dimension, $T_p = 600^\circ\text{K}$, $D = 10^{-5} \text{ cm}^2/\text{sec}$ $d = 10^{-6} \text{ cm}$ is found. The cellular effect has thus a remarkable influence on the radiolysis of liquid hydrocarbons. L. S. Polak and M. A. Mokul'skiy are mentioned. There are 3 figures and 9 references: 5 Soviet-bloc and 4 non-Soviet-bloc. The two most important references to English-language publications read as follows: Ref. 8: E. Rabinovitch, Trans. Farad. Soc., 33, 1225 (1937); Ref. 9: B. Williamson, V. K. La Mer, J. Am. Chem. Soc., 70, no. 2, 717 (1948).

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR
(Institute of Petrochemical Synthesis, Academy of Sciences USSR)

SUBMITTED: February 18, 1961

Fig. 1: Schematic representation of the function $\ln G = F(1/T)$; T_p = critical point.



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43233
S/844/62/000/000/049/129
D287/D307

11.0130

AUTHORS: Brodskiy, A. M., Lavrovskiy, K. P. and Titov, V. B.

TITLE: Radiation-induced thermal cracking of kerosene-gas oil fractions

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 295-303

TEXT: The present work is a continuation of an earlier investigation with the difference that thermal cracking of petroleum fractions was replaced by radiolysis of the kerosene-gas oil fraction in the liquid phase, the fraction containing relatively large quantities of naphthenes and aromatic hydrocarbons. The gas oil was purified before the process of hydrostabilization. The experiments were carried out both under static conditions (at 100 - 450°C, 150 - 200 megarad) and under dynamic conditions (at temperatures of 300° and 315°C, 3 - 5 atm pressures and 100 megarad). In the absence of radiation hardly any thermal cracking could be observed under either

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Radiation-induced thermal ...

S/844/62/000/000/049/129
D287/D307

of these conditions at the given temperatures (except at 450°C). Pure gas oil fractions as well as fractions containing $(1 \pm 0.2) \times 10^{-3}$ M inhibitors (tetraphenylbutadiene and terphenyl) were tested under static conditions. Under dynamic conditions in circulation reactors, marked changes in the rate and direction of radiolysis conversions could be observed at $\sim 310^\circ\text{C}$ and at temperatures above 300 - 330°C radical decomposition reactions proceeded at considerable rates, with a cleavage of the C-C bond; the CH_4 content in the gaseous products increased whilst the H_2 content decreased. Activation energies are calculated. The yield of products was found to vary linearly with the dosage (up to 100 megarad), slight deviations during the initial stages being due to gaseous products being dissolved in the gas oil. Investigations on the relationship between the radiolysis yield of the high-boiling residue and $1/T$ have proved that the yield increased slightly at 100 - 300°C and began to decrease at 300 - 450°C. Investigations of the chemical composition of liquid products under dynamic conditions have indicated that the percentage of naphthenic and unsaturated compounds increased slight-

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Radiation-induced thermal ...

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D287/D307

ly with increasing dose whilst the percentage of paraffins and aromatics had decreased. Addition of inhibitors decreased the yields of gaseous products, and of the high-boiling residue by 20 - 30%. There are 6 figures and 5 tables.

ASSOCIATION: Institut neftekhimicheskogo sinteza, AN SSSR (Institute of Petrochemical Synthesis, AS USSR)

Card 3/3

S/204/62/002/004/006/019
E075/E436

AUTHORS: Lavrovskiy, K.P., Brodskiy, A.M., Musayev, I.A.,
Sanin, P.I., Rumyantsev, A.N., Filatova, Ye.D.,
Iskhakova, E.Kh.

TITLE: On the preparation of higher normal α -olefines by a
high speed cracking of paraffinic petroleum products

PERIODICAL: Neftekhimiya, v.2, no.4, 1962, 487-494

TEXT: Results are described of high speed cracking of soft and hard paraffin waxes, slack wax from Bitkov crude and waxy residue from Ozek - suat crude in a pilot plant. The plant was described previously (Khim. nauka i prom-stv, v.2, no.2, 1957). The waxes were heated to 900 - 1000°C and mixed with powdered coke preheated to 600 - 730°C. They were fed into the reactor at the rate of 60 to 80 h⁻¹. The gases produced (23.0 to 47.4% by weight of total products) contained 33.1 to 52.7% wt. ethylene. The fraction of the liquid products from the slack wax boiling between 40 - 73°C and 73 - 100°C contained heptene-1 as the main component. For the hard wax cracking products, the fraction boiling up to 60°C contained 49.80% α -olefines (main component), about 20% conjugated dienes and 15 to 12% cyclenes. The content of α -olefines in
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S/204/62/002/004/006/019
EO75/E436

On the preparation of higher ...

the 60-175°C fraction was 70.4% (13.6% hexene-1, 17.1% heptene-1, 15% octene-1, 11.9% nonene-1, 12.8% decene-1). In general it was shown that the benzene from the high speed cracking of paraffin waxes consisted mainly of α -paraffins, their content in benzenes from the cracking of slack wax and waxy residue being much lower. There are 11 tables.

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR
(Institute of Petrochemical Synthesis AS USSR)

Card 2/2

38211
S/O20/62/144/G04/018/024
B101/B138

AUTHORS:

Brodskiy, A. M., Kalinenko, R. A., Lavroyakiy, K. P.
Corresponding Member AS USSR, and Shevel'kova, L. V.

TITLE:

Mechanism of by-product formation in high-temperature
cracking of ethane

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 4, 1962, 817-820

TEXT: Following previous papers and using techniques described therein (ZhFKh, 33, no. 11 (1959); *ibid.*, 34, no. 1 (1960)) the formation of CH_4 , C_2H_2 , C_3H_8 , C_3H_6 , C_4H_{10} , C_4H_8 , and C_4H_6 during the cracking of ethane at 800-880°C and 90 ± 3 mm Hg with additional 0.45% of ethylene tagged by C^{14} was examined. Corundum or ground quartz was used as a heat carrier. The reaction products were separated by chromatography and their radioactivity was measured. Results: (1) CH_4 showed low activity, indicating that it is formed mainly from C_2H_4 of low activity and from transformation products thereof. About one-half of the CH_4 is formed without the participation of

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Mechanism of by-product formation ...

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B101/B138

CH_3^* by the decay of high-molecular products. (2) The equal degree of activity exhibited by C_2H_2 and C_2H_4 indicates that C_2H_2 is formed with the participation of a C_2H_4 molecule. (3) C_3H_8 and C_4H_{10} had a low content of C^{14} . They are formed by recombination of weakly active CH_3 and C_2H_5 radicals. (4) C_3H_6 and C_4H_8 showed the same activity as C_2H_4 . They are not formed from C_3H_8 and C_4H_{10} , respectively, but mainly by the disintegration of C_4H_9 and, at temperatures $< 880^\circ\text{C}$, also by C_2H_3 recombining with CH_3 or C_2H_5 . (5) The fact that C_4H_6 (divinyl) is twice as active as C_2H_4 justifies the supposition that it is formed with the participation of 2 molecules of C_2H_4 . As $[\text{C}_4\text{H}_6]$ is larger than corresponds to the equilibrium concentration in the reaction $\text{C}_4\text{H}_6 \rightleftharpoons \text{C}_2\text{H}_2 + \text{C}_2\text{H}_4$, a simple reaction involving free radicals is assumed. (6) The specific activity of the coke at 880°C amounted to one-half the activity of C_2H_4 . At this

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Mechanism of by-product formation ...

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B101/B138

temperature it is produced from highly active, unsaturated hydrocarbons. At lower temperatures the coke was much less active, implying that this is the point at which the interaction of unsaturated and condensed hydrocarbons with weakly active alkyl radicals begins to predominate. There are 2 tables. The English-language reference is: C. G. Danby, B. C. Spall et al., Proc. Roy. Soc., A218, no. 1135, 450 (1953).

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR
(Institute of Petrochemical Synthesis of the Academy of Sciences USSR)

SUBMITTED: February 27, 1962

Card 3/3

LAVROVSKIY, K.P.

1

POLAK, L.S., LAVROVSKIY, K.P., GLAZUNOV, P.YA.

Radiation thermal cracking of petroleum hydrocarbons and its commercial application.

Report to be submitted for the Sixth World Petroleum Congress, Frankfurt, 16-26 June 63

KOPUPAYEVA, D.I.; LAVROVSKIY, K.P.; ROZENTAL', A.L.

Dehydrogenation of isopentane in a vacuum on an industrial chromia-alumina catalyst. Neftekhimia 3 no.2:177-180 Mr-Apr '63. (MIRA 16:5)

1. Institut neftekhimicheskogo sinteza AN SSSR imeni A.V.Topchiyeva.
(Butane) (Dehydrogenation) (Catalysts)