

DORFMAN, W.

"Principles of biology, ed. by W. Dorfman and A. Paramonov" (p. 183) Rev. by Salkind, S. J.

SO: Advances in Modern Biology (Uspekhi Sovremennoi Biologii) Vol. XII, No. 1, 1940

PROCESSES AND PROPERTIES INDEX

CA

11E

The physicochemical nature of bacteriolysis. V. A. Durbman and E. A. Mikhaylovskaya. *Am. Rev. Soviet Med. Biol. Sci.* (1963); *cf. C.A.B.* 36, 6642. —The early stages of bacteriolysis are localized, probably, on the cell surface. The anionic charge of bacteria before and after exposure to egg-white lysozyme was studied in Abramson's modification of the microelectrothermometric chamber of Northrop. The organisms studied were *Micrococcus lysodeikticus*, which is very susceptible to lysozyme, and *S. subtilis*, which is less susceptible. As controls for measuring the possible effect of lysozyme on electrokinetic potential in the presence of lysozyme, quartz particles and *E. coli* were used. The test objects were washed 3 times and suspended in 0.5% NaCl soln. and then placed in the elec. field at room temp. The initial values for the electrokinetic potential of 10 preps. of *M. lysodeikticus* were increased by 80-100% five min. after the addn. of lysozyme; 10 min. later the potential had decreased, in most cases approx. to 50% of the initial value. Lysozyme which had been inactivated by boiling had no appreciable effect on the potential of the test preps. For *S. subtilis*, on exposure to active lysozyme the potential usually decreased by 10-30%; during the next 15 min. the values gradually rose toward normal. *E. coli* and quartz particles showed no consistent alteration in the potential after exposure to lysozyme. It is concluded that the initial stages of bacteriolysis, preceding visible swelling, are attended by a transient change in the elec. charge of the cell surface. The cell and staphylococcus bacteriophage exert a similar effect on the homogeneous susceptible organisms.

W. R. Hess

ASB-51A METALLURGICAL LITERATURE CLASSIFICATION

6-27-72/11E

GROUPS: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

CA

11C

PROCESSES AND PROPERTIES INDEX

The physicochemical nature of antibacterial action. V. A. Dolgova, E. A. Mokiavskaya, T. L. Kastorskaya, and P. B. Lazypkina (Inst. Exptl. Med., Moscow). *Biotekhnika* 10, 407-23 (in English, 421-2) (1968); cf. C.A.B. 30, 2777. — The efficacy of an antibiotic on susceptible bacteria can be detected within 5-15 min. by measuring the electromotive potential (E). A rise in the E is obtained by using such diverse antibiotics as bacteriophage, lysozyme, penicillin, streptomycin, and liver prep.; it is stated that sulfonamides also fall into this category, although no results with these compounds are recorded. Thus, the addn. of bacteriophage to *Escherichia coli* results in an immediate rise in the E, with a max. in 5-15 min., after which the value returns to normal. If the bacteriophage is inactivated, no rise is obtained. Similarly, no increase in the E is observed by using an active bacteriophage and dead bacteria. In the case of bacteriostatic antibiotics, such as penicillin, the rise in the E is maintained for a long time. It is suggested that the effect may be due to adsorption of the antibiotic on the bacterial surface, followed by disocn. into electrically charged particles. H. Priestley

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

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PA40753

USSR/Medicine - Penicillin, Determination Feb 1946
Chemistry - Electrokinetics

"New Electrokinetic Method of Assaying Penicillin,"
W. A. Dorfman, T. L. Kastorskaya, Physicochemical
Laboratory, Biochemistry of Microbes Dept, All-Union
Institute of Experimental Medicine, Moscow, 6 pp

"Microbiologia" Vol IV, No 1

A new method is suggested for assaying penicillin as
well as other antibiotics. This is based on the in-
crease of zeta-potential of susceptible bacteria acted
upon by the antibiotic. This method is more sensi-
tive than those based on common bacteriological pro-
cedures, does not require sterilization nor bacterial
40753

IC
USSR/Medicine - Penicillin, Determination Feb 1946
(Contd)

growth and the measurements may be completed within
less than one hour. Includes a drawing and tables.

DORFMAN, W. A.

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PROCESSES AND PROCEDURES INDEX

Primary decomposition of bacteria under influence of antibiotics. *Mosk. Doklady Akad. Nauk S.S.S.R.* 99, 000 72(1948); cf. C.A. 40, 7284p. The primary decomposition of bacteria under action of antibiotics is the surface destruction, regardless of the further extent of reaction (if the reaction proceeds further, lysis results; if it stops, the result is bacteriostasis). Agar culture of *M. lyodezhianus* was subjected to detn. of ζ -potential (cf. C.A. 40, 3158p; *Russl. Eksp. Biol. Med.* 20, 57(1945); *ibid.* 13, 48(1942)) with the migration velocity in elec. field being the measure of the antibiotic. The results are given graphically. At 1:20 concn. of the antibiotic the ζ -effect begins rapidly and is max. in 20-30 min.; lower concn. (1:100) extends the process over several hrs. The ζ -effect of lyszyme is represented by a sigmoid curve similar to that obtained with penicillin (see above references). G. M. K.

ASM-51A METALLURGICAL LITERATURE CLASSIFICATION

GROUP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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CA

Histochemistry of embryonic differentiation. Color method of detection of alkaline phosphatase. V. A. Derjabin and S. M. Epstein (Inst. Exptl. Biol., Acad. Med. Sci. U.S.S.R.). *Doklady Akad. Nauk S.S.S.R.* 73, 977-8(1960).—The Gomori method (*C.A.* 34, 462) is modified, in that Co salts are replaced by Fe salts; the method was successfully tested in various tissue specimens. The specimens are incubated as in Gomori method and both the test and the control specimens are rinsed in 0.5% $\text{Ca}(\text{NO}_3)_2$ and treated 5 min. with 2% FeSO_4 , washed with H_2O , treated with K ferricyanide (2%) acidified with equal vol. 0.1 N HCl, rinsed in H_2O and fixed in balsam. The phosphatase-contg. structures acquire a distinct blue color. A blue background in the control can be removed by staining with 0.1% eosin.
G. M. Kosolapoff

CA

Histochemistry of embryonic differentiation. Gradient of activity of alkaline phosphatase in connection with nerve tube differentiation. V. A. Dufman and S. M. Epshteyn (Inst. Exptl. Biol. Acad. Med. Sci. U.S.S.R.). *Doklady Nauk Akad. S.S.S.R.* 72, 1187-9(1960); cf. *C.A.* 44, 9403b.—Histochem. examn. of developing specimens of *Triton laciniatus* embryos showed high level of alk. phosphatase at the moment of emergence from the egg, with localization in neuroblast nuclei of ventral half of the nerve tube, and lesser activity going to the dorsal half. As the specimens grew, the enzyme activity showed a shift to the dorsal half. G. M. K.

DORFMAN, V.A. (Moskva)

Problems in the stimulation of the egg cell. Usp. sov. biol. 40
no.3:331-348 N-D '55. (MLBA 9:4)

(FERTILIZATION (BIOLOGY)) (EMBRYOLOGY) (IRRITABILITY)

USSR / General Biology. Individual Development.

B-4

Abs J ur : Ref Zhur - Biol., No 11, 1958, No 47557

Author : ~~Dorfen, V. A.~~

Inst : Not given

Title : The Chemical Promorphology of the Ovum

Orig Pub : Uspekhi Sovren Biologii, 43, No 1, 55-69 (1957)

Abstract : A review of present knowledge concerning the chemical processes underlying the visible differentiation processes in the ovum and preceding their manifestation. The early structure of mosaic amphibian eggs and the related physicochemical composition of the ovum (physicochemical polarization phenomena) are described. The author discusses the bioelectric, pH, and redox gradients of the egg as well as the sulhydryl and RNA gradients. Work pointing up the influence of the constitution of the cytoplasm on early cleavage in mosaic and regulation eggs is emphasized. The part played by nucleic acids

Card 1/2

12

USSR / General Biology. Individual Development.

B-4

Abs Jour : Ref Zhur - Biol., No 11, 1958, No 47557

Abstract : in the synthesis of protein as well as the part played by intracellular particles (nuclei, microsomes, and mitochondria) is discussed in connection with the presumed role of the former in the cleavage process. A number of suggestions concerning the character of the chemical organization of the egg are made and the synthesis of the preformation and of the epigenetic conceptions is noted.

Card 2/2

DORFMAN, V.A. (Moskva)

Protein as a basis in the formation of embryonic structures.
Usp.sovr.biol. 45 no.3:313-327 My-Je '58 (MIRA 11:8)
(EMBRYO, metabolism
proteins, review (Rus))
(PROTEINS, metabolism,
embryo, review (Rus))

GIBSE, Arthur Charles; DOEFMAN, V.A. [translator]

[Physiology of the cell] Fiziologiya kletki. Moskva, Izd-vo
inostr.lit-ry, 1959. 455 p. (MIRA 13:8)
(CELLS)

DORFMAN, Vol'f Aleksandrovich; DETLAF, T.A., doktor biol. nauk,
otv. red.; ASPIZ, M.Ye., red. izd-va; GUS'KOVA, O.M.,
tekhn. red.

[Physicochemical foundations of fertilization] Fiziko-khimi-
cheskie osnovy oplodotvorenii. Moskva, Izd-vo Akad. nauk
SSSR, 1963. 254 p. (MIRA 16:7)
(FERTILIZATION(BIOLOGY))

DORFMAN, V.F.; BOL'SHAKOV, K.A.; KISLYAKOV, I.P.

Transport reactions in germanium precipitation by the iodide method.
Izv. AN SSSR. Neorg. mat. 1 no.1:37-46 Ja '65. (MIRA 18:5)

L 52623-65	EWT(l)/EWT(m)/EWP(t)/T/DP(t)/EC(b)-2/EWP(b)	Pi-l	LJP(c)
JD/GO			
ACCESSION NR: AP5014074		UR/0333/65/001/004/0471/0477	
AUTHOR: Dorfman, V. F.; Bol'uhakov, K. A.; Kislykov, I. P.			40 37 B
TITLE: Conditions of crystallization of deposits from the gas phase in transport reactions			
SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 4, 1955, 471-477			
TOPIC TAGS: epitaxial growing, germanium film, transport chemical reaction, mass transfer, crystal growth			
ABSTRACT: The mechanisms of the transport of reagents in the gas phase and the possibility of controlling mass transfer in transport chemical methods have been studied by taking as an example the method of growing epitaxial films of germanium, based on the reversibility of the reaction			
	$GeI_4 \text{ gas} + Ge \text{ solid} \rightleftharpoons 2GeI_2 \text{ gas}$		
A formula is proposed for an approximate estimate of the critical velocity of a gas stream below which it is necessary to take into account the role of diffusion in the			
Card 1/3			

L 52623-65

ACCESSION NR: AP5014074

transport of the gaseous reagents.

$$v_a = \sqrt{D \cdot v_i \left| \frac{d^2 f(l/v_i)}{dl^2} \right| \frac{df(l/v_i)}{dl}}$$

In the iodide process of growth of germanium films in a horizontal gas stream, iodine and germanium iodides separate into phases in the source zone, and the diiodide and tetraiodide do so in the substrate zone. These effects lead respectively to the slowing down of iodination and to the nonuniformity of the epitaxial deposition on a vertical substrate. The uniformity of deposition is promoted by an inclined position of the substrate in the tube, a regular decrease in temperature along the axis of the deposition tube, and an increase in the rate of gas flow. The latter two factors also improve the homogeneity of the film thickness on various substrates in the same process, and the increase in flow rate accelerates the process. By alternating the regions of deposition with small source zones, one can achieve a multizone deposition from a single gas stream. A continuous deposition of epitaxial films can be achieved by means of a parallel arrangement of the source and substrates in the reaction tube, a suitable temperature gradient being present between them. The authors express their appreciation to A. M. Anisimova.

Card 2/3

L 52623-65

ACCESSION NR: AP5014074

G. S. Banina, and M. S. Beloken' for their participation in the experimental work."
Orig. art. has: 4 figures and 8 formulas.

ASSOCIATION: none

SUBMITTED: 20Jan65

NO REF SOV: 008

ENCL: 00

SUB CODE: GC, SS

OTHER: 000

282
Card 3/3

L 2791-66 EWT(m)/EWP(1)/T/EWP(t)/EWP(b)/EWA(c) LJP(c) JD

ACCESSION NR: AP5022246

UR/0363/65/001/007/1016/1020
546.289:548.55

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8

AUTHOR: Dorfman, V. F.; Ielokon', M. S.; Krasnova, G. F.; Tolkacheva, G. N.

TITLE: Effect of growth conditions on certain properties of epitaxial germanium layers

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 7, 1965, 1016-1020

TOPIC TAGS: epitaxial growing, germanium, crystal dislocation

ABSTRACT: This paper deals primarily with the morphological and structural characteristics of epitaxial germanium layers grown by the iodide process. The dislocation density and its distribution over the thickness of the layers are determined by etching with 8 pts. $K_3[Fe(CN)_6]$ + 12 pts. KOH + 100 pts. H_2O . As the temperature of the growing process rises, the role of homogeneous disproportionation of GeI_2 in the gas phase increases. As a result, the structure of the epitaxial layers changes, and in particular, stacking faults appear. A hypothesis is advanced concerning the general nature of stacking faults and trigonal growth pyramids on the (111) plane. A mechanism accounting for both of these formations

Card 1/2

L 2791-66

ACCESSION NR: AP502224(

5

is proposed. The morphology of epitaxial deposits is closely related to their internal structure. Smooth deposits are obtained by decreasing the dislocation density and increasing the uniformity of their distribution in the layers. "The authors thank K. A. Bol'shakov and I. P. Kislyakov for their helpful comments throughout the course of the study, A. M. Anisimova and T. B. Fleskacheva for assistance in the experiments, and V. G. Kholodova for taking photographs with the electron microscope." Orig. art. has: 7 figures.

ASSOCIATION: none

SUBMITTED: 18Feb65

ENCL: 00

SUB CODE: 811, IC

NO REF SOV: 005

OTHER: 004

BVR
Card 2/2

REF ID: A65 EEO(b) -2/ENI (c)/EWT(1)/EWT(2)/EWP(b)/T/E/P(t) P1-4 IJP(c) 00/10

ACCESSION NR: AF5011472

UR/0076/15/039/004/0996/1000 29

28
B

AUTHOR: Dorfman, V. P.; Kislyakov, I. P.; Bol'shakov, K. A.

TITLE: Reaction kinetics in the iodide method of growing epitaxial germanium layers 21

SOURCE: Zhurnal fizicheskoy khimii, v. 39, no. 4, 1965, 996-1000

TOPIC TAGS: germanium crystal, epitaxial germanium layer, crystal cultivation, iodide method, reaction kinetics, disproportionation reaction 21

ABSTRACT: The kinetics of the iodide process under dynamic conditions was studied in a horizontal quartz tube with hydrogen as the carrier of iodine. The substrates were germanium plates cut out of a single crystal along the (111) plane. The degree to which equilibrium was established in the zone of the source was measured by the ratio R = total consumption of germanium/total consumption of iodine. At sufficiently small R, the growth rate of germanium layers can assume even negative values, i.e., gaseous etching of the substrates begins. The temperature effect on the growth is expressed by the equation

$$v = (8.2 \pm 0.5) \cdot 10^3 \cdot e^{-10000/RT} - (2.8 \pm 0.2) \cdot 10^4 \cdot e^{10000/RT} (\mu/sec)$$

Card 1/2

L 48986-65

ACCESSION NR: A/5011472

where v is the rate of epitaxial growth. The dependence of the growth rate on the initial concentration of iodine vapors and hence GeI_2 vapors indicates that the disproportionation $GeI_2 (s) + GeI_2 (g) \rightleftharpoons Ge (l) + GeI_4 (g)$ is a first-order, heterogeneous reaction. The nature of the distribution of the growth rate along the length of the reaction tube can be adjusted within certain limits by changing the temperature curve in the deposition zone. (orig. art. has: 7 figures and 7 formulas.

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M. V. Lomonosova (Moscow Institute of Fine Chemical Technology)

SUBMITTED: 01Apr64

ENCL: 00

SUB CODE: SS, IC

NO REF SOV: 004

OTHER: 001

Card

212 7/18

DORFMAN, V.F.; KISLYAKOV, I.P.; BOL'SHAKOV, K.A.

Kinetics of reactions in the iodide method of formation of
epitaxial films of germanium. Zhur. fiz. khim. 39 no.4:996-
1000 Ap '65. (MIRA 19:1)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni
Lomonosova.

DOEFMAN, V.F., KISLYAKOV, I.P., POLISEAKOV, F.A.

Alloying the epitaxial germanium layers in the 100%de method.
Zhur. fiz. khim. 39 no.5:1248-1251 My '65. (MIRA 18:8)

TYKCHINSKAYA, E.D.; DOMOGAROVA, O.V.; DORFMAN, V.Ye.

Role and place of physical therapy in the treatment of nervous and mental diseases. Trudy Gos. nauch.-issl. psikhonevr. inst. no.20:55-62 '59. (MIRA 14:1)

1. Gosudarstvennyy nauchno-issledovatel'skiy psikhonevrologicheskiy institut imeni V.M. Bekhtereva, Leningrad.
(NERVOUS SYSTEM—DISEASES) (PHYSICAL THERAPY)

FASMAN, A.B.; DOPFMAN, Ya.A.; SOKOL'SKIY D.V.

Kinetics and the mechanism of liquid-phase catalytic hydrogenation.
Part 3: Macrokinetics of reduction over a colloidal palladium cata-
lyst. Kin. i kat. 5 no.4:716-723 J1-Ag '64.

(MIRA 17:11)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova.

L 58348-65 ENT(m)/EPF(c)/EWP(j)/EWA(c) Pc-4/Pr-4 IM
ACCESSION NR: AP5018081

UR/0020/65/163/001/0103/0105

AUTHOR: Dorfman, Ya. A.; Sokol'skiy, D. V. (Academician AN KazSSR)

25
24
B

TITLE: The reaction mechanism of components with the catalyst in the Kucherov reaction

SOURCE: AN SSSR. Doklady, v. 163, no. 1, 1965, 103-105

TOPIC TAGS: acetaldehyde, hydration, acetylene hydration, catalytic hydration, reaction mechanism

ABSTRACT: In the course of hydration of acetylene to acetaldehyde the mercury catalyst is gradually deactivated, and therefore must be constantly regenerated. This work was devoted to studying the composition of the catalytic solution under reaction conditions, i.e., essentially the reaction of acetylene and acetaldehyde with mercury in various oxidation states (Hg^0 , Hg_2^{++} , Hg^{++}). The above system was studied at 92C in 2.5 M H_2SO_4 . It was found that mercuric ions are not reduced in the acidic medium, but instead form a complex with acetaldehyde. The complex is rapidly destroyed when the concentration of acetaldehyde is lowered. This contradicts the widely held view that the ~~deactivation~~ of the catalyst is caused by the reduction of mercury ions by acetaldehyde. Orig. art. has: 1 table.

[VS]

Card 1/2

L 58243-65
ACCESSION NR: AP5018081

ASSOCIATION: Institut khimicheskikh nauk Akademii nauk KazSSR (Institute of Chemical Sciences, Academy of Sciences, KazSSR)

SUBMITTED: 14Jan65

ENCL: 00

SUB CODE: OC, GC

NO REF SOV: 009

OTHER: 003

ATD PRESS: 4042

Card 2/2

CA

3

The magnetic moment and the number of the conducting electrons in nickel.
 Ya. G. DORONIN AND I. K. KIROV. *J. Russ. Phys.-Chem. Soc.*, Phys. 17, 61, 159-161
 (1925).—A thermodynamic investigation makes it possible to find the change of the
 sp. heat of the conducting electrons in a ferromagnetic substance at the Curie point
 through the study of the thermoelec. behavior of the substance. The ratio of the change
 of the sp. heat of the electrons in the metal to the sp. heat of the metal itself gives in-
 formation about the role of the conducting electrons in ferromagnetism. The exper-
 iments obtained make it certain that the pos. ions in Ni do not play any role in ferro-
 magnetism and that the conducting electrons only are the real elementary magnets of Ni.
 The numerical value of the sp. heat of the conducting electrons gives the inner quantum
 no. of this magnet. This result also makes it possible to find the magnetic moment of
 the spinning electron, which is 1 Bohr magneton. Different magnetic data when com-
 bined with the thermoelec. data, already known, lead to the conclusion that the no. of
 conducting electrons in Ni is a function of temp.

V. VESKOVICH

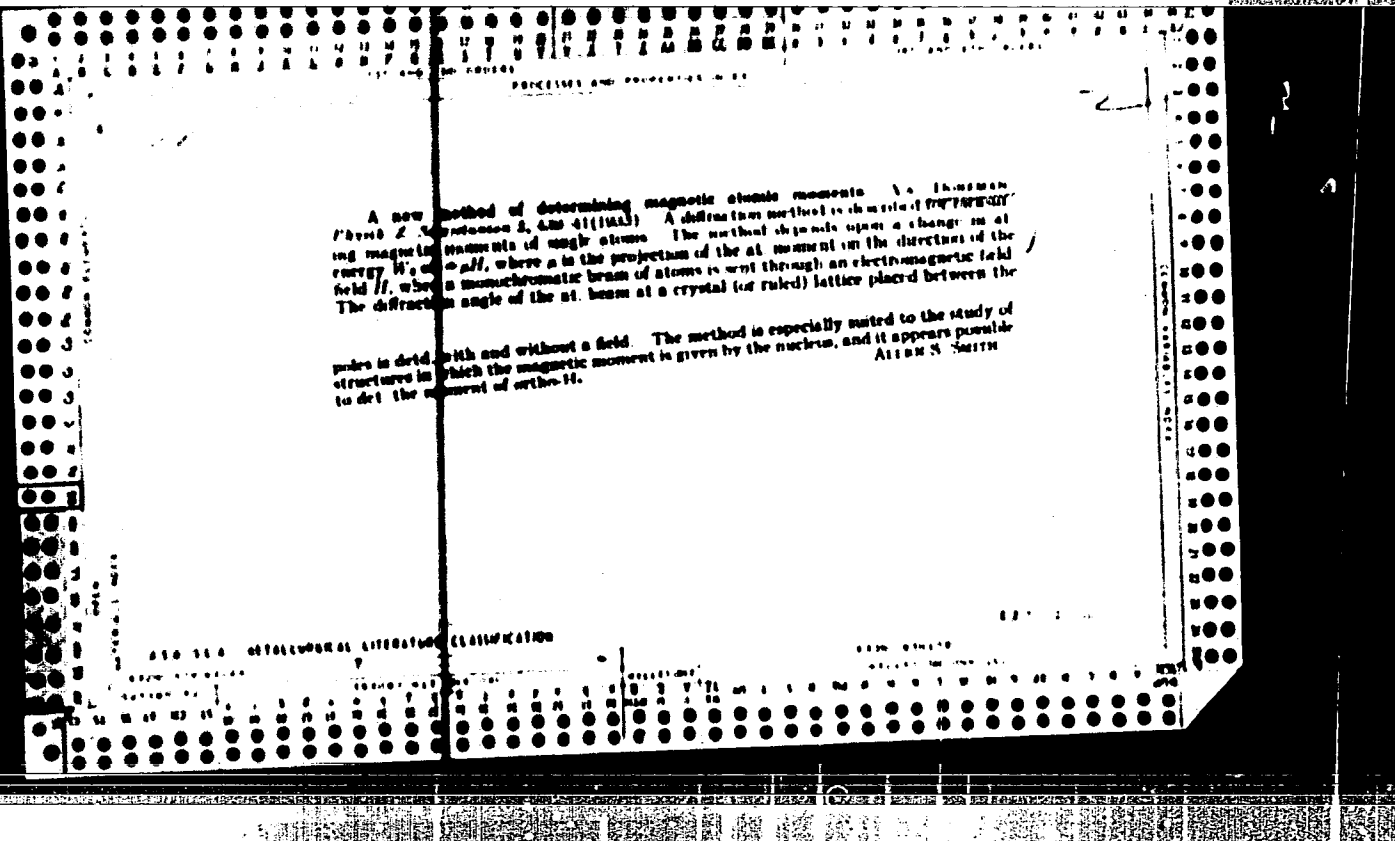
AND SEE METALLURGICAL LITERATURE CLASSIFICATION

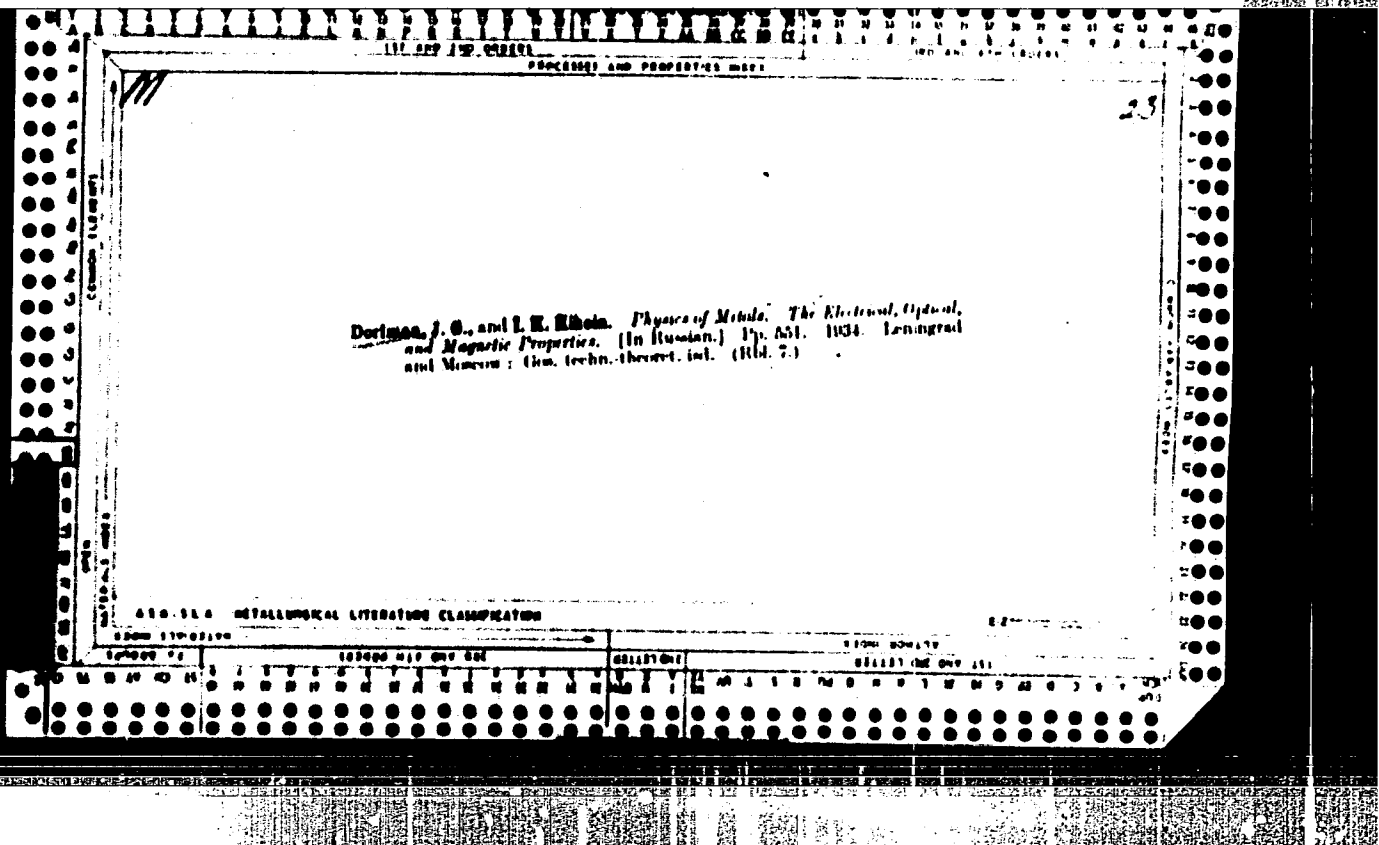
3166. Theory of Superconductivity. J. Dorfman. *Phys Zeits f*
Soviet Union, 3 4 pp 306 380, 1953. In German. Discusses the theory of
the superconducting state from the point of view that when a metal is
in this condition, the electrons are in a different energy state from the
normal. The influence of a magnetic field is explained, and the theory
found to predict correctly the formula connecting field-strength and the
temperature at which superconductivity sets in. The effect of h.f. currents
is also successfully explained, and the anomaly of the specific heat is
discussed. On this theory, about 2% of the valency electrons present take
part in superconductivity. J. H. A.

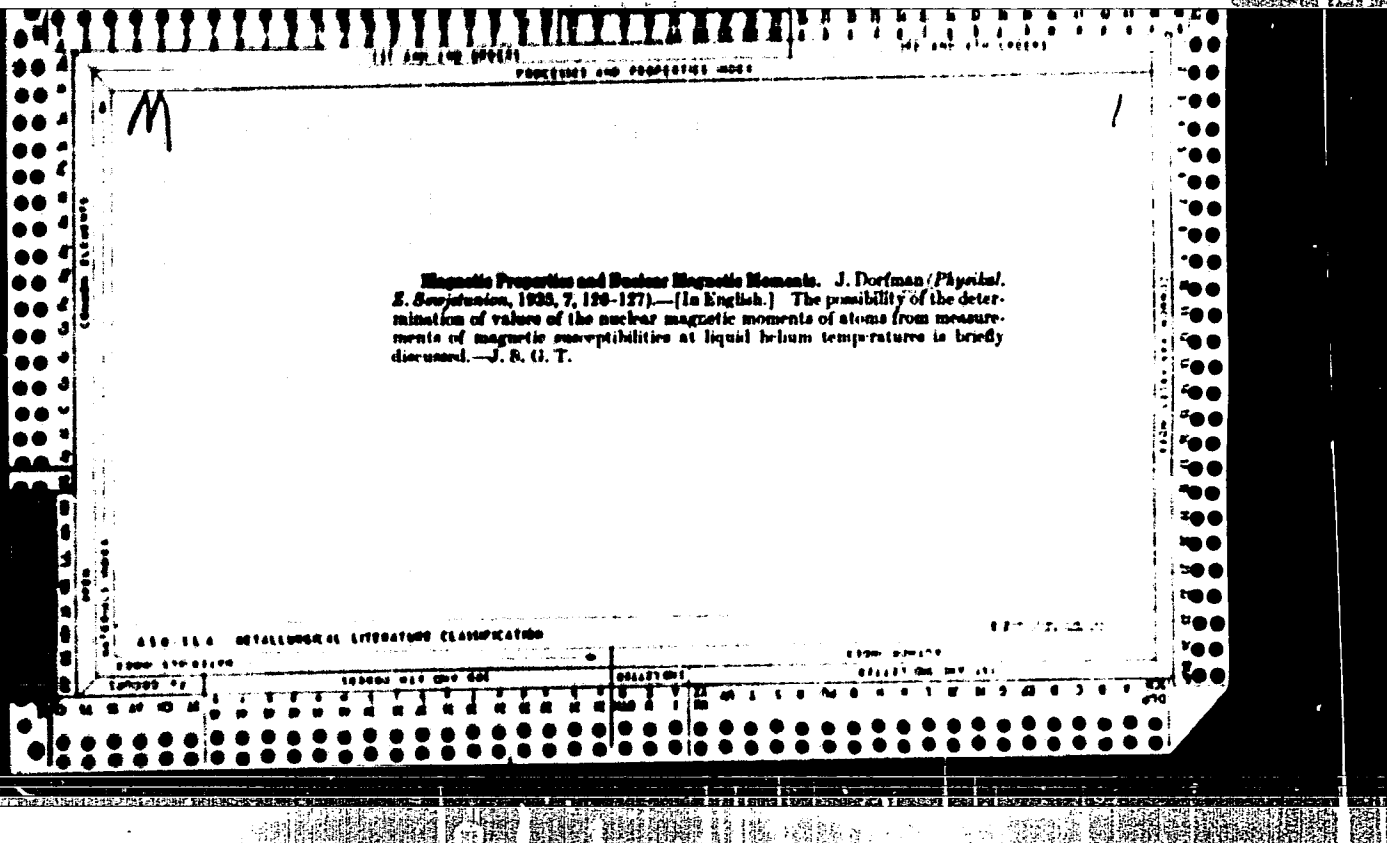
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271

2846. Modified Torsion Balance for Magnetic Measurements.
J. J. Thomson and I. Kikoin. *Phys. Zeits. d. Sowjetunion*, 3 4 pp 421
1955. 1955. In German.—Modifications in the method of mounting the
torsion arm and the specimen tube in a magnetic balance are described.
Experimental data on H_2 , NaCl, and KCl are used to test the apparatus.
Data on several Pt and Pd complex salts are also given. W R A

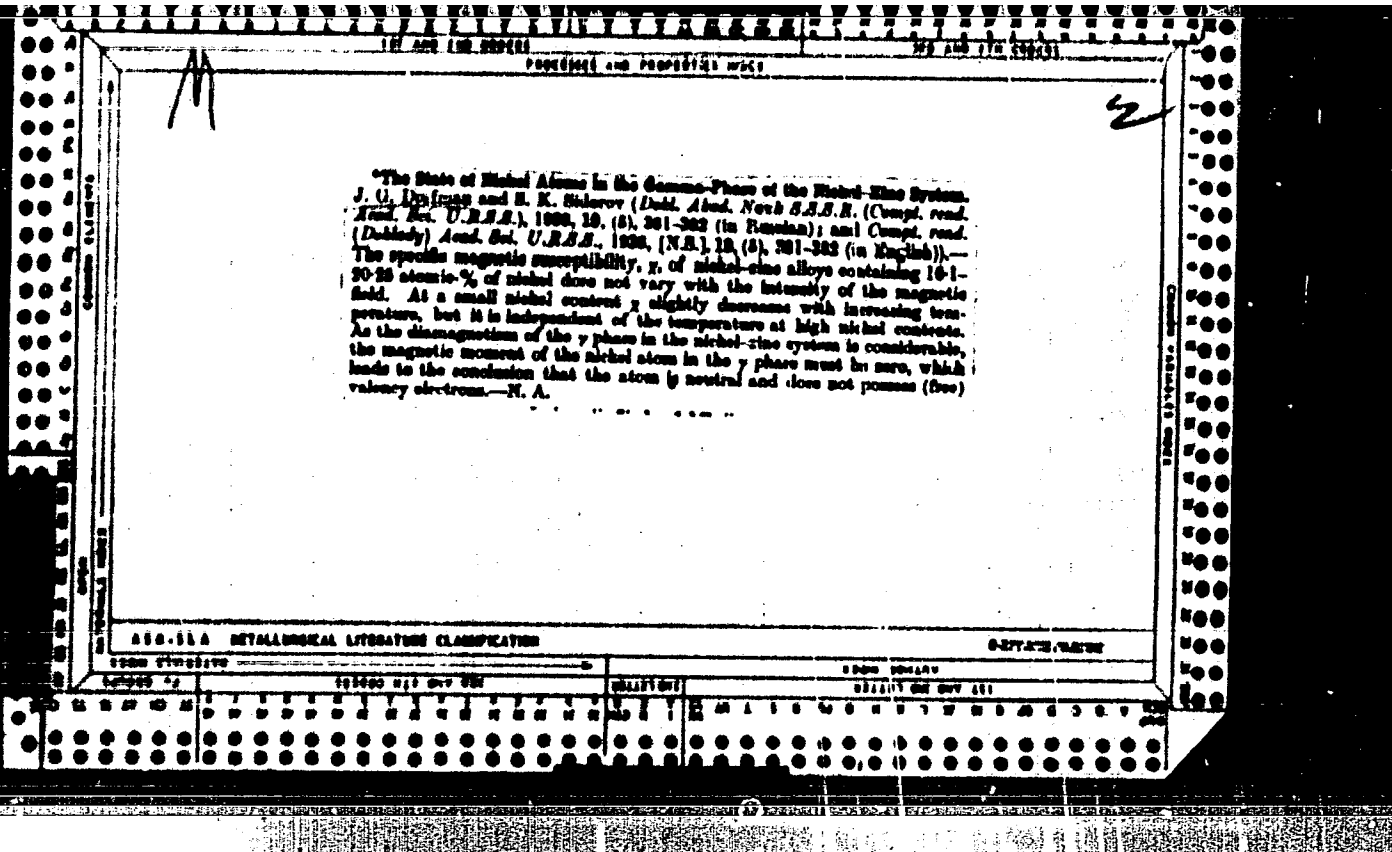


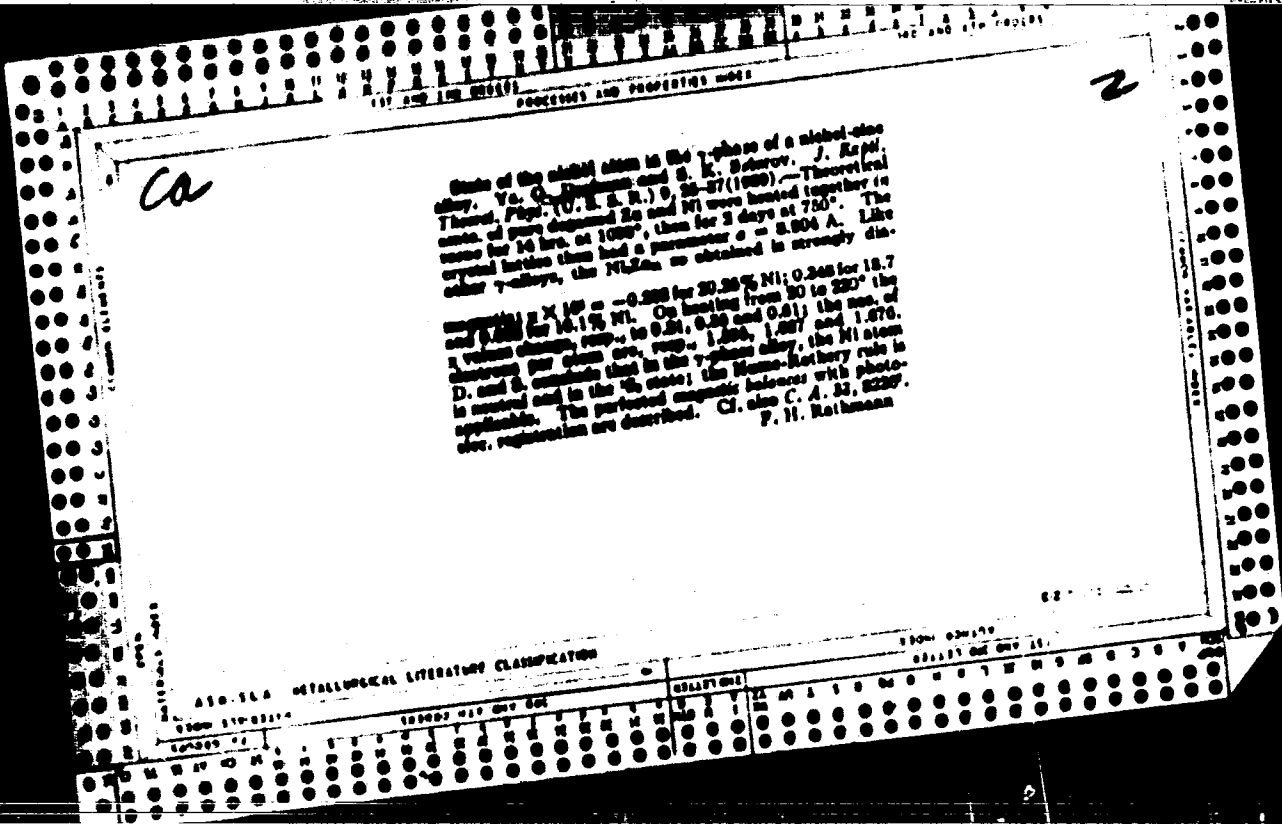


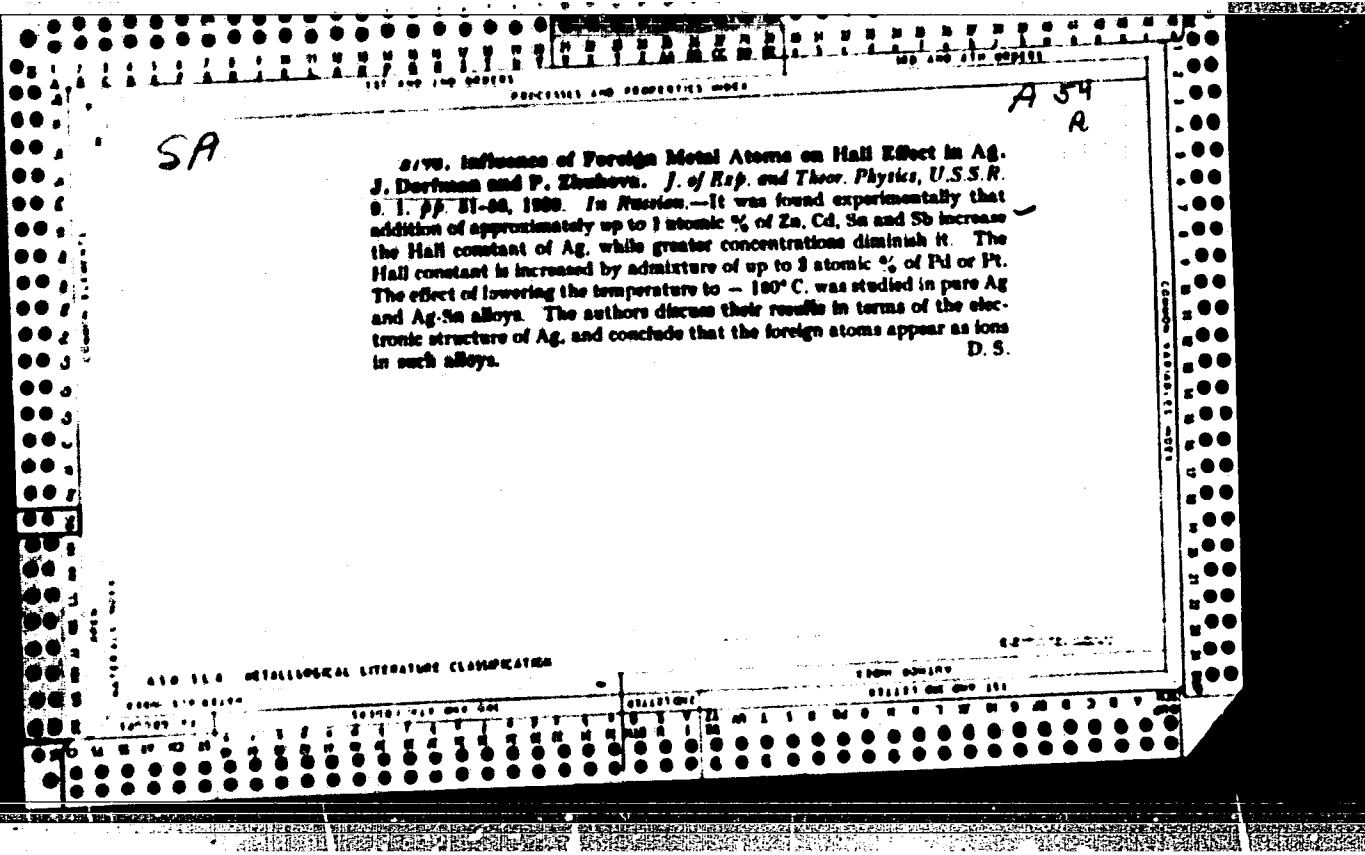


DORFMAN, Ya. G.

Nature of Molecular Bonds in Alloys. "Roentgenography as Applied to
the Study of Materials." Edited by G. Kurdyumov; ONTI NKTP 1936, p. 49.







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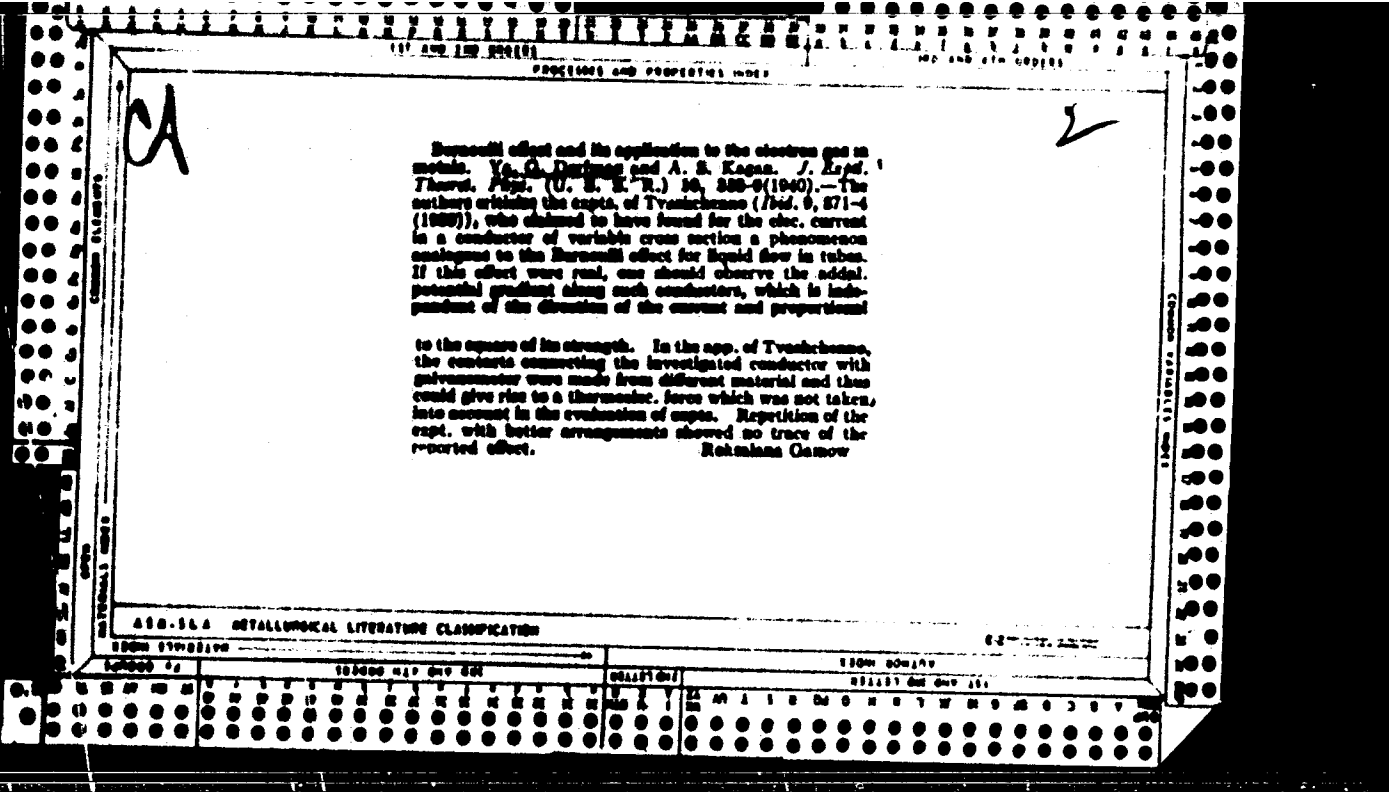
Influence of Foreign Metal Atoms on Hall Effect in Ag.
J. Dorfmann and P. Zhukova. *J. of Exp. and Theor. Physics, U.S.S.R.*
9, 1, pp. 81-88, 1969. In Russian.—It was found experimentally that
addition of approximately up to 1 atomic % of Zn, Cd, Sn and Sb increase
the Hall constant of Ag, while greater concentrations diminish it. The
Hall constant is increased by admixture of up to 3 atomic % of Pd or Pt.
The effect of lowering the temperature to -180°C . was studied in pure Ag
and Ag-Sn alloys. The authors discuss their results in terms of the elec-
tronic structure of Ag, and conclude that the foreign atoms appear as ions
in such alloys. D. S.

METALLURGICAL LITERATURE CLASSIFICATION

DORFMAN, Ya. G.

"Some New Physical Methods Applied to the Problem of the Rational Location of Oil
Wells," Zhur. fis., 3, Nos. 4-5, 1940

Physics Dept., Azerbaydahan Fil. AS USSR, Baku.



Theory of the surface tension of metals. J. G. Duffman (Comp. rend. Acad. Sci. U.S.S.R., 1943, 41, 315-316) - The surface tension (γ) of metals is due to a double layer caused by electrostatic attraction by both the bound electrons of the metal and the free electrons at the surface. The contributions of each of these are calc. with the aid of Poisson's theory (A., 1917, II, 191). Agreement with experiment is obtained for Na, Ag, and Cu. Neelan's relation between γ and latent heat of evaporation holds for Hg but not for Na, Ag, Cu, or Zn. The surface properties of Hg approximate to those of a non-metal. The valency electrons of the surface atoms are bound to discrete levels. Metals can be divided into two classes according to their surface properties: (a) normal metals with a diffuse ionic cloud; (b) abnormal metals with discrete electronic surface levels. J. O'M-B

PA 13T49

USSR/Magnetic Materials
Nickel

Apr 1946

"Magnetic Properties and Chemical Nature of Solid Solutions of Weak Magnetic Elements in Nickel and Iron," J. Dorfman, 12 pp

"Zhur Eksp i Teor Fiz" Vol XVI, No 4, pp 349-60.

The author claims solution of the difficulties in the interpretation of the nature of the elementary magnetic nickel by taking into account numerical results of gyromagnetic investigations.

13T49

DOFFMAN, YA. G.

LA 57773

USSR/Nuclear Phys - Atoms

Nov/Dec 1947

Nuclear Phys - Electron Theory

"Atomic Magnetic Moments in Solid and Liquid Bodies,"
Ya. G. Doffman, 8 pp

"Izv Akad Nauk SSSR, Ser Fiz" Vol XI, No 6,
pp 598-606.

Discusses problem of studying magnetic moments of the electron shell of atoms, experimental methods to determine atomic magnetic moments, and atomic magnetic moments and interatomic bond in solid and liquid bodies. Determination of atomic magnetic moments in condensed systems can serve as very precise means of studying entire series of peculiarities in interaction between atoms and ions.

57773

BOYD, YA. G.

Oct. 1947

USSR/Atomic Physics - Atoms - Properties Oct 1947
Ferromagnetism

"Reality of Some Regularities Which Connect Inter-atomic Spacing and Magnetic Properties," Ya. G. Dorfman, 3 1/2 pp

"Zhur Tekh Fiz" Vol XVII, No 10, pp 1215-19.

Discusses two regularities put forth by F. M. Gal'perin, which connect spacing between atoms to magnetic properties of ferromagnets. However, author shows that these regularities by no means results of available experimental data, and cannot be considered really substantial. Submitted, 10 Jun 1947.

49274

DORFMAN, Ya. G.

"New Resonance Method of Measuring Nuclear Magnetic Moments," Dokl. AN SSSR,
57, No.8, 1947

DORFMAN, Ya. G.

Lavoisier, Moskva, 1948.

DORFMAN, Ya. G.

"Magnetic Characteristics of the Atomic Nucleus," Moscow, 1948

Prof, URALFTI

Dorfman, Ya. G. .

~~1 Magnetic properties and the nature of catalysis. Ya. G. Dorfman. *Problemy Kinetiki i Kataliza, Akad. Nauk SSSR, Ser. Khim. S. Meddy Ispycheni: Katalizator*, 121-7(1918).--The purpose of the report was to name the methods of application of magnetic investigation to problems of catalysis. The only methods considered were those which, combined with chem. or elec. investigations, could solve problems of catalysis. G. H. M.~~

7

The nature of intermetallic solid solutions. Ya. G. Dorfman, *Izvest. Sektora Fiz.-Khim. Anal. Inst. Obshchei i Neorg. Khim., Akad. Nauk S.S.S.R.* 16, No. 4, 46-50 (1948).—The current interpretation of an intermetallic phase is characterized by crystallographic structure and the structure and filling of energy zones. The chem. or valency interaction of 2 adjacent atoms is absent and each atom interacts with the crystal as a whole. Yet, the interaction of adjacent atoms can hardly be disregarded. This is evidenced by the existence of intermetallic phases which are semiconductors or even insulators, e.g. Na₃Sn. If to such a phase be added one of its metal components, then there should form a continuous series of intermediate states ranging from a typical "zonal" metal to a typical "valent" (chem.) insulator or semiconductor. Within these intermediate states the valency bond between adjacent atoms must appear to a greater or lesser extent. Two ways can be followed to prove this: either starting with valent intermetallic compds. and proceeding until the valency bond changes to zonal, or indication of valency bonds can be looked for in ordinary metal solid solns. It chooses the 2nd method. To this end the magnetic properties of some Ni alloys were studied. By calcg. the increment of valency electrons of the added metal it is shown that the interaction between Ni atoms and atoms of the other metal involves solely counter orientation of electron spins. This kind of orientation of valency spins of interacting atoms is essentially the rudiment of a chem. bond. Thus, the mutual orientation of at. spins becomes a characteristic of a metal phase complementary to its crystallographic description.

M. Hirsch

DORFMAN, Ya G.

Dorfman, Ya. G. - "Contemporary concepts of the magnetic properties of materials", Fizika v shkole, 1949, No. 2, p. 6-16.

SO: U-4630, 16 Sept. 53, (Letopis 'Zhurnal 'nykh Statey, No. 23, 1949).

PA 39/49100

DOEFMAN'S, YA. G.

Apr 49

USSR/Electricity
X-Rays
Bibliography

"New Books on Electricity, Electrical Engineering,
and Power Engineering" 2 pp

"Elektrichestvo" No 4

Includes Ya. G. Dorfman's "Magnetic Characteristics
of the Atomic Nucleus," "The People of Russian
Science," with foreword and first article by S. I.
Vavilov, and A. I. Kitaygorodskiy's "X-Rays and
X-Ray Study Methods."

39/49130

1. DORFMAN, Ya. G.
2. USSR (600)
4. Physics and Mathematics
7. Collected Works, A. G. Stoletov. A. K. Timiryazev, editor and commentator. ("Classics of Science," Moscow-Leningrad, State Technical Press, 1950).
Reviewed by Ya. G. Dorfman, Sov. Kniga, No. 4, 1951.

9. FDD Report U-3081, 16 Jan. 1953, Unclassified.

CA

Paramagnetic and diamagnetic resonance of conduction electrons. Yu. G. Dostman. *Doklady Akad. Nauk S.S.S.R.* 81, 703-6 (1951).—An effect analogous to paramagnetic resonance with respect to radio-frequency quanta, consisting in selective absorption linked with a change of orientation of elementary spins relative to a const. magnetic field H , must obviously exist also for conduction electrons, with the max. of selective absorption ν_p lying at $\nu_p = 2\mu H/h = eH/mc$, where μ = spin magnetic moment of the electron. A corresponding, but not yet observed, effect should exist on account of the diamagnetism of conduction electrons according to Landau (*C.A.* 25, 247). For entirely free conduction electrons, the energy of electron orbits perpendicular to H is $E = (eH/mc)(n + 1/2)$, with $n = 0, 1, 2, \dots$. Diamagnetic resonance of conduction electrons is linked with transition of n by ± 1 , and hence the frequency ν_d of the max. of diamagnetic resonance, $\nu_d = eH/mc$, i.e. coinciding with ν_p . Sepn. of the 2 effects should be possible owing to the fact that the diamagnetic effect is detd. by the component of the alternating magnetic field parallel to H , whereas the paramagnetic effect is due to the perpendicular component. For quasi-bound electrons, $\nu_d = eH/m^*c$, where m^* is the "effective" mass of the conduction electrons. In this case, $\nu_d \neq \nu_p$. Thus far, only the paramagnetic resonance effect of conduction electrons has been observed on solns. of alkali metals in liquid NII, (Hutchinson and Pastor, *C.A.* 45, 2772b; Garstens and Ryan, *C.A.* 45, 4402a). Observation of the diamagnetic effect would permit detn. of the m^* of the conduction electrons. N. Thon

DORFMAN, Ya. G.

Epinus' selected works on the theory of electricity and magnetism. F. U.
T. Epinus. Theory of electricity and magnetism. Edited by Prof. Ya. G.
Dorfman. D. R. Elektrichestvo No 5, 1952a

DOEFMAN, YA. G.

PA 241T86

USSR/Physics - Ferromagnetics

Jul/Aug 52

"Ferromagnetic and Anti-Ferromagnetic Semiconductors
as a Problem of Solid-State Physics," Ya. G. Dorf-
man, Leningrad Hydrometeorolog Inst

"Iz Ak Nauk, Ser Fiz" Vol 16, No 4, pp 412-419

Problem of ferromagnetic and antiferromagnetic
semiconductors and dielectrics is essential in
study of solid-state physics. Discusses ferromag-
netism and antiferromagnetism as depending on elec-
tron spin and closely bound to state of current
carrier electrons.

241T86

DORFMAN, Ya.G., professor (Leningrad).

Outstanding Russian physicist G.V. Richman, and his role in the history of the
science of electricity. Elektrichestvo no.8:61-67 Ag '53. (MIRA 6:8)
(Richman, Georg Wilhelm, 1711-1753)

AMPERE, Andre Marie, 1775-1836; DORFMAN, Ya.G., professor redaktor; KAYCHIK, N.K., redaktor; PETROVSKIY, I.G., akademik, redaktor; ANDREYEV, N.N., akademik, redaktor; BYKOV, K.M., akademik, redaktor; KAZANSKIY, B.A., akademik, redaktor; OPARIN, A.I., akademik, redaktor; SHMIDT, O.Yu., akademik, redaktor; SHCHERBAKOV, D.I., akademik, redaktor; YUDIN, P.F., akademik, redaktor; KOSHTOYANTS, Kh.S., redaktor; MAKSIMOV, A.A., redaktor; SAMARIN, A.M., redaktor; LEBEDEV, D.M., doktor geograficheskikh nauk, redaktor; FIGUROVSKIY, N.A., doktor khimicheskikh nauk, redaktor; KUZNETSOV, I.V., kandidat filosofskikh nauk, redaktor; OZNOBISHIN, D.V., kandidat istoricheskikh nauk, redaktor; SMIRNOVA, A.V., tekhnicheskii redaktor

[Electrodynamics] Elektrodinamika. Redaktsiia, stat'i i primochaniia IA.G.Dorfmana. [Leningrad] Izd-vo Akademii nauk SSSR, 1954. 492 p. (MLRA 7:10)

1. Chlen-korrespondent AN SSSR (for Koshtoyants, Maksimov, Samarin)
(Electrodynamics)

DORFMAN, Ya.

USSR/ Chemistry Catalytic synthesis

Card : 1/1 Pub. 151 - 15/35

Authors : Yakovlev, I. P., and Dorfman, Ya.

Title : Catalytic synthesis of ketones. Part 3.- Synthesis of methylethyl-, methyl- and methylisobutyl ketones

Periodical : Zhur. ob. khim. 24, Ed. 7, 1171 - 1175, July 1954

Abstract : The theoretical assumptions regarding the ketonization (conversion into ketones) of alcohol mixtures, were investigated and confirmed. A new method for the synthesis of ketones from acetic acid anhydride and alcohols (preferably ethyl, butyl and isobutyl), is described. It was established that catalytic synthesis of saturated ketones from alcohols and acid anhydrides is possible only in the presence of H. A CrMn catalyst was found most stable in the presence of H and requires no regeneration. Six USSR references. Tables.

Institution : State University, Kishinev, Mold-SSR

Submitted : October 20, 1953

DORFMAN, Ya. G.

3.
✓ Catalytic synthesis of ketones. III. Synthesis of methyl ethyl, methyl butyl, and methyl isobutyl ketones. I. P. Yakovlev and Ya. Dorfman. *J. Gen. Chem. U.S.S.R.* 24, 1103-6 (1954) (Engl. translation).—See *C.A.* 49, 12282f.
IV. Synthesis of methyl propyl, methyl isobutyl, diisopropyl, and isopropyl butyl ketones. I. P. Yakovlev. *Ibid.* 25, 253-7 (1955) (Engl. translation).—See *C.A.* 50, 1621c.
B. M. R. ① A

~~SECRET~~

SH

DORFMAN, Ya. Prof.

"Nuclear Physics in Heavy Industry" Leningrad Pravda, No. 64, 17 Mar 55

Translation TI No. 165196

Dorfman, Ya. G.

518.115; 518.521
DIAMAGNETIC RESONANCE IN STRONGLY MAGNETIC BODIES. Ya.G. Dorfman.

Dokl. Akad. Nauk SSSR, Vol. 110, No. 2, 291-3 (1956). In Russian.

A qualitative discussion of the resonance due to the orbital motion of the current carriers — electrons — in the internal magnetic field of a ferromagnetic body. It is shown that the resonance frequency is independent of the external magnetic field.

As the external field is raised towards the Curie point, the resonance frequency is affected. External fields should affect the polarization and sharpness of the resonance but not its frequency.

D.H. Whiffen

DOFFMAN, Ya G. (Leningrad)

"On the determination of the Individual Components of the Magnetic Susceptibility of a Semiconductor," a paper submitted at the International Conference on Physics of Magnetic Phenomena, Sverdlovsk, 23-31 May 56.

DORFMAN, Ya-G., (Leningrad)

"The Magnetochemistry of Diamagnetic Compounds and the Role of the Polarizational Paramagnetism," a paper submitted at the International Conference on Physics of Magnetic Phenomena, Sverdlovsk, 23-31 May 56.

DORFMAN, Ya. G

AUTHORS: Grigor'yan, A.T., Dorfman, Ya.G. and Kuznetsov, B.G 3-5-34/38
TITLE: A Serious Work on the History of Physics (Ser'yeznyy trud po istorii fiziki)
PERIODICAL: Vestnik vysshey shkoly, 1957, Nr 5, pp 87-90 (USSR)

ABSTRACT: This article is a review of a new book, published in 1948 by Uchpedgiz, "The History of Physics" (Istoriya fiziki) by P.S. Kudryavtsev. The first volume of this book appeared in 1948. Now a second edition of Volume I and a second volume have been published simultaneously. The critics state that this book is a great and useful work and constitutes a serious attempt to cover the history of physics. It must therefore be considered as a valuable contribution to Soviet science literature. The first volume of the new edition shows some improvements compared with its first edition, but there are also a number of shortcomings, in particular, in the periodization, and in the composition and distribution of illustrations. The second volume is very much appreciated by the critics because of the great importance of contribution of Russian scientists which is given great prominence. There are however some faults.

Card 1/2

A serious Work on the History of Physics

3-5-34/38

.ASSOCIATION: The Institute of History and Natural Science and Technics, AN
USSR (Institut istorii yestestvoznaniya i tekhniki AN SSSR)

AVAILABLE: Library of Congress

Card 2/2

~~DOIFMAN, Ya.G.;~~ RADOVSKIY, M.I.

B. Franklin and Russian electric research scientists of the 18th
century. Trudy Inst. ist. est. i tekhn. 19:290-312 '57. (MIRA 11:2)
(Franklin, Benjamin, 1706-1790)
(Electricity--Research--History)

DORTMAN, Ya.G.

Pierre Curie's contribution to the study of magnetism. Trudy Inst.
ist. est. i tekhn. 19:70-83 '57. (MIRA 11:2)
(Curie, Pierre, 1859-1906)
(Magnetism)

DORFMAN, Ya.G.; LAZUKIN, V.N.

Concerning the term "cyclotron resonance." Usp.fiz.nauk 61 no.1:
133-135 Ja '57. (MLRA 10:2)
(Cyclotron)

DORFMAN, YA.G.

PA - 2597

AUTHOR:
TITLE:

VARCHENYA, S.A., DORFMAN, YA.G.
Thermo-Electric Properties of Ferrites in the Range Close to
Curie Temperature. (Termoelektricheskiye svoystva ferritov vblizi
temperatury Kyuri, Russian).

PERIODICAL:

Radiotekhnika i Elektronika, 1957, Vol 2, Nr 3, pp 345 - 347
(U.S.S.R.)
Received: 5 / 1957

Reviewed: 6 / 1957

ABSTRACT:

Lecture delivered at the All-Union Conference for Semiconductors
in November 1955 at Leningrad. It was the purpose of this work
to settle the question as to whether an anomaly of the thermoelectric
properties in the range close to curie temperatures exists in ferro-
magnetic semiconductors, and specially in ferrites, and whether
therefore the electrons of conductivity participate in ferro- or
antiferro magnetism. At first Ni-Zn samples and more complicated
ferrites with a specific resistance of from $10^6 - 10^7$ Ohm/cm were
investigated. The plotted integral curves of the dependence of
the thermoelectromotoric force on temperature showed a steady course
without anomalies, which is due to the high electric resistance.
Next, a small ringplate of Ni-Zn ferrite of $2,6 \times 10$ Ohm/cm was in-
vestigated. The resistance amounted to 6000 Ohm, Curie temperature
to 200° C. On the nickel-zinc-ferrite sample an anomaly of the
Peltier- as well as of the Thomson effect was observed which had the
same character, the same sign, and the same order of magnitude as

Card 1/2

Thermo-Electric Properties of Ferrites in the
Range Close to Curie Temperature.

PA - 2597

those observed on ferromagnetic metals. It is thus proved for the first time that not only in metals, but at least in some semi-conductors the electrons of conductivity in some way participate in ferromagnetism. (More accurate: in non-compensated antiferromagnetism). It can be concluded herefrom that for this type of ferrite with an increase of temperature in the range close to Curie point a decrease of the width of the forbidden zone by about 0,01 - 0,03 eV takes place. It is possible that the current carriers in this case are those electrons which reach the conduction zone from the stripe of the d-level or from local d-levels. (3 illustrations and 5 citations from Slav publications).

ASSOCIATION: Not given
PRESENTED BY:
SUBMITTED:
AVAILABLE: Library of Congress.

Card 2/2

DORFMAN, YA. G.

-48-6-3/23

SUBJECT: USSR/Physics of Magnetic Phenomena

AUTHOR: Dorfman, Ya.G.

TITLE: On the Determination of Individual Components of Magnetic Susceptibility in a Semiconductor (Ob opredelenii otdel'nykh sostavlyayushchikh magnitnoy vospriimchivosti poluprovodnika)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1957, Vol. 21, # 6, pp 796-800 (USSR)

ABSTRACT: The magnetic susceptibility of an impure semiconductor χ (per 1 mole) can be represented as a sum of its components:

$$\chi = \chi_a + \chi_e + \chi_i$$

where χ_a - is the susceptibility of the main substance, χ_e - is the susceptibility of charge carriers, electrons or holes, χ_i - is the susceptibility of the atoms (or ions) of an admixture.The author criticizes the methods proposed by Hutchison (2), Schumacher (3) and Busch (4) for determination of χ_e . He considers other possibilities of an experimental determination

Card 1/3

48-6-3/23

TITLE: On the Determination of Individual Components of Magnetic Susceptibility in a Semiconductor (Ob opredelenii ot del'nykh sostavlyayushchikh magnitnoy vospriimchivosti poluprovodnika)

of the individual components of magnetic susceptibility in a semiconductor with one kind of charge carriers. He analyzes the problem in question from the principal viewpoint without considering the details of the experimental performance of the measurements.

The method proposed by the author employs the Nernst-Ettingshausen longitudinal effect of generating a potential difference and other effects arising due to applying a strong variable field H_V . The author estimates that the magnitude of effects should be of the order of 10^{-8} to 10^{-9} v. However, they can be increased considerably by using a "battery" of cores of a semiconductor, by field modulation and by an amplification of signals.

Since Jousset-Dubien et al. (6) succeeded in designing a device for direct measuring the magnetic susceptibility of weakly magnetic bodies of the order of 10^{-6} CGS, it will be feasible to apply this method for measuring the paramagnetic susceptibility of charge carriers in semiconductors.

Card 2/3

48-6-3/23

TITLE: On the Determination of Individual Components of Magnetic Susceptibility in a Semiconductor (Ob opredelenii otdel'nykh sostavlyayushchikh magnitnoy vospriimchivosti poluprovodnika)

The article contains 5 figures.

There are 7 references, one of which is Russian.

ASSOCIATION: Leningrad Hydrometeorological Institute

PRESENTED BY:

SUBMITTED: No date indicated

AVAILABLE: At the Library of Congress

Card 3/3

DORFMAN, YA.G

SUBJECT: USSR/Physics of Magnetic Phenomena 48-6-7/23
AUTHOR: Dorfman, Ya.G.
TITLE: Magnetochemistry of Diamagnetic Compounds and Role of Polarization Paramagnetism (Magnetokhimiya diamagnitnykh sovedineniy i rol' polarizatsionnogo paramagnetizma)
PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1957, Vol. 21, # 6, pp 817-820 (USSR)

ABSTRACT: The author criticizes the two existing viewpoints on the diamagnetic susceptibility of salts and asserts that an additional term, depending on the existence of polarization paramagnetism, must be included into the formula of diamagnetic susceptibility in addition to the terms expressing the diamagnetic susceptibility of cations and anions.

In principle, the polarization paramagnetism can be observed in salts where the spheric symmetry of ions is distorted by the crystalline field. Therefore, two corrections should be taken into account for diamagnetic ionic salts: the first accounting for the mutual alterations of the effective radii of ions, which lead to some diamagnetic effect, and the

Card 1/2

48-5-7/23

TITLE:

Magnetochemistry of Diamagnetic Compounds and Role of Polarization Paramagnetism (Magnetokhimiya diamagnitnykh soedineniy i rol' polarizatsionnogo paramagnetizma)

second connected with a change in the ion symmetry, which leads to the arising of polarization paramagnetism. This second correction will probably account for anomalous magnetic properties of isomorphic solid solutions of salts investigated by Bhatnagar (8). The effect of polarization paramagnetism is implicitly comprised in the so-called "constitutive" correction term in the Pascal (11) formula. It is predicted that the Pascal constitutive correction term cannot be independent of temperature.

The article contains 1 table.

There are 11 references, one of which is Russian.

ASSOCIATION: Leningrad Hydrometeorological Institute
PRESENTED BY:
SUBMITTED: No date indicated
AVAILABLE: At the Library of Congress
Card 2/2

DORFMAN, Ya.G.

"Experiments and observations on electricity by Benjamin Franklin.
Translated from the English by V.A. Alekseev. Reviewed by IA.G.
Dorfman. Usp. fiz. nauk 63 no.4:859-860 D '57. (MIRA 11:1)
(Electricity--Early works to 1850)
(Alekseev, V.A.)

KANAYEV, A.A.; DORFMAN, Ya.G., prof., nauchnyy red.; VLADIMERSKIY,
D.M., red.isd-va; GUMBEHIYEVA, A.M., tekhn.red.

[Atomic electric power plants] Atomnye elektrostantsii.
Leningrad, Obshchestvo po rasprostraneniyu polit. i nauchn.
znaniy, 1958. 40 p. (MIRA 12:7)
(Atomic power plants)

DORFMAN, Ya. G.

24(7) p.3 PHASE I BOOK EXPLOITATION SOV/1338.

Frenkel', Yakov Il'ich, Corresponding Member, USSR Academy of Sciences

Sobraniye izbrannykh trudov. t. 2: Nauchnyye stat'i (Collection of Selected Works. Vol. 2: Scientific Articles) Moscow, Izd-vo AN SSSR, 1958. 600 p. 3,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Redaktsionno-izdatel'skiy sovet.

Resp. Ed.: Semenov, N.N., Academician; Ed. of Publishing House: Kontorova, T.A.; Tech. Ed.: Smirnova, A.V.; Editorial Board for the Works of Ya. I. Frenkel'; Semenov, N.N. (Chairman) Academician, Sokolov, A.A. (Deputy Chairman) Doctor of Physical and Mathematical Sciences. Bogolyubov, N.N., Academician, Tamm, I.Ye., Academician, Ansel'm, A.I., Doctor of Physical and Mathematical Sciences, Blokhintsev, D.I., Doctor of Physical and Mathematical Sciences, and Kontorova, T.A., Candidate of Physical and Mathematical Sciences.

Card 1/8

Collection of Selected Works. (Cont:)

SOV/1338

PURPOSE: This book is intended for persons interested in the scientific contributions of Ya. I. Frenkel'.

COVERAGE: This, the second volume of the collected works of Ya. I. Frenkel', is a compilation of his scientific articles and books. The volume is divided into four sections. The first consists of his contributions to semiconductors, and dielectrics and the electron theory of metals. The second section covers his works on molecular physics and deals with the kinetic theory of solids and liquids, the mechanical properties of solids, and the physical properties of high-molecular compounds. The third section covers his works on the theory of electrons and atomic nuclei, and the last section presents his contributions to geophysics. No personalities are mentioned. The volume includes a list of Ya. I. Frenkel''s published works amounting to 251 articles and 41 books.

Card 2/8

Collection of Selected Works (Cont.)

SOV/1338

TABLE OF CONTENTS:

<u>Dorfman, Ya. G.</u> Yakov Il'ich Frenkel' (1894-1952)	3
Ioffe, A.F. On Ya. I. Frenkel''s scientific legacy	17
SECTION I. SEMICONDUCTORS, DIELECTRICS AND THE ELECTRON THEORY OF METALS	
Vonsovskiy, S.V. The Works of Ya. I. Frenkel' on the Electron Theory of Solids	21
1. On the electric double layer on the surface of solids and liquids	54
2. Theory of the electrical conductivity of metals	54
3. New developments in the electron theory of metals	71
4. Elementary theory of magnetic and electrical properties of metals under absolute zero temperature	96

Card 3/8

Collection of Selected Works (Cont.)

SOV/1338

5.	Applying the Pauli-Fermi theory of electron gas to the problem of adhesive power	109
6.	Spontaneous and inductive magnetization in ferromagnetic materials	122
7.	On the transformation of light into heat in solids. I	126
8.	On the transformation of light into heat in solids. II.	157
9.	On the elementary derivation of some relations in the electron theory of metals	176
10.	On light absorption and electron adhesion and positive holes in crystalline dielectrics	182
11.	On the rotation of dipole molecules in solids	201
12.	On the theory of mobile holes and dissociation of atoms in crystals	211
13..	On the thoery of disruptive discharge in dielectrics and electron semiconductors	217

Card 4/8

Collection of Selected Works (Cont.)

SOV/1338

SECTION II. MOLECULAR PHYSICS

Bresler, S. Ye. The Works of Ya. I. Frenkel' on Molecular Physics	231
A. The Kinetic Theory of Solids and Liquids	
14. The theory of condensation and adsorption	239
15. On thermal movement in solids and liquids	254
16. The liquid state and the theory of fusion. Part I. Continuity of the solid and liquid states	269
17. The liquid state and the theory of fusion. Part II. The theory of fusion and crystallization	280
18. The kinetic theory and the electrical properties of liquids	299
19. The general theory of heterophase fluctuation and pre-transitional phenomena	333
20. The relation of surface tension of amorphous bodies to temperature	347

Card 5/8

Collection of Selected Works (Cont.)

SOV/1338

B. MECHANICAL PROPERTIES OF SOLIDS

- | | | |
|-----|--|-----|
| 21. | On the theory of plastic deformation and twinning. I. | 364 |
| 22. | On the theory of plastic deformation and twinning. II. | 371 |
| 23. | Phenomenological theory of the mechanical properties of amorphous bodies and the propagation of vibrations in them | 381 |
| 24. | On surface creeping of particles on crystals and the natural roughness of crystal faces | 397 |
| 25. | Viscous flow in crystalline bodies | 412 |

C. THE PHYSICAL PROPERTIES OF HIGH-MOLECULAR COMPOUNDS

- | | | |
|-----|---|-----|
| 26. | Theory of the elasticity, viscosity and swelling of polymeric rubberlike substances | 425 |
|-----|---|-----|

Card 6/8

Collection of Selected Works (Cont.)

SOV/1338

27. On the nature of thermal flow of long organic chains and on the causes of elastic properties of rubber 437

SECTION III. THE THEORY OF ELECTRONS AND ATOMIC NUCLEI

Smorodinskiy, Ya. I., and I. Ye. Tamm. The Works of Ya. I. Frenkel' on Atomic Nuclei 455

28. Electrodynamics of rotating electrons 460
29. On the solid body model of heavy nuclei 477
30. On the statistical theory of the atomic disintegration of nuclei 480
31. Electrocapillary theory of splitting heavy nuclei with slow neutrons 496

Card 7/8

Collection of Selected Works (Cont.)

SOV/1338

SECTION IV. GEOPHYSICS

Bazilevich, V.V., and K.S. Shifrin. The Works of Ya. I. Frenkel' on Geophysics	515
32. On the theory of seismic and seismoelectrical phenomena in wet ground	520
33. Theory of the fundamental phenomena of atmospheric electricity	538
34. On the electric charge of the earth's surface	568
35. Terrestrial magnetism	572
List of Ya. I. Frenkel''s published works	585

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Card 8/8

SOV/56-35-2-45/60

24(2)

AUTHOR:

Dorfman, Ya. G.

TITLE:

The Diamagnetism and the Interatomic Bonds in Molecules and Non-Metallic Crystals (Diamagnetizm i mezhatomnyye svyazi v molekulakh i nemetallicheskih kristallakh)

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 2(8), pp 533-535 (USSR)

ABSTRACT:

A good deal of the magnetic investigations of diamagnetic substances have hitherto been unprofitable for the investigation of the nature of the interatomic bonds. The method recommended in this paper will facilitate a new approach to this problem. The paper discusses some possibilities and perspectives of this method when applied to diamagnetic molecules and non-metallic crystals. First, a formula of the experimentally measurable susceptibility $\chi = \chi_d + \chi_p$ of molecules and non-metallic bodies is given and discussed in short. The Langevin (Lanzheven) component χ_d depends only on the dimensions of the electron clouds. The van Vleck (van-Flek) component χ_p , on the other hand, depends on the sym-

Card 1/3

SOV/56-35-2-45/60

The Diamagnetism and the Interatomic Bonds in Molecules and Non-Metallic Crystals

metry character and the deformability of the electron clouds. For atoms with central-symmetrical clouds $\chi_p = 0$. χ_p may therefore be an important source of interesting data concerning the structure of the electron clouds. Since χ cannot be separated experimentally into χ_d and χ_p , χ_p may be estimated only by comparison of χ_d with χ if there is a reliable method for the independent determination of χ_d for any given substance. The author gives a formula which may be generalized for any interatomic system consisting of more or less symmetric electron clouds. For polar crystals with obviously deformed crystals (for instance KCl, KBr, and KJ) $\chi_p \cdot 10^6$ has values of +1, +5, 2, and +8, 8, respectively. The crystals of some semiconductors have a high value of χ_p which may be explained by the high diffuseness of the clouds of the valence electrons. It may be assumed that also purely molecular semiconductors (the aromatic compounds are typical exemplars of them) have an anomalously strong polarization magnetism. It may, therefore, be assumed that also the metallic-organic compounds are semiconductors, because

Card 2/3

SOV/56-35-2-45/60

The Diamagnetism and the Interatomic Bonds in Molecules and Non-Metallic Crystals

many of them have high values of χ_p . The examples discussed in this paper may be considered as an illustration of the magneto-chemical investigation of the interatomic bond in most various diamagnetic substances. The author thanks some of his colleagues for their critical comments and especially A. G. Samoylovich and L. L. Korenblit for their useful advice. There are 1 table and 5 references, 2 of which are Soviet.

SUBMITTED: May 15, 1958

Card 3/3

AUTHOR: Dorfman, Ya. G. SOV/53-66-4-6/10

TITLE: The Life and the Discoveries in Physics of Torricelli
(Zhizn' i fizicheskiye otkrytiya Torricelli)

PERIODICAL: Uspekhi fizicheskikh nauk, 1958, Vol 66, Nr 4,
pp 653-669 (USSR)

ABSTRACT: The author first gives a detailed report on the life of this most prominent of all Italian physicists and mathematicians of the 17th century (15.10.1608 - 24.10.1647). The second part of the article deals with Torricelli's scientific research work and publications. Torricelli's activities as a scientist extended to point mechanics and the mechanics of solids, hydromechanics, atmospheric physics, geometrical optics, and the technology of lens-production. Several of his activities are discussed in detail as e. g. his investigations of the motion of solids, of the momentum of moving bodies, his experiments in connection with the barometer and with lenses (interference), etc.

Card 1/2

The Life and the **Discoveries in Physics of Torricelli** 307/53-66-4-6/10

There are 3 figures and 17 references, 5 of which are Soviet.

Card 2/2

AUTHOR: Dorfman, Ya. G. 20-119-2-32/60

TITLE: A New Method for the Interpretation of the Magnetic Susceptibility of Diamagnetic Organic Compounds
(Novyy metod interpretatsii magnitnoy vospriimchivosti diamagnitnykh organicheskikh soyedineniy)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 2, pp. 305-306 (USSR)

ABSTRACT: According to the quantum-mechanical theory the magnetic susceptibility χ of the diamagnetic molecules is composed of the classical Langevin (Lanzheven) diamagnetism χ_d and of the quantum mechanical Van Vleck (Fanflek) paramagnetism χ_p : $\chi = \chi_d + \chi_p$. This sum is put down in detail. On the other hand according to the magnetochemical scheme by P. Pascal (Paskal) $\chi = \sum \chi_A + \sum \lambda_s$ holds. Here χ_A denotes the negative constants of the individual atoms of the molecule and λ_s denotes the

Card 1/4

A New Method for the Interpretation of the Magnetic Susceptibility of Diamagnetic Organic Compounds 20-119-2-32/60

(positive or negative) correction constants which characterize the deviation from the additivity dependent on some structural characteristic features. Between the two above mentioned formulae there is no explicit agreement. Therefore no simple physical interpretation exists for the Pascal empiric constants χ_A and χ_S from the standpoint of modern theory. The author here starts from the formula $\chi = \chi_d + \chi_p$ in the investigation of the magnetochemistry of the diamagnetic organic compounds. First the separation of the measured values of χ in χ_d and χ_p (which cannot be realized experimentally) are discussed. χ_d was calculated with the approximation formula by J. G. Kirkwood (Kirkwood) (reference 3). The analysis of this formula and the comparison of the calculated values showed that the Kirkwood formula

Card 2/4

A New Method for the Interpretation of the Magnetic Susceptibility of Diamagnetic Organic Compounds 20-119-2-32/60

describes well the Langevin (Lanzheven) diamagnetism. The comparison of the thus calculated values of χ_d with the experimental values of χ made possible the estimation of χ_p for many aliphatic and alicyclic compounds. In this investigation some regularities were found: the specific carriers of paramagnetism, the "magnetophores", are represented by some atom groups mentioned in a table. The molecules as a whole possess a certain, comparatively weak, total-molecular paramagnetism χ which depends on the symmetry of the molecule and decreases with increasing ramification of the isomers. An additive scheme can also be applied to the diamagnetic component χ_d of the susceptibility. The values of some compounds calculated according to the here discussed scheme are compiled in a table. There are 2 tables and 4 references, 1 of which is Soviet.

Card 3/4

A New Method for the Interpretation of the Magnetic Susceptibility of Diamagnetic Organic Compounds 20-119-2-32/60

PRESENTED: November 13, 1957, by N. N. Semenov, Member, Academy of Sciences, USSR

SUBMITTED: October 1, 1957

Card 4/4

20-119-3-34/65

AUTHOR: Dorfman, Ya. G.

TITLE: The Magnetochemistry of the Organic Compounds and the "Chemical" Shifts of the Nuclear Magnetic Resonance (Magnetokhimiya organicheskikh soedineniy i "khimicheskiye" sdvigi yadernogo magnitnogo rezonansa)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 3, pp. 518-519 (USSR)

ABSTRACT: Lately the author succeeded to set up a new version of the magnetochemical scheme of the organic compounds. This renders possible the estimation of the diamagnetic and of the paramagnetic component of the magnetism of various aliphatic and alicyclic compounds as well as the determination of the susceptibilities, which fall to the share of the single atoms and atom groups. Of course these magnetochemical results will then be used for the discussion and computation of the chemical shifts of the nuclear magnetic resonance. The author above all examines those cases, where the protons belong to atom groups with single bindings (e.g. $\text{CH}_3 - \text{C} \llcorner$, NH_2 , $\text{CH}_3 - \text{N} \llcorner$, CH_2 in alicyclic compounds). As it is desired to refer the observed shifts to the shifts in H_2O , also the OH-group must be examined. At a certain fixed frequency a resonance is assumed to be observed.

Card 1/4