SOV/2416

Lebedev, V.V.

11(2,7)

PHASE I BOOK EXPLOITATION

Gazosnabzheniye vostochnykh rayonov SSSR na osnove gazifikatsii tverdykh topliv (Supplying the Eastern Regions of the USSR With Gas Produced by Solid Fuel Gasification) Moscow, Gostoptekhizdat, 1959. 214 p. 2,000 copies printed.

Ed.: N.V. Shishakov, Doctor of Technical Sciences; Executive Ed.: T. D. Yefremova; Tech. Ed.: A.V. Trofimov.

PURPOSE: This collection of articles is intended for designing, planning, and scientific research personnel, as well as for engineers, technicians, and students specializing in solid fuel gasification.

COVERAGE: This collection of articles describes the problem of supplying the eastern regions of the USSR with synthetic gas derived from the gasification of solid fuels to overcome that area's lack of natural gas. Individual articles discuss the distribution of the region's coal deposits, the quality and types of coal encountered, gasification process, and the economics involved in the production and supply of the synthetic gas product. The author thanks V.S. Al'tshuler, Doctor of Technical Sciences. References accompany each article.

Card 1/4

Supplying the Eastern Regions of the USSR (Cont.)

Card 2/4

Lebedev, V. V.

PHASE I BOOK EXPLOITATION   SOV/3751

Akademiya nauk SSSR. Institut goryuchikh iskopayemykh

Gazifikatsiya i goreniye topliva (Fuel Gasification and Combustion) Moscow, Izd-vo AN SSSR, 1959. 227 p. (Series: Its Trudy, Vol 11) Errata slip inserted. 1,800 copies printed.

Ed.: K. V. Lavrov; Ed. of Publishing House: V. K. Pokrovskiy; Tech. Ed.: I. N. Dorokhina.

PURPOSE: This collection of articles is intended for scientific research workers and engineers studying combustion processes and solid fuel gasification.

COVERAGE: This collection concerns the theoretical and experimental study of the mechanism of chemical reactions occurring in combustion and gasification. Results of the isotopic method of studying the gas operating process and its reaction, and the reaction of carbon monoxide and heated coal are analyzed and the pilot plants used in this study are described. Reactions of coal combustion, coal oxidation, methane dissociation and conversion are discussed and their equilibrium constants given in tables. The processes of methane oxidation by oxygen and synthesis-gas production by oxidizing natural gas with the subsequent reduction of oxidation products by carbon are analyzed as is the effect of an excessive amount of air on the burning process of powdered solid fuel. The utilization of heavy petroleum residue and tar for combustion and gasification purposes is also discussed along with the principles of fluidization. Analysis, routine control and intensification of physical and chemical processes by means of ultrasonic vibrations are also covered. No personalities are mentioned. References accompany all but the first article.

Al'tshuler, V.S., and O.F. Sechenov. Some Conditions of Normal Operation of Gas Generators With a Fluidized Bed   139

Fluyagin, A.P. Problem of Relative Velocity of Powdered Solid Fuel and or Air in a Aerosol Stream in an Experimental Combustion Chamber   148

Ivanov, V.M., B.V. Kantorovich, L.S. Knptovets, and L.L. Khozretsev. Utilization of an Emulsion of Heavy Petroleum Residues and Tar for Combustion and Gasification Purposes   156

Ivanov, V.M. Combustion of Liquid Fuel With the Simultaneous Evaporation of Water Spray in a Common Reaction Chamber   169

Sechenov, O.F., and V.S. Al'tshuler. Effect of Pressure on the Behavior of a Fluidized Bed   188

Nikolayeva, T.A. Gas Formation Process in a Coal Conduit During the Steam-Oxygen Blast   198

Bogdanov, P.F., K.V. Lavrov, and Ye. P. Melnikov. Ultrasonic Vibrations as a Means of Investigating, Controlling and Intensifying the Physico-chemical Processes of Fuel Production   205

Lebedev, V.V. Continuous Hydrogen Production by Means of the Metal-Steam Method   215

AVAILABLE: Library of Congress

Card 6/6   JA/abv/fal
                                                                          7-18-60

LEBEDEV, V.V.; POPOV, V.M.

    All-Union Conference on the Coordination of Scientific Re-
    search on the Use of Fuel Gases in the National Economy. Gaz.
    prom. 4 no.9:54 S '59.   (MIRA 12:11)
            (Gas as fuel--Congresses)

LAVROV, Nikolay Vladimirovich; KOROBOV, Valeriy Vladimirovich;
FILIPPOVA, Vera Ivanovna; LEBEDEV, V.V., otv.red.; IVANOVA,
D.A., red.izd-va; BRUZGUL', V.V., tekhn.red.

[Thermodynamics of gasification reactions and of synthesis
from gases] Termodinamika reaktsii gazifikatsii i sinteza
iz gazov. Moskva, Izd-vo Akad.nauk SSSR, 1960. 97 p.
(MIRA 13:7)

(Gases)   (Thermodynamics)

26. 2312

85083
S/139/60/000/004/038/044/XX
E031/E413

AUTHORS: Lebedev, V.V. and Makirov, A.Ye.

TITLE: Determination of the Parameters of the Distribution
             of the Dimensions of Particles

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika, 1960,
             No.4, pp.60-65

TEXT: The scattering properties of a cloudy medium can be used as
a source of information about the distribution of the dimensions
of the particles composing it.   A similar problem was investigated
by K.S.Shifrin (Ref.1) and leads to the inversion of a special form
of the Fourier integral.   The particle distribution curve is
obtained by numerical integration with respect to the angles of
scattering of the experimental distribution curve for the intensity
of the light.   In the present note an attempt is made to modify
the problem and, using experimentally measured intensities of
light scattered through three angles, establish the parameters of
the distribution function.   The use of a parametric representation
of the particle distribution function simplifies the problem
considerably.   The distribution function for the particle
dimension is taken in the form

$$dn(r) = Ar^{\mu}e^{-cr} dr \qquad (2)$$

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E031/E413

Determination of the Parameters of the Distribution of the
Dimensions of Particles

where c (greater than zero) μ (an integer greater than or equal
to zero) are parameters of the distribution and A is a normalizing
constant.   If the medium consists of suspended reflecting
particles, the intensity of scattered light depends only on the
character of the distribution of the particles according to their
dimensions.   The assumption that multiple scattering has
negligible influence leads to Eq.(5) for the intensity of light
scattered through a small angle β .   This type of integral has
been calculated in explicit form by Shifrin for $\mu = -2(1)2$, and
leads to the expression for the intensity of the form

$$I_{\mu}(\alpha, c) = \alpha^{-(\mu + 3)} \varphi_{\mu + 2}(k) \qquad\qquad (6)$$

where $\alpha = 2\pi\beta / \lambda$, λ is the wavelength, and $k = 1/(\sqrt{1+c^2/4\alpha^2})$
The functions obtained ($\varphi_0 - \varphi_4$) are far from being sufficient to
determine the parameters of the distribution function because μ
can have values greater than 2 .   Expressions for $\varphi_5 - \varphi_{10}$ are
Card 2/3

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S/139/60/000/004/038/044/XX
E031/E413

Determination of the Parameters of the Distribution of the
Dimensions of Particles

quoted.   With the relations given, Eq.(10) is arrived at which can
be used for the experimental determination of the parameters μ and
c, assuming a distribution of the form (2) above.

$$I_\mu(\alpha,c) = I_o \frac{4\pi^2 n c^{\mu+1}}{\mu! \lambda^2 \alpha^{\mu+5}} \varphi_{\mu+2}(k) \tag{10}$$

The method is less strict than Shifrin's but it leads more quickly
to the answer.   There are 2 figures, 2 tables and 8 references:
7 Soviet and 1 English.

ASSOCIATION: Moskovskiy institut neftekhimicheskoy i gazovoy
             promyshlennosti imeni I.M.Gubkina (Moscow Institute
             of the Petrochemical and Gas Industry imeni I.M.Gubkin)

SUBMITTED: August 22, 1959

Card 3/3

83357

S/139/60/000/004/014/033
E032/E514

24.6900

AUTHOR: Lebedev, V.V.

TITLE: On the Conservation of Mesonic Charges

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika,
            1960, No.4, pp.135-138

TEXT: The Dirac formalism has two disadvantages, namely, the
nonconservation of the mesonic charges of nucleons and the fact that
it cannot be used to formulate a relation with scalar, pseudoscalar
and pseudo-vector meson fields, i.e. fields which preserve their
properties on time reversal.   It is argued in the present paper
that these difficulties can be avoided if one uses the generalized
Dirac equation

$$\frac{h}{i}\, \varepsilon_3 \, \frac{\partial \chi}{\partial t} + \frac{hc}{i}\, \varrho_1 \, \underline{\sigma} \, \mathrm{grad}\, \chi + Mc^2 \varrho_3 \, \chi = 0 \qquad (6)$$

where χ is an 8-component nucleon wave function.   The formalism
based on this equation predicts many of the properties of the
particles which can be described by it.   It is possible that these
particles are in fact nucleons.   There are 9 references: 3 Soviet.

Card 1/2   Moscow Inst. for Petrological & Gas Industries im I.M.Gutkin

LEBEDEV, V.V.; ADONIN, A.N.; GABRIYELOV, L.V.

Problems in using gas anchors. Trudy KF VNII no.5:92-104 '61.

(MIRA 14:10)

(Oil wells--Equipment and supplies)

ADONIN, A.N.; LEBEDEV, V.V.

> Some problems of gas separation at the intake of a deep well pump.
> Trudy KF VNII no.5:105-116 '61.   (MIRA 14:10)
>   (Gas, Natural.--Separation)

LEBEDEV, V.V.; GAVRILOVA, A.A.

Kinetics of hydrogen production on iron oxides based on the use of
solid fuels. Trudy IGI 16:307-314 '61.
(Hydrogen)   (Iron oxides) (Fuel)   (MIRA 16:7)

LEBEDEV, V.V.; GAVRILOVA, A.A.

Kinetics of the reduction of iron oxides with carbon.   Trudy IGI
16:295-300 '61.

(Iron oxides) (Carbon)   (MIRA 16:7)

LEBEDEV, V.V.; GAVRILOVA, A.A.

Kinetics of the formation of hydrogen from water on iron. Trudy
IGI 16:301-306 '61.
(Hydrogen)   (Iron oxides)   (Steam)   (MIRA 16:7)

LEBEDEV, V.V.; POLYAKOVA, V.N.

Production of synthesis gas from methane on metallic oxides. Trudy
IGI 16:46-50 '61.
         (Methane) (Gas as fuel) (Metallic oxides)   (MIRA 16:7)

LEBEDEV, V.V.

Prospects for pumping large quantities of viscous petroleum with a deep well pump. Trudy KF VNII no.11:153-158 '62.

Foaming in oil wells.   197-207

(MIRA 17:3)

LEBEDEV., V. V.,

Sutures

Primary suture of tendons in digital and wrist flexors. Uch. zap. Vt. mosk. med. inst. 2, 1951.

9. Monthly List of Russian Accessions, Library of Congress, _____April_____ 1953, Uncl.

LEBEDEV, V. V.

Dissertation: "Change in the Protein Content of the Cerebrospinal Fluid and Blood
Serum of Patients With Craniocerebral Trauma in the Acute Stage." Cand Med Sci,
Second Moscow State Medical Inst imeni I. V. Stalin, Moscow, 28 Jun 54. (Meditsinskiy
Rabotnik, Moscow, 18 Jun 54)

SO: SUM 318, 23 Dec. 1954

LEBEDEV, V.V. (Moskva)

Effect of artificial hibernation on certain functions of the
organism in cerebrocranial injuries. Eksper.khir. 4 no.4:
52-53 Jl-Ag '59.   (MIRA 12:11)
          (BRAIN wds. & inj)
          (HIBERNATION, ARTIFICIAL eff)

LEBEDEV, V.V. (Moskva)

Closed injury of abdominal organs. Fel'd i akush. 24 no.8:12-18
Ag '59.   (MIRA 12:12)
                (ABDOMEN--WOUNDS AND INJURIES)

LEBEDEV, V.V.; VELIKORETSKIY, D.A. (Moskva)

Contusions of the thoracic cavity and rib fractures. Fel'd.
i akush. 25 no.3:15-21 Mr. '60.   (MIRA 13:6)
        (CHEST--WOUNDS AND INJURIES) (RIBS--FRACTURE)

BAKULEV, A.N.; LEBEDEV, V.V.

Experiments in the surgical treatment of acute myocardial
infarct. Klin.med. 38 no.1:48-55 Ja '60.   (MIRA 13:10)
                    (HEART—INFRACTION)

LEBEDEV, V.V. (Moskva, B.Stroganovskiy per. d.5/36,kv.6)

Heart wounds and their surgical treatment. Grud. khir. 1 no.5:
115-126 S-O '61.   (MIRA 15:3)

1. Iz Instituta grudnoy khirurgii AMN SSSR (dir. - prof.
A.A. Busalov).
               (HEART—WOUNDS AND INJURIES)

BAKULEV, A.N.; LEBEDEV, V.V. (Moskva, ul.Shchukinskaya-Novaya,d.11,kv.25)

Surgical treatment of myocardial infarct in the acute stage.
Grud..khir. 3 no.1:3-8 Ja-F '61.   (MIRA 16:5)

1. Iz Instituta grudnoy khirurgii (dir. - prof. S.A.Kolesnikov)
AMN SSSR.
            (HEART—INFARCTION)   (HEART—SURGERY)

BOGOLEPOV, N. K.; LEBEDEV, V. V.; SHAPIRO, L. B. (Moskva)

Indices for the early hospitalization and moving of patients
with cerebral insults. Vrach. delo no.7:10-14 Jl '62.
(MIRA 15:7)

1. Klinika nervnykh bolezney (zav. - prof. N. K. Bogolepov)
Vtorogo meditsinskogo instituta imeni N. I. Pirogova, neyro-
khirurgicheskoye otdeleniye, travmatologicheskaya klinika (zav. -
prof. I. I. Sokolov) Instituta imeni N. V. Sklifosovskogo, Mos-
kovskaya stantsiya skoroy pomoshchi.

(APOPLEXY)

LEBEDEV, V.V.

    Surgical treatment of cerebral insultus. Zhur.nevr.i psikh. 62
no.8:1160-1166 Ag '62.   (MIRA 15:12)

    1. Neyrokhirurgicheskoye otdeleniye (zav. V.V.Lebedev)
travmatologicheskoy kliniki (zav. - prof. I.I.Sokolov) Instituta
imeni N.V.Sklifosovskogo (glavnyy khirurg - prof. B.A.Petrov) i
klinika nervnykh bolezney II Moskovskogo meditsinskogo instituta
(zav. kafedroy - prof. N.K.Bogolepov) imeni Pirogova.
                            (APOPLEXY)

LEBEDEV, V. V., kand. med. nauk; ISAKOV, Yu. V. (Moskva)

Gaseous composition of the blood in severe craniocerebral trauma.
Vop. neirokhirurgii no.3:19-23 '62.   (MIRA 15:7)

1. 1-ya khirurgicheskaya klinika instituta imeni Sklifosovskogo
i klinika obshchey khirurgii II Moskovskogo meditsinskogo insti-
tuta imeni N. I. Pirogova.

(BRAIN—WOUNDS AND INJURIES)   (BLOOD, GASES IN)
(SKULL—WOUNDS AND INJURIES)

LEBEDEV, V.V.; ISAKOV, Yu.V.; POKROVSKIY, G.A.

Shock as a result of craniocerebral injuries. Vop. neirokhir. 2ᵖ
no.6:1-6 N-D '64. (MIRA 18:4)

1. Ordena Trudovogo Krasnogo Znameni nauchno-issledovatel'skiy
institut skoroy pomoshchi imeni Sklifosovskogo, Moskva.

LEBEDEV, V.V.

Method for the quantitative determination of carbon tetra-
chloride in the intestinal juice. Gig. i san. 28 no.6:55-56
Je'63   (MIRA 17:4)

1. Iz Yakutskogo gosudarstvennogo universiteta.

LEBEDEV, V.V., starshiy nauchnyy sotrudnik; ISAKOV, Yu.V., kand. med. nauk

Some problems of diagnosis and surgical treatment of acute cranio-
cerebral traumas based on materials of the Sklifosovskii Institute.
Trudy Inst. im. N.V. Sklif. 8:5-11 '63.

(MIRA 18:6)

1. Institut skoroy pomoshchi imeni Sklifosovskogc, Moskva.

LEBEDEV, V.V.

Diagnosis and treatment of epidural hematomas. Zhur. nevr.
i psikh. 64 no.8:1145-1150 '64.   (MIRA 17:12)

1. Institut skoroy i neotlozhnoy pomoshchi im. N.V. Sklifosovskogo
(glavnyy khirurg - prof. B.A. Petrov) i klinika nervnykh bolezney
II Moskovskogo meditsinskogo instituta (zaveduyushchiy - prof.
N.K. Bogolepov).

LEBEDEV, V.V., kand. med. nauk

Acute traumatic epidural hematoma. Trudy Inst. im. N.V. Sklif. 8:21-26 '63.   (MIRA 18:6)

1. Institut skoroy pomoshchi imeni Sklifosovskogo, Moskva.

L 23268-66   FBD/EWT(1)/EWT(m)/EEC(k)-2/T/EWP(t)/EWP(k)/EWA(h)   IJP(c)   WG/JD

ACC NR: AP6011569   SOURCE CODE: UR/0051/66/020/003/0501/0503

AUTHOR: Lebedeva, V. V.; Odintsov, A. I.; Lebedev, I. V.; Andriyakhin, V. M.; Gudovich, E. S.; Ponomareva, I. P.

ORG: none

TITLE: An He—Ne laser amplifier with feedback

SOURCE: Optika i spektroskopiya, v. 20, no. 3, 1966, 501-503

TOPIC TAGS: laser system, gas laser, helium neon laser, laser amplifier, feedback laser

ABSTRACT: An He—Ne laser amplifier with feedback (at $\lambda = 0.633 \mu$) is described and illustrated (see Fig. 1). Master oscillator 1 and amplifier 2 are placed parallel to
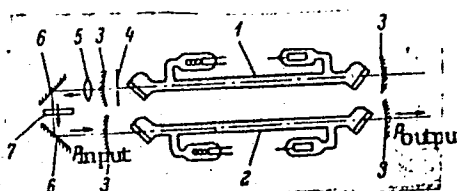

Fig. 1. Schematic of the device

1 - Master oscillator; 2 - amplifier; 3 - resonator mirror, radius of curvature 1160 mm; 4 - diaphragm for separating TEM_{00} modes; 5 - coincidence lens; 6 - rotating mirrors; 7 - light filter.

UDC: 621.375.9:535

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ACC NR: AP6011569

each other on a heavy bench. Radiation from 1 is attenuated by neutral filters by 10^4 or 10^3 times to provide a bypass from 1 to 2 and to avoid amplifier saturation. Lens 5 is used to produce coincidence of the wavefront, incident on 2, with the input mirror surface. The ratio of partial pressures of He and Ne in the amplifier is 17:1, resulting in a weak dependence of gain and activity of the medium on variations in the discharge current. The maximum gain of the system, measured in terms of the magnitude of the output signal from the amplifier when the oscillator frequency and the center of the amplifier passband are coincident, is 1000 (30 db). The misalignment of the amplifier axis with the direction of the incident wave, which affects gain, was not more than 3 sec of arc. The values of gain observed experimentally (mirrors: 99 and 98% reflective) and theoretically (mirrors: ideal dielectric) are in good agreement. Orig. art. has: 1 formula and 3 figures.   [YK]

SUB CODE: 20/ SUBM DATE: 06Jul65/ ORIG REF: 003/ OTH REF: 003/ ATD PRESS: 4230

Card 2/2 UUP

LEBEDEV, V.V.; IOFFE, Yu.S.; CHETVERUSHKIN, B.V.

Treatment of skull traumas accompanied by injuries of the
venous sinuses of the dura mater. Trudy Inst. im. N.V.
Sklif. 8:54-57 '63.   (MIRA 18:6)

1. Institut skoroy pomoshchi imeni Sklifosovskogo, Moskva.

LEBEDEV, V.V., starshiy nauchnyy sotrudnik; ISAKOV, Yu.V., kand. med. nauk

Gases in the blood in pathology of central respiratory regulation in patients with serious craniocerebral traumas. Trudy Inst. im. N.V. Sklif. 8:99-103 '63.   (MIRA 18:6)

1. Institut skoroy pomoshchi imeni Sklifosovskogo, Moskva.

LEBEDEV, V.V.; ZHILIS, B.G.; CHETVERUSHKIN, B.V.

Anesthesia in surgery on craniocerebral traumas. Trudy Inst.
im. N.V. Sklif. 9:222-225 '63.   (MIRA 18:6)

1. Moskovskiy gorodskoy nauchno-issledovatel'skiy institut
skoroy pomoshchi imeni Sklifosovskogo.

LEBEDEV, V.T.; POLYAKKER, R.M.; SHPEHNEVA, N.F.

New developments in supplying buildings under construction with
materials and equipment. Vych. i org.tekn. v stroi. i proekt.
no.7:21-26 '64.
(MIRA 18:10)

1. Gosudarstvennyy institut tipovogo i eksperimental'nogo
proyektirovaniya i tekhnicheskikh issledovaniy Gosstroya SSSR.

LEBEDEV, V.Ya., Inzh.; RAYSKIY, Yu.S., inzh.

Distance-type measurement of the water level in a cooling tower.
Energetik. 13 no.1:14-15 Ja '65.   (MIRA 18:8)

1. Teploelektrotsentral' No.2, Chelyabinsk.

KOROLEV, N.P., inzh.; LEBEDEV, V.Ye., inzh.

Welding objects made of the AMg5B alloy on the MTP-75 machine
with a voltage booster. Svar. proizv. no.4:36-37 Ap '65.
(MIRA 18:6)

LEBEDEV, V. Ye.

"Investigation and Calculation of the Freely Supporting Grate With Wall Matrices of a Macaroni Press." Sub 18 Apr 51, Moscow Technological Inst of Food Industry

Dissertations presented for science and engineering degrees in Moscow during 1951.

SO: Sum. No. 480, 9 May 55

ROGASH, A.R., otv. red.; ABRAMOV, N.G., red.; KONDRASHUK, P.K.,
      red.; DUDAREV, Ye.I., kand. sel'khoz. nauk, red.;
      LEBEDEV, Ya.A., kand. sel'khoz. nauk, red.; LISTVIN,
      K.S., kand. sel'khoz. nauk, red.; LAPSHINA, O.V., red.

      [New facts in fiber plant cultivation; from the trans-
      actions of the All-Union Scientific Research Institute on
      Flax] Novoe v kul'ture l'na-dolguntsa; iz trudov Vsesoiuz-
      nogo nauchno-issledovatel'skogo instituta l'na. Moskva,
      Kolos, 1965. 230 p.   (MIRA 18:8)

      1. Torzhok. Vsesoyuznyy nauchno-issledovatel'skiy institut
      l'na.

Lebedev, Ya. A.

USSR/Cultivated Plants - Commercial. Oil-Bearing. Sugar-Bearing.   M.

Abs Jour   : Ref Zhur - Biol., No 10, 1958, 44216

Author   : Lebedev, Ya.A.
Inst   : -
Title   : Once More on the Separate Harvesting of Flax.

Orig Pub   : Len i konoplya, 1957, No 12, 13-19.

Abstract   : No abstract.

Card 1/1

- 114 -

BOLOTOV, I.N., KOZYREVA, A.A.;KONDRASHUK, P.K.; KRYLOV, A.A.; TOLKOVSKIY, V.A.; KHAYLIS, G.A., Prinimal uchastiye LEBEDEV, Ya.A.; GOLOMYSOV, F.S., red.; BARANOVA, L.G., tekhn. red.; FRIDMAN, Z.L., tekhn. red.

[Over-all mechanization of flax growing]Kompleksnaia mekhaniza-tsiia l'novodstva. [By] I.N.Bolotov i dr. Leningrad, Sel'khoz-izdat, 1962. 354 p.   (MIRA 16:2)
              (Flax processing machinery)

ABROSIMOV, Ye.V.; ORLOV, V.I.; LUZGIN, V.P.; LEBEDEV, Ya.I.; DASHEVSKIY,
        Yu.A.

    Improving the surface of chromium-nickel-molybdenum steel sheet
    ignots. Stal' 22 no.12:1086 D '62.   (MIRA 15:12)
        (Chromium-nickel-molybdenum alloys) (Steel ingots)

LEBEDEV, Ya. I., NOSOV, G. I., NEYLAND, K. K., VERGAZOV, N. G., KSENEFONTOB, V. F.

"Melting Chromium-Molybdenum-Nickel Steel in a 350-Ton Basic Open-Hearth Furnace," Stal', No.6, pp. 459-466, 1946

Evaluation B-61757

LEBEDEV, Ya. I., NOSOV, G. I., NEYLAND, K. K., BEZDENEZHNYKH, A. A., and KSENEFONTOV, V. F.

"Utilization of Alloy Scrap at Magnitogorsk Combine," Stal', No.6, pp. 10-18, 1946

Evaluation B-60428

S/133/62/000/012/002/012
A054/A127

AUTHORS: Abrosimov, Ye.V., Orlov, V.I., Luzgin, V.P., Lebedev, Ya.I., Dashev-
            skiy, Yu.A.

TITLE: Improving the surface of chrome-nickel-molybdenum steel sheet slabs

PERIODICAL: Stal', no. 12, 1962, 1,086

TEXT: 9.3-ton top-poured chrome-nickel-molybdenum slabs frequently have
surface defects (of 467 test slabs 215 showed transversal cracks and 194 had
scales). Several methods were tested to improve the slab surface; one of them
involved reduction of the partial oxygen pressure in the ingot mold by adding ni-
trogen at a pressure of 3 - 6 atm, which, however, did not improve the surface
quality. The best results were obtained with pouring through intermediate spouts,
30 and 35 mm in diameter (to reduce the impact of the metal jet) into molds with
double lacquer coating. In such molds an intensive gassing takes place, which
prevents the sputtering metal and the creasing surface skin from sticking to the
mold walls. This gassing also produces a reducing mold atmosphere, preventing
oxidation. Favorable results were also obtained in some cases with a glass cloth

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Improving the surface of chrome-nickel-molybdenum S/133/62/000/012/002/012
                                                           A054/A127

fixed on the broad ingot mold side, which floats on the metal surface, and being lifted with the metal level, passes over into the slag, entraining metal drops deposited on it. The 0.29 mm thick cloth was glued into strips 2.2 - 2.5 mm thick by liquid glass. It should be considered that steels containing up to 2.5% chromium can be poured through a 30-mm spout only if heated to 1,630 - 1,640°C before reduction and if their ductility is decreased by reducing the aluminum added to the ladle to 150 g/ton.

Card 2/2

LEBEDEV, Ye.I.; RESHINA, I.I.; SAKIN, I.L.

Attachment to infrared spectrometers. Zav.lab. 29 no.8:1000-1002
(MIRA 16:9)
'63.   (Spectrometer)

L 45435-66   EWT(m)/EWP(w)/T/EWP(t)/ETT   IJP(c)   JD
SOURCE CODE: UR/0370/66/000/003/0003/0016

ACC NR: AP6019765   (A)

AUTHOR: Kravchenko, V. F.; Isakov, I. V.; Khlebnikov, A. Ye.; Dashevskiy, Yu. A.;
Lebedev, Ya. I.; Selivanov, N. M.

ORG: none

TITLE: Improving the quality of open hearth steel by treating it with rare earth
metal alloys

SOURCE: AN SSSR. Izvestiya. Metally, no. 3, 1966, 3-18

TOPIC TAGS: rare earth metal, metallurgic process, metal physics, metal property,
steel property, mechanical property, steel/40Kh2NMa steel

ABSTRACT: There is very little published information concerning the effect of rare
earth metals (REM) on the properties of steel, and on the optimum conditions for the
use of such metals. This paper investigates the effects of REM on specific properties
of steel, notes procedures for alloying steel, and indicates optimum REM content to
achieve desired combinations of mechanical properties. Chemical thermodynamic data
and composition of REM alloys are presented in order to provide a better understanding
of the principles involved in alloying steel with REM. Experimental melts were pro-
duced in a 150 ton induction furnace as well as in 25 and 200 ton basic open hearth
furnaces. Mishmetal, a rare earth alloy containing 56.1% Ce and 41.3% La (other REM,
iron, and impurities totaled 2.6%), was used as the deoxidizing agent. Studies were
made of both cast and wrought metal states and tables of mechanical properties are in-

UDC: 669.141.243.4

Card 1/2

L 45435-66

ACC NR: AP6019765

cluded. The impact strength of steel 40Kh2NMa, melted in a 25 ton furnace and top-poured at 1580°C, is given. Results of the experiments showed that in all cases the addition of REM increased steel ductility. This increase was greatest when the mishmetal was able to reduce sulfur content in the solidified ingot. Desulfurization was best accomplished when it was initiated in the ladle prior to pouring into the mold. Optimum conditions were concluded to be ladle deoxidation and desulfurization by adding 0.15-0.20% mishmetal (calculated) to the molten steel (1560-1580°C) immediately after tapping from the furnace. The mishmetal reaction begins and most of the sulfur is removed by the time the steel is poured and solidified. The procedure lowers the sulfur content 25 to 30%. The mishmetal significantly reduces nonmetallic inclusion content, as well as changing the shape, composition, and distribution of that content. Finally, the REM alloy increases impact strength of the rolled steel 27 to 47% (transverse test samples) and of cast steel by 47 to 65%, with a simultaneous increase in ductility. Orig. art. has: 12 tables and 6 figures.

SUB CODE: 11/   SUBM DATE: 25 May 64 / ORIG REF: 026 / OTH REF: 001

LS

Card 2/2

TSVETKOV, Yu.D.; LEBEDEV, Ya.S.; VOYEVODSKIY, V.V.

Free radical reactions in irradiated polytetrafluoroethylene.
Part 1: Use of electron resonance (ER) in studying radi-
cal conversions and in the determination of the coefficient
of diffusion of oxygen in polytetrafluoroethylene. Vysokom.
soed. 1 no.10:1519-1525 O '59.   (MIRA 13:3)

1. Institut khimicheskoy fiziki AN SSSR.
      (Radicals(chemistry)) (Ethylene) (Oxygen)

TSVETKOV, Yu.D.; LEBEDEV, Ya.S.; VOYEVODSKIY, V.V.

Reactions of free radicals in irradiated polytetrafluoroethylene.
Part 2: Determination of the rate constants for the reactions
$RO_2 \rightarrow R + O_2$ and $R + O_2 \rightarrow RO_2$. Vysokom.soed. 1 no.11:1634-1642
N '59.
(MIRA 13:5)

1. Institut khimicheskoy fiziki AN SSSR.
       (Radicals (Chemistry) (Ethylene)   (Oxygen)

LEBEDEV, Ya. S.
LATYSHEV (G. D).   174

PHASE I BOOK EXPLOITATION   SOV/5410

Tashkentskaya konferentsiya po mirnomu ispol'zovaniyu atomnoy
    energii, Tashkent, 1959.

Trudy (Transactions of the Tashkent Conference on the Peaceful
    Uses of Atomic Energy) v. 2. Tashkent, Izd-vo AN UzSSR, 1960.
    449 p. Errata slip inserted. 1,500 copies printed.

Sponsoring Agency: Akademiya nauk Uzbekskoy SSR.

Responsible Ed.: S. V. Starodubtsev, Academician, Academy of
    Sciences Uzbek SSR. Editorial Board: A. A. Abdullayev, Can-
    didate of Physics and Mathematics; D. M. Abdurasulov, Doctor
    of Medical Sciences; U. A. Arifov, Academician, Academy of
    Sciences Uzbek SSR; A. A. Borodulina, Candidate of Biological
    Sciences; V. N. Ivashev; G. S. Ikramova; A. Ye. Kiv; Yu. M.
    Lebanov, Candidate of Physics and Mathematics; A. I. Nikolayev,
    Candidate of Medical Sciences; D. Nishanov, Candidate of Chemical
    Sciences; A. S. Sadykov, Corresponding Member, Academy of Sciences
    USSR, Academician, Academy of Sciences Uzbek SSR; Yu. N. Talanin,

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Transactions of the Tashkent (Cont.)   SOV/5410

Candidate of Physics and Mathematics; Ya. Kh. Turakulov, Doctor
of Biological Sciences. Ed.: R. I. Khamidov; Tech. Ed.: A. G.
Babakhanova.

PURPOSE : The publication is intended for scientific workers and
specialists employed in enterprises where radioactive isotopes
and nuclear radiation are used for research in chemical, geo-
logical, and technological fields.

COVERAGE: This collection of 133 articles represents the second
volume of the Transactions of the Tashkent Conference on the
Peaceful Uses of Atomic Energy. The individual articles deal
with a wide range of problems in the field of nuclear radiation,
including: production and chemical analysis of radioactive
isotopes; investigation of the kinetics of chemical reactions
by means of isotopes; application of spectral analysis for the
manufacturing of radioactive preparations; radioactive methods
for determining the content of elements in the rocks; and an
analysis of methods for obtaining pure substances. Certain

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Transactions of the Tashkent (Cont.)   SOV/5410

instruments used, such as automatic regulators, flowmeters,
level gauges, and high-sensitivity gamma-relays, are described.
No personalities are mentioned. References follow individual
articles.

TABLE OF CONTENTS:

RADIOACTIVE ISOTOPES AND NUCLEAR RADIATION
IN ENGINEERING AND GEOLOGY

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Transactions of the Tashkent (Cont.)   SOV/5410

Ethylene Irradiated by High-Speed Electrons   430

Tyuchkov, Yu. D., Ya. S. Lebedev, and V. V. Voyevodskiy   [In-
stitute of Chemical Physics AS USSR]. Investigation of the Re-
actions of Free Radicals in Irradiated Teflon   431

Markevich, S. V., and A. A. Ivko   [Institute of Physical Or-
ganic Chemistry AS BelSSR]. Deuterium Exchange on Solid Sur-
faces in the Gas Phase. Deuterium Exchange in Ethylene on
an Industrial Aluminosilicate Catalyst   .   440

AVAILABLE: Library of Congress

                                                        JA/rsm/ju
                                                        11-3-61

Card 20/20

88358
S/195/60/001/004/002/015
B017/B055

5.3832   (2209)

AUTHORS: Lebedev, Ya. S., Tsvetkov, Yu. D., Voyevodskiy, V. V.

TITLE: The Origin of the Compensation Effect in Recombination
             Reactions of Radicals in Irradiated Polymers

PERIODICAL: Kinetika i kataliz, 1960, Vol. 1, No. 4, pp. 496-502

TEXT: The authors studied the rate constants of the recombination
reactions of radicals in hydrocarbon polymerizates, polyvinyl chloride
and various Teflon samples. Log k^o in irradiated polymers was found to
be a linear function of the activation energy E. Table 1 gives values of
k^o and E for radical recombination in various polymers. This recombination
is generally observed at temperatures around the melting point of the
polymer. Within the melting range, the activation energy was found to
decrease with an increase in temperature. Basing on the equation k
$= k_o \exp [-E(T)/RT]$, the authors calculated E and k^o from the relations

$$E_{eff} = E - T \partial E / \partial T \quad (1) \text{ and}$$
$$k^o_{eff} = k^o \exp(-(1/R) \partial E / \partial T) \quad (2).$$

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The Origin of the Compensation Effect in
Recombination Reactions of Radicals in
Irradiated Polymers

88358
S/195/60/001/004/002/015
B017/B055

The true values of k^0 for the recombination of fluoroalkyl radicals in
Teflon are shown in Table 2. They are of the order of $10^{-9} - 10^{-16}$ cm^3/sec.
The true value of E is of the order of 10-20 kcal/mole. The assumed
temperature dependence of the activation energy of radical recombination
in Teflon is represented graphically in Fig. 2. The anomalous values of
k^0 are ascribed not only to the occurrence of phase changes on temperature
increase, but also to factors due to condensation of phases. S. Z.
Roginskiy and Yu. L. Khait are mentioned. There are 2 figures, 2 tables,
and 14 references: 9 Soviet, 4 US, and 1 Polish.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical
              Physics of the AS USSR). Institut khimicheskoy kinetiki i
              goreniya CO AN SSSR (Institute of Chemical Kinetics and
              Combustion of CO of the AS USSR)

SUBMITTED: July 27, 1960

Card 2/2

21.4000
5.3100

S/051/60/008/06/010/02.
E201/E691

AUTHORS: Lebedev, Ya.S., Tsvetkov, Yu.D., and Voyevodskiy, V.V.

TITLE: The Electron Paramagnetic Resonance Spectra of Fluoroalkyl and
Nitrosofluoroalkyl Radicals in Irradiated Teflon

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 6, pp 811-814 (USSR)

ABSTRACT: The authors describe their results obtained in an investigation of
electron paramagnetic resonance (EPR) spectra of fluoroalkyl and
nitrosofluoroalkyl radicals in irradiated teflon at temperatures up
to $300°C$. An EPR spectrometer with high-frequency (300 kc/s) magnetic-
field modulation, described earlier (Ref 4), was used. The samples
were heated by blowing hot air around them. The EPR spectrum of the
fluoroalkyl radical exhibited additional hyperfine splitting of
3.5 oersted at high temperatures. This splitting was due to the
interaction of the unpaired electron with fluorine atoms in the
γ-position (Fig 1 shows this at $250°C$). These γ-components were
broadened on cooling (Fig 2) so that at room temperature they could
no longer be resolved. Fig 3 shows that on further lowering of
temperature to about $16°C$ the β-components broaden as well and finally
below $0°C$ the hyperfine splitting due to α- and β-atoms of fluorine

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80349

S/051/60/008/06/010/024
E201/E691

The Electron Paramagnetic Resonance Spectra of Fluoroalkyl and Nitrosofluoroalkyl
Radicals in Irradiated Teflon

        disappears completely. Gordy (Ref 2) reported that the EPR spectrum
of fluoroalkyl radical disappeared on interaction with NO. The
present authors found that simultaneously with the disappearance of
the original fluoroalkyl spectra a new complex EPR spectrum appears
(Fig 4). This new spectrum is ascribed to the nitrosofluoroalkyl
radical and its profile at 150°C (Fig 4a) agrees with theoretical
predictions (Fig 4b). Splittings in the EPR spectrum of
nitrosofluoroalkyl suggest that the unpaired electron is localized
mainly at the nitrogen nucleus. The paper ends with a short discussion
of the results obtained and comparison with other published work.
There are 5 figures and 11 references, of which 3 are Soviet and
8 English.

SUBMITTED: September 21, 1959

Card 2/2

S/081/62/000/005/007/112
B158/B110

//IS/O

AUTHORS: Buchachenko, A. L. Neyman, M. B. Lebedev, Ya. S.

TITLE: Investigation of radical reactions of antioxidants in liquid phase by the method of electronic paramagnetic resonance

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 5, 1962, 59, abstract 5B360 (Tr. po khimii i khim. tekhnol. (Gor'kiy), no. 1, 1961, 39 - 43)

TEXT: By the method of electronic paramagnetic resonance it is shown that stable radicals are formed when a number of active radicals, obtained by decomposing benzoyl peroxide, cyclohexyl percarbonate, p-tert-butyl cumene peroxide, etc., in the presence of a catalyst, are reacted with antioxidants - aromatic amines, alkyl substitution phenols, naphthols, etc. Their lifetimes in a solution of toluene or benzene (in liquid phase) range from several minutes to several hours depending on the nature of the radicals and the temperature. For a number of antioxidants - phenols and amines - it was possible to identify the structures of the radicals formed and to study

Card 1/2

Investigation of radical reactions ...   S/081/62/000/005/007/112
                                                  B158/B110
their conversions as well as formation mechanism. [Abstracter's note:
Complete translation.]

Card 2/2

28974
S/192/61/002/005/001/005
D202/D304

5 5310

AUTHORS: Buchachenko, A.L., Lebedev, Ya.S. and Neyman, M.P.

TITLE: Investigating anti-oxidant radicals by means of
              electronic para-magnetic resonance
              I. Phenoxyradicals

PERIODICAL: Zhurnal strukturnoy khimii, v. 2, no. 5, 1961,
              558-561

TEXT: This experimental work is similar to that published by
Becconsall and others in 1960, the difference between these two
investigations lying in the use of active compounds, capable
of splitting off hydrogen from the phenol: The Western scien-
tists used lead peroxide and the Russians benzoyl peroxide,
cyclohexyl percarbonate and p-tert-butylcumene hydroxy-peroxide
with cobalt stearate to catalyze the decomposition. The authors
state that the Western investigation was published when theirs

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Investigating anti-oxidant ...   S/192/61/002/003/001/005
                                  D202/D304

was virtually finished. After briefly discussing the phenoxy-
radicals theory, based on Western publications, the authors
state that their object was to obtain stable phenoxy-radicals
and to study their structure and life-span; it was found that
the latter amounted to hours. Substituted phenols used in the pre-
sent work are given in the Table together with the characteristics
of their spectra. Experiments were carried out in sealed thin
glass tubes in toluene solutions, with compounds in the ratio of
1:1; the tubes were heated to 50-60°C, put in the resonator of
the EPR spectrometer and the first derivatives of absorption
spectra recorded on a self-recording EPR-09 potentiometer. The
equipment was previously described by A.G. Semenov and M.N.
Bubnov (Ref. 5: Pribory i tekhnika eksperim, 1, 92, 1959). The
authors discuss in detail, the spectrum of 2,6-di-tert-butyl-4-
methyl phenoxy radical, obtained by the action of benzoyl pero-
xide, cyclohexyl percarbonate or diphenyl-picryl hydrasine
(DFPC); with the last component the formation of the phenoxy-

Card 2/5

S/1ɔ2/
D202D3G

Investigating anti-oxidant ...

radical took place even at room temperature. ...
were obtained by irradiating 2,6-di-tert-but...
with high-speed electrons; the irradiation e...
formed together with A.T. Koritskiy and A.F. ...
oxygen through a solution of this compound w...
xide for two hours at 100 °C did not change ...
affected only slightly the intensity of the ...
authors failed to obtain radical spectra fr...
nitro-benzene, p-cresol and unsubstituted ...
that their results disprove the hypothesis ...
nol-benzoyl peroxide reaction; the impair...
calized along the II bonds of the benzene ...
density is centered around the para-positi...
oxygen atom. It is proposed to continue t...
other substituted phenols and to study ...
tics. There are 1 table, 3 figures and 6 ...
bloc and 5 non-Soviet-bloc. The refer...

Card 3/9

Investigating anti-oxidant ,,,   S/192/61/
                                       D202/D30+

English-language publications read as f...
E. Kooyman, Y. Chem.Soc., 3211 (1963); D. ...
Soc., 4926 (1956); Ch. Walling, J. Amer. C...
(1958); Y.K. Beoonsall, S. Clough, C. Sc...
Soc., 56, 459, (1960)

ASSOCIATION: Institut khimicheskoy ...
                of Chemical Physics AS USSR)

SUBMITTED: July 14, 1960

Card 4/5

24, 7900

5.5310

28976
S/192/61/002/005/003/005
D202/D304

AUTHORS: Lebedev, Ya.S. and Tsvetkov, Yu.D.

TITLE: Electronic paramagnetic resonance spectra of
             radicals formed by irradiation of polypropylene

PERIODICAL: Zhurnal strukturnoy khimii, v.2, no.5, 1961,
             607-609

TEXT: The authors give results of their study of free radi-
cals found in poly-propylene (PP) by irradiation with γ-rays
of Co^{60} or by the action of high-speed electrons, but do not
describe the methods used. In their experiments, they used
powdered ПП (PP) samples, crystallized to various extents, the
corresponding electronic paramagnetic resonance spectra ЭПР
(EPR) being studied in different temperature conditions: at
77° K, a.t -78°C, at 25°C after defreezing in vacuo and at 40-
60° C. The EPR of PP in the temperature range $77 - 195^{\circ}$K has

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S/192/61/002/005/003/005
Electronic paramagnetic ...   D202/D304

been studied previously. When the sample temperature is raised
to 25°C the spectrum is changed, and consists of 15 lines which
remain in the same position when the temperature is lowered
again, although line broadening occurs; the radical content
increasing with progressive crystallization. The authors
assume that the 15 line spectrum consists of two superimposed
spectra of 9 and 6 components with superfine structure, having
tne same splitting ($\sim$ 20 oer). Both spectra disappear at 40 -
60°C at equal rates. A further spectrum change is observed
after 2 hours, in vacuo, at room temperature: the signal inten-
sity gradually falling and a broad line ($\sim$ 40 oer) appaering
in the center. By passing oxygen through the sample at room
temperature, a peroxide line is obtained, but no effects are
apparent if the oxygen is passed in after a few days. At least
4 different free radicals are believed to be present in spec-
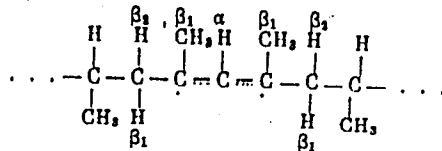tra of the irradiated PP samples; after defreezing only the
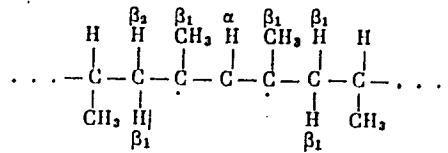
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D202/D304

Electronic paramagnetic ...

allyl radical

$$\ldots-\overset{\underset{CH_3}{|}}{\underset{\beta_1}{\overset{H}{\overset{|}{C}}}}-\overset{\underset{H}{|}}{\overset{\beta_2 H}{\overset{|}{C}}}-\overset{\overset{\beta_1 CH_3}{}}{C}=\overset{\overset{\alpha H}{}}{C}=\overset{\overset{\beta_1 CH_3}{}}{C}-\overset{\underset{H}{|}}{\overset{\beta_2 H}{\overset{|}{C}}}-\overset{\underset{CH_3}{|}}{\overset{\beta_1 H}{\overset{|}{C}}}-\ldots$$

R_2 has to be taken into account. Assuming that the spin density on the central C atom is small the splitting has to be observed on $8\beta_1$ protons, giving a spectrum of 9 components; the β_2 protons being oriented in such a way that they cannot take part in it. The spectrum with an even number of lines may be explained by a small admixture of the radical R_3

$$\ldots-\overset{\underset{CH_3}{|}}{\underset{\beta_1}{\overset{H}{\overset{|}{C}}}}-\overset{\underset{H|}{|}}{\overset{\beta_2 H}{\overset{|}{C}}}-\overset{\overset{\beta_1 CH_3}{}}{C}-\overset{\overset{\alpha H}{}}{C}-\overset{\overset{\beta_1 CH_3}{}}{C}-\overset{\underset{H}{|}}{\overset{\beta_2 H}{\overset{|}{C}}}-\overset{\underset{CH_3}{|}}{\underset{\beta_1}{\overset{H}{\overset{|}{C}}}}-\ldots,$$

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Electronic paramagnetic ...

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and the appearance of a broad line after prolonged standing in vacuo as the formation of some unknown radicals, more stable, than the allyl. The authors also investigated oriented PP films; when the magnetic field was oriented along the macromolecular a- xes, the PP spectrum was similar to that of crystalline samples; when the direction of the field formed an angle ($\varnothing$) with this axis, the line width became larger, reaching a maximum at $\Theta = \pi/2$, but their number and position did not change. This angular EPR spectrum dependence is considered to be in agree- ment with the structure of the free allyl radical proposed in Western literature. The authors state that in 1961, when their paper was being printed, similar work was published in the West, the experimental results being the same, but being given a different interpretation. There are 1 figure and 5 references: 3 Soviet-bloc and 2 non-Soviet-bloc. /Abstracter's note: 1 Soviet-bloc reference is a translation from Western literature/.

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28976

Electronic paramagnetic ...   S/192/61/002/005/003/005
D202/D304

The references to the English-language publications read as
follows: S. Ohnishi, M. Kashiwagi, J. Ikeda, N. Nitta, Isotopes
and Radiazion (Japan), 1,210 (1958); H. Fisher, K.H. Hellwege,
V. International Simposium on Free Radicals, Uppsala (Sweden),
(1961).

ASSOCIATION: Institut khimicheskoy fiziki AN USSR. Institut
                khimicheskoy kinetiki i goreniya CO AN USSR
                (Institute of Chemical Physics AS USSR. Institute
                of Chemical Kinetics and CO Combustion AS USSR)

SUBMITTED: April 8, 1961

Card 5/5

30915
S/192/61/002/006/002/004
D228/D304

24,7900 (1055, 1144, 1163)

AUTHORS: Lebedev, Ya. S., Chernikova, D. M., and Tikhomirova, N. N.

TITLE: Computing the spectra of electron paramagnetic resonance on an electronic calculating machine. 1. EPR spectra with an ultrafine structure (symmetrical components)

PERIODICAL: Zhurnal strukturnoy khimii, v. 2, no. 6, 1961, 690-695

TEXT: The authors computed theoretical EPR spectra with an ultrafine structure by means of a high-speed calculating machine at different ratios of individual component widths to the resolution magnitude. Special attention was paid to the area beneath the absorption curve, the number of components and the intensity correlations, the line widths in the spectra, and the form of individual lines. Previous work shows that determining these parameters is

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Computing the spectra of ...

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D228/D304

impeded by the spectrum's distorted form, and that the line form can only be mathematically analyzed, when laborious calculations are necessary, in the simplest of cases-singlet and doublet lines. Graphs of theoretical spectra were plotted both for cases of equal component intensity and for those of the binomial distribution of intensities (1:2:1, 1:3:3:1, 1:4:6:4:1). The Gauss and Lorentz forms of individual component lines were calculated from the equation

$$I(x) = \sum_{k=1}^{n} a_k f\left[\frac{x - k + 1}{\beta}\right]$$

where n = the number of UFS components, a_k = the coefficients of intensity, k = the ordinal number of UFS components, $f(x) =$ $(1 + 1.335 x^2/\beta^2)^{-1}$ and $\exp(-2x^2/\beta^2)$ for the Lorentz and Gauss

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Computing the spectra of ...

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S/192/61/002/006/002/004
D228/D304

forms respectively, $\beta = \Delta H_l / \Delta H_r$; $x = H - H_0 / \Delta H_r$, ΔH_r = the resolution between the UFS components, ΔH_l = the width of individual lines between the points of maximum inclination, H_0 = the field corresponding to the center of the end component, and H = the magnetic field's alternating value. Two methods are proposed for examining experimental spectra: The direct comparison of observed and theoretical spectra, and the use of nomograms for analyzing unresolved EPR spectra. In the latter the true values of $\beta = \Delta H_l / \Delta H_r$ are plotted

along the x-axis and $\Delta H_s^* / \Delta H_r$, $\Delta H_l / \Delta H_r$, $\Delta H_{r(k-1)}^* / \Delta H_r$, and I_k' / I_l' along the y-axis; k and 1 are the component numbers, I_k' and I_l' being the amplitudes of components k and 1 recorded in a first derivative form. The combination of both methods allows the parameters of unresolved spectra to be determined with sufficient accuracy when both the spectrum structure and ΔH_r are known, or when only one of these quantities is known. The desired parameters can apparently be evaluated even if there is absolutely no information about a partially

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Computing the spectra of ...

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resolved spectrum. Thus, the authors conclude that the foregoing procedure will enable different EPR spectra to be satisfactorily deciphered and processed which in turn will increase the possibility of applying the EPR method to solving scientific problems. Due acknowledgement is made to V. V. Voyevodskiy, A. Ya. Povzner, and others on the staff of the Matematicheskiy otdel IKhF AN SSSR Mathematics Section, Institute of Chemical Physics, Academy of Sciences USSR) for their advice and interest. There are figures, 1 table, and 10 references: 7 Soviet-bloc and 3 non-Soviet-bloc. The reference to the English-language publications read as follows: J. G. Powles et al, Proc. Phys. Soc. 77, 729 (1959). W. Gordy et al, Proc. Nat. Acad. Sci. USA 46, 1124 (1961); D. Libby et al, J. Phys. Chem. Solids 18, 316 (1961).

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of
              Chemical Physics, AS USSR)

SUBMITTED: July 7, 1961

Card 4/4

//. 2214 &so 2209

S/190/61/003/006/013/019
23770
B110/B208

AUTHORS: Tsvetkov, Yu. D., Lebedev, Ya. S., Voyevodskiy, V. V.

TITLE: Study of free radical reactions. III. Recombination of
              fluoroalkyl and peroxide radicals

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 6, 1961,
              882-890

TEXT: The purpose of the present paper is the investigation of the
recombination reactions of fluoroalkyl and peroxide radicals under ex-
clusion of oxygen diffusion. The dependence of the radical recombina-
tion on the ratio of the amorphous and crystalline phase was studied
on Teflon with different degree of crystallinity. Teflon samples in the
form of films or chips were irradiated by a γCo^{60} radiation source
at ~60 Mrad. The free radical concentration is in this case
~10^{18} 1/cm^3. Polymerization took place on the oil bath, the electron
paramagnetic resonance was studied at 10°C to determine the free radicals.

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Study of free radical reactions.   S/190/61/003/006/013/019
III. Recombination of ...   B110/B208

The kinetics of the recombination of the radicals $\dot{R}$ and $\dot{R}O_2$ was determined at different temperatures and degrees of crystallinity (74 and 46 %) (Fig. 1). The relative concentration I was referred to the initial concentration = 1: $I_\alpha = [\dot{R}O_2]/[\dot{R}O_2]_o +, I_\beta = [R]/[R]_o$. The reciprocal concentration as a function of time (Fig. 1) approaches linearity asymptotically corresponding to the bimolecular recombination reaction. In polymers with crystalline and amorphous phases (polyethylene, polypropylene, Teflon) recombination proceeds according to the bimolecular law with different rates in the amorphous and crystalline phase. Assuming that $[\dot{R}]_{cryst} = c_1; [\dot{R}]_{am} = c_2$ in the case of Teflon, the mean concentration $c_{mean} = c_1\alpha + c_2(1 - \alpha)$, where α = degree of crystallinity. c_1 and c_2 depend on the time: $\partial c_{1,2}/\partial t = -k_{1,2}c^2_{1,2}$ (2). According to $\lim_{t\to o} (1/I)$

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Study of free radical reactions.
III. Recombination of ...

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B110/B208

$= 1 + (1 - \alpha)k_2 t$ initially a rectilinear section appears in the
coordinates reciprocal concentration-time (Fig. 1., curve 1), which
corresponds to the square recombination in the amorphous zone, as well
as a section corresponding to the square recombination in the crystalline
zone in the case of higher t-values. According to (2) the straight
line corresponding to the recombination in the crystalline phase cuts
off the section $1/\alpha$ on the y-axis. The degree of crystallinity may
thus be determined from the recombination kinetics. Table 1 gives the
degrees of crystallinity calculated from the recombination kinetics $\dot{R}O_2$
and $\dot{R}$, and the α-values calculated from the specific weight (according
to $d = 2.00 + 0.31\alpha [g/cm^3]$). Their agreement confirms the model
suggested and the equality of the initial combination in both phases.
The different stability of the radicals in amorphous and crystalline
phase is confirmed by their decrease in concentration by 25-50 % during

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primary heating of the irradiated samples to 150-200°C, and constancy
of the concentration of repeated heating. According to (2), the rate
constants of the recombination reactions at different temperatures and
degrees of crystallinity can be determined from the linear anamorphisms
of the kinetic curves of the type of Figs. 1, a and 5. The recombination
of fluoroalkyl radicals takes place in a measurable rate only at
temperatures which are by 50-70°C higher than in the case of peroxide
radicals. The following is written: peroxide radicals:

$$k_{\text{нл}}^{(46)} \simeq 10^{-3} \cdot \exp \left\{ -\frac{26\,000 \pm 3\,000}{RT} \right\};$$

$$k_{\text{aт}}^{(46)} \simeq 10^{-15} \cdot \exp \left\{ -\frac{12\,000 \pm 2\,000}{RT} \right\}.$$

(A)

fluoroalkyl radicals:
$$k_{kr}^{(46)} \simeq 10^{-3} \cdot \exp \left\{ -(40,000 \pm 4,000)/RT \right\}$$

$$k_{at}^{(46)} \simeq 10^{-7} \cdot \exp \left\{ -(30,000 \pm 3,000)/RT \right\}.$$

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The activation energy of peroxide radical recombination is 26 ± 3 kcal/mole in the crystalline phase, 11 ± 3 kcal/mole in the amorphous phase. Values of 20 - 40 kcal/mole are obtained for primary alkyl radicals in various hydrocarbon polymers. The recombination of long-life radicals of solid polymers is not determined by their structure but by the properties of the medium: movement of the segments of polymer chains. In the amorphous phase with high chain mobility the recombination rate is determined by rotation of small chain parts. In the crystalline phase with firmly bound chains it is determined by the rotation of long chain parts. In the recombination rate of fluoroalkyl radicals the high values of the pre-exponential factors are remarkable, which have also been observed in other polymers (Table 2). The activation energy and the pre-exponential factor highly differ for various Teflon samples, which was also observable in many reactions of the solid phase and of the electric conductivity. The linear dependence $\log k^c$ (E) existing in this case is called compensation dependence (Fig. 3). The potential barrier of the segment rotation of the polymer chain probably decreases with a rise in temperature, which

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explains the compensation dependence and the high pre-exponential factors, whose real values are 10^{-8} and 10^{-16} cm^3/sec. The high values obtained experimentally are thus a result of the change in activation energy with temperature rise. The authors thank G. G. Titova for her assistance in some experiments. There are 3 figures, 2 tables, and 13 references: 8 Soviet-bloc and 4 non-Soviet-bloc. The most important references to English-language publications read as follows: Ref. 4: S. Ohnishi, I. Nitta, J. Polymer Sci., 38, 451, 1959. Ref. 5: Z. Kuri, H. Ueda, S. Shida, J. Chem. Phys., 32, 371, 1960. Ref. 7: J. A. Sauer, A. E. Woodward, Rev. Mod. Phys., 32, 88, 1960.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics AS USSR).
Institut khimicheskoy kinetiki i goreniya CO AN SSSR (Institute of Chemical Kinetics and Combustion of the Siberian Division AS USSR)

Card 6/10

AUTHORS: Lebedev, Ya. S., Tsepalov, V. F., and Shlyapintokh, V. Ya.

TITLE: The possibility of using the method of electron paramagnetic resonance to record the active centers in the oxidation of hydrocarbons in the liquid phase

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 139, no. 6, 1961, 1409-1412

TEXT: The authors studied the applicability of electron paramagnetic resonance (epr): a) for determining free radicals; b) for measuring the steady concentration of these radicals in the oxidation of hydrocarbons. A continuation of these studies will probably contribute to the knowledge of the kinetics of processes of other types. From the measured values it is possible to determine directly the rate constants of the elementary reactions that constitute parts of the entire process. Since the concentration of the radicals is low, their determination under steady conditions is difficult. For this reason the active radicals could not be identified during the oxidation of hydrocarbons in the liquid phase. 2 types of active centers take part in the oxidation of hydrocarbons:

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hydrocarbon radicals $\dot{R}$ and peroxide radicals $R\dot{O}_2$. At a given initiation rate the steady concentration is known for several substances. It is approximately equal for the following substances: cyclohexene, methyl cyclohexene, 1-octene, dihydromyrcene, ethyl linoleate, digeranyl, tetralin, ethyl benzene, cumene, n-decanal, and benzaldehyde. Under steady conditions: $\dfrac{d(R\dot{O}_2)}{dt} = 0$, and $(R\dot{O}_2) = \sqrt{\dfrac{w_i}{k_6}}$ (1). Hence, the steady concentration of the $R\dot{O}_2$, at a given initiation rate, is the higher the lower the rate constant of $R\dot{O}_2$ recombination. An increase of the constant to the threefold increases the steady concentration only to the 1.7-fold. In aromatic hydrocarbons, tetralin and ethyl benzene, in which the peroxide group is located at a secondary hydrocarbon atom, the recombination constant is by 1-2 orders of magnitude higher. Among the substances mentioned the cumyl peroxide radicals recombine with the smallest constant. In order to prove the existence of the peroxide radicals their concentration must amount to at least $1 \cdot 10^{15}$ to $5 \cdot 10^{15}$ radicals/cm^3. The authors studied

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cumene since they expected the highest concentration in this substance. They used an epr-spectrometer ИХФ-2 (IKhF-2) with high-frequency modulation of the magnetic field (A. G. Semenov, N. N. Bubnov, PTE, 1, 92 (1959)). During the oxidation, oxygen was continuously bubbled through the hydrocarbon. The following substances were used for the oxidation: I) azobisisobutyronitrile, II) dicyclohexyl percarbonate, III) cobalt stearate, and IV) cobalt acetate. Different initiators give identical spectra. The spectrum is a wide, almost symmetrical singlet ($\Delta H \simeq 18 \pm 2$ oersteds) with a g factor of 2.015 ± 0.001. According to the shift of the g factor and the effective line width, this spectrum is similar to the epr spectrum of the peroxide radicals in the solid phase. In control tests in which isopropyl benzene was replaced by ethyl benzene no epr spectrum was observed in any of the initiators mentioned. Besides, epr absorption disappeared when the oxygen supply was stopped and when nitrogen was blown through for a short period. Ad I) The authors calculated the steady concentrations of the cumyl peroxide radicals at different initiation rates from the known values w_i and k_6 of Eq. (1).

These concentrations were also measured between 70 and 90°C and a

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concentration of I) between 0.05 and 0.55 mole/l. The absolute values of the concentrations of $(R\dot{O}_2)_{meas}$ lie between $2 \cdot 10^{15}$ and $4 \cdot 10^{16}$ radicals/cm^3. The measured steady concentration of RO_2 radicals was close to the calculated one. In experiments with II) the authors measured concentrations of $4 \cdot 10^{15}$ to $2 \cdot 10^{16}$ radicals/cm^3. The rate constant of decay of II) into radicals is unknown. The authors assume that its decay rate is equal to the decay rate into radicals. Thus, they calculate the initiation rate and find that the measured concentrations of the RO_2 radicals are 1/4 to 1/2 of the calculated values. Since this rate is unknown in experiments with III) and IV) the measured and calculated radical concentrations could not be intercompared. There are 2 figures, 1 table, and 11 references: 4 Soviet and 7 non-Soviet. The four most important references to English-language publications read as follows: Ref. 1: H. W. Melville, S. Richards, J. Chem. Soc. 1954, 944; Ref. 4: H. R. Cooper, H. W. Melville, J. Chem. Soc., 1951, 1993; Ref. 5: L. Bateman, G. Gee, Trans. Farad. Soc., 47, 155 (1951); Ref. 6: T. A. Ingles, H. W. Melville, Proc. Roy. Soc., A218, 163 (1953).

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The possibility of using the method...   B103/B101

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute
of Chemical Physics of the Academy of Sciences USSR)

PRESENTED: May 20, 1961, by V. N. Kondrat'yev, Academician

SUBMITTED: May 20, 1961

Card 5/5

LEBEDEV, Ya.S.; TSVETKOV, Yu.D.; ZHIDOMIROV, G.M.

Analysis of asymmetrical lines in electron paramagnetic resonance spectra as a method of studying internal movements in polymers. Zhur.strukt.khim. 3 no.1:21-27 Ja-F '62.   (MIRA 15:3)

1. Institut khimicheskoy fiziki AN SSSR i Institut khimicheskoy kinetiki i goreniya Sibirskogo otdeleniya AN SSSR.
                    (Polymers—Spectra)

AUTHORS: Tsvetkov, Yu. D., Lebedev, Ya. S. and Voyevodskiy, V. V.

TITLE: A study of radical recombinations in irradiated teflon

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khi-
mii. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962,
521-525.

TEXT: The kinetics were studied of the recombinations of fluoroal-
kyl (R) and peroxide (RO_2) radicals, formed when polytetrafluoroe-
thylene (teflon) is irradiated with γ rays, in vacuum or under O_2,
as this field is as yet incompletely explored. EPR spectroscopy was
employed to follow the reactions in specimens in which the degree
of crystallinity, α, was 46 or 74%. The reactions were always of the
2nd order, but the velocity constants (k^0) depended on α. Thus for
R radicals, with $\alpha = 74\%$, $k^0 = 10^6$, and with $\alpha = 46\%$, $k^0 = 10^{-3}$
cm^3/sec. A linear relation was observed between $\log k^0$ and E_{eff},

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the effective activation energies, which were between 30 ± 3 and 65 ± 5 and between 10 ± 2 and 26 ± 3 kcal/mole for R and RO_2 radicals respectively. The pre-exponential constants were anomalously high. To explain the observed phenomena, it is suggested that the activation energy, which apparently depends on the potential barrier for the rotation of polymeric chain segments, decreases with increasing temperature ($180 - 270^\circ C$ for R, and $110 - 200^\circ C$ for RO_2, i.e. for teflon irradiated under oxygen). The theoretical results may be of use in the study of solid state reactions exhibiting a compensating effect and abnormally high pre-exponential multipliers. There are 2 figures and 2 tables.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR; Institut khimicheskoy kinetiki i goreniya SO AN SSSR (Institute of Chemical Physics, AS USSR; Institute of Chemical Kinetics and Combustion, Siberian Branch of the AS USSR)

Card 2/2

KUZ'MINSKIY, A.S.; NEYMAN, M.B.; FEDOSEYEVA, T.S.; LEBEDEV, Ya.S.; BUCHACHENKO, A.L.; CHERTKOVA, V.F.

Transformations of free radicals in γ-irradiated polyisoprenes.
Dokl. AN SSSR 146 no.3:611-614 S '62.   (MIRA 15:10)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti i
Institut khimicheskoy fiziki AN SSSR. Predstavleno akademikom V.N.
Kondrat'yevym.
    (Radicals (Chemistry))   (Gamma rays)   (Isoprene)

LEBEDEV, Ya.S.

Electron paramagnetic resonance spectra of a fluorallyl radical.
Kin.i kat. 3 no.4:615-616 Jl-Ag '62.   (MIRA 15:8)

1. Institut khimicheskoy fiziki AN SSSR.
                  (Allyl compounds--Spectra)

S/192/62/003/005/001/003
D267/D308

AUTHORS: Zhidomirov, G.M., Lebedev, Ya.S., and Tsvetkov, Yu.D.

TITLE: Form of line in the electronic paramagnetic resonance
             spectra of peroxide type radicals in oriented poly-
             mers

PERIODICAL: Zhurnal strukturnoy khimii, v. 3, no. 5, 1962, 541-
             545

TEXT: It was shown in an earlier paper that the spectrum
of peroxide radicals (RO$_2$) in oriented specimens depends on the
orientation of the specimen in the magnetic field. To calculate the
line form in the e.p.r. spectrum for oriented specimens the authors
assumed that (1) the peroxide radical has an axial symmetry of the
g factor and (2) the symmetry axes of this factor are distributed
randomly in the plane S at right angles to the orientation direction
of polymer chains. The calculation has been carried out to the end
for the case of an infinitely narrow individual line, when the ex-
ternal magnetic field is parallel to the orientation axis. It has

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been shown that the form of the e.p.r. line can be used for deter-
mining the degree of orientation of the chains (such estimation has
been carried out for a Teflon specimen oriented by stretching). The
paper ends with a discussion of the structure of peroxide type radi-
cals (on the strength of the data showing the temperature dependence
of the form of e.p.r. lines). There are 3 figures.

ASSOCIATION: Institut khimicheskoy kinetiki i goreniya SO AN
                 Novosibirsk SSSR (Institute of Chemical Kinetics
                 and Combustion, Siberian Branch of the AS Novosibirsk,
                 USSR); Institut khimicheskoy fiziki AN SSSR (Insti-
                 tute of Chemical Physics, AS USSR)

SUBMITTED: June 17, 1961

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B101/B144

5.4600

AUTHORS: Kuz'minskiy, A. S., Neyman, M. B., Fedoseyeva, T. S.,
             Lebedev, Ya. S., Buchachenko, A. L., Chertkova, V. F.

TITLE: Conversions of free radicals in gamma-irradiated polyiso-
             prenes

PERIODIAL: Akademiya nauk SSSR. Doklady, v. 146, no. 3, 1962, 611-614

TEXT: The initial stage of cis- and trans-polyisoprene structuration
caused by 10-50 Mrad Co60 irradiation was studied. The appearance and
disappearance of free radicals was ascertained by recording the epr
spectrum. An epr spectrum with a signal width of 14 oersteds was
observed on trans-polyisoprene after irradiation at room temperature in
vacuo. The structure of the radical causing this signal could not be
clarified; probably it was formed by separation of a hydrogen atom from
the α-methylene group. At -196°C, irradiated trans-polyisoprene showed
a broad singlet due to superposition of various radical spectra. If air
was admitted to the ampoule at room temperature, the spectrum passed
over into a peroxide spectrum. No epr spectrum appeared in cis-poly-

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Conversions of free radicals ...

isoprene at room temperature, owing to quick radical recombination. At -196°C, cis-polyisoprene showed a spectrum similar to that of trans-compound. The concentration of free radicals at -196°C was higher than at room temperature. The kinetics of disappearance of free radicals is described by an equation of second degree and corresponds to the recombination $R^{\cdot} + R^{\cdot} \rightarrow$ stable product. As the slope of the straight lines representing the "reciprocal concentration of free radicals versus time" depends on the dose, it is concluded that in the case of high doses the recombination is impeded by steric hindrances in the amorphous part of the polymer. The following effective constants of radical disappearance have been calculated:

Dose, $r \cdot 10^{-6}$	10	20	37	47
K_{eff}, $sec^{-1} \cdot 10^4$	6.25	4.33	3.34	2.74

Calculation of the degree of cross linking according to P. L. Flory (J. Chem. Phys., 11, 521 (1943)) showed that at 10 Mrad about 600 isoprene units were between two cross links, that the number of cross links increased with the dose, and that at 150 Mrad 1.2 isoprene units were between two cross links. The steady decrease of K with increasing

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number of cross links also proves that with increasing density of the
network the mobility of molecular chains is impeded and the recombination
of free radicals is rendered difficult. There are 4 figures.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy
                 promyshlennosti (Scientific Research Institute of the
                 Rubber Industry). Institut khimicheskoy fiziki Akademii
                 nauk SSSR (Institute of Chemical Physics of the Academy of
                 Sciences USSR)

PRESENTED: May 21, 1962, by V. N. Kondrat'yev, Academician

SUBMITTED: May 25, 1962

Card 3/3

LEBEDEV, Ya.S.; CHERNIKOVA, D.M.; TIKHOMIROVA, N.N.; VOYEVODSKIY,
    V.V., otv. red.; BUTOMO,N.N., red.izd-va; SIMKINA, G.S.,
    tekhn. red.; POLENOVO, T.P., tekhn. red.

[Atlas of electron paramagnetic resonance spectra; theoretical-
ly computet multicomponent symmetric spectra]Atlas spektrov
elektronnogo paramagnitnogo rezonansa; teoreticheski rasschi-
tannye mnogokomponentnye simmetricheskie spektry. Moskva, Izd-
vo Akad. nauk SSSR, 1962. 228 p.   (MIRA 15:12)

1. Akademiya nauk SSSR. Institut khimicheskoy fiziki. 2. Labo-
ratoriya khimicheskoy radiospektroskopii Instituta khimicheskoy
fiziki Akademii nauk SSSR (for Lebedev, Chernikova, Tikhomirova).
    (Paramagnetic resonance and relaxation—Spectra)

BUCHACHENKO, Anatoliy Leonidovich; LEBEDEV, Ya.S., red.; DOROKHINA,
        I.N., tekhn. red.

    [Stable radicals] Stabil'nye radikaly. Moskva, Izd-vo
    AN SSSR, 1963. 170 p.   (MIRA 17:1)
                    (Radicals (Chemistry))