

AL'TSHULER, N. S., kand. med. nauk

Organization of tuberculosis control in rural localities of the  
R.S.F.S.R. Probl. tub. 40 no.5:3-9 '62. (MIRA 15:7)

1. Iz Moskovskogo nauchno-issledovatel'skogo instituta tuberku-  
leza Ministerstva zdravookhraneniya RSFSR (dir. - kandidat medi-  
tsinskikh nauk T. P. Mochalova, zam. dir. po nauchnoy chasti -  
prof. D. D. Aseyev)

(TUBERCULOSIS—PREVENTION)  
(PUBLIC HEALTH, RURAL)

ASKYEV, D.D., prof.; AL'TSHULER, N.S., kand.med.nauk

Prevention of tuberculosis at the present stage. Zdrav.Ros.  
Feder. 7 no.3:15-18 Mr '63. (MIRA 16:3)

1. Iz Moskovskogo nauchni-issledovatel'skogo instituta tuberkuleza Ministerstva zdravookhraneniya RSFSR (dir. T.P. Mochalova).  
(TUBERCULOSIS---PREVENTION)

AL'TSHULER, N.S., kand.med.nauk

Participation of the rural community in the control of tuberculosis. Fel'd. i akush. 28 No.6:16-20 Je'63. (MIRA 16:8)

1. Iz Moskovskogo nauchno-issledovatel'skogo instituta tuberkuleza Ministerstva zdravookhraneniya RSFSR.  
(TUBERCULOSIS--PREVENTION)

ASEYEV, D.D., prof.; AL'TSHULER, N.S., kand.med.nauk; SAFONOV-CHABOVSKIY,  
M.G.; VINOGRADOVA, R.G., kand.med.nauk

Clinical recovery of adult pulmonary tuberculosis patients.  
Probl. tub. 41 no.10:15-21 '63. (MIRA 17:9)

1. Iz Moskovskogo nauchno-issledovatel'skogo instituta tuberkuleza  
(dir. - kand.med.nauk T.P.Mochalova, zamestitel' direktora po nauchnoy  
chasti-prof. D.D.Aseyev) Ministerstva zdravookhraneniya RSFSR.

AL'TSHULER, N.S., kand.med.nauk; VARSAVA, B.A., kand.med.nauk; LYUBAVINA, B.T.

Dispensary methods of antitubercular work in rural areas. Probl. tub.  
no.2:14-18 '64. (MIRA 17:12)

1. Moskovskiy nauchno-issledovatel'skiy institut tuberkuleza (dir. T.P. Mochalova, zamestitel' direktora po nauchnoy chasti - prof. D.D. Asayev) Ministerstva zdravookhraneniya RSFSR i Moskovskiy oblastnoy protivotuberkuleznyy dispanser.

TITLE NUMBER 9.V. PROCESSED AND REPRODUCED IN FULL

C-2

Heterogeneous catalytic decomposition of hydrogen peroxide on manganese compounds. O. V. Altshuler, B. A. Kononova and N. N. Patin. *J. Phys. Chem.* (U. S. S. R.) 13, 1007-15 (1959). The decomn. of H<sub>2</sub>O<sub>2</sub> by manganous salts in 0.002 0.003 N NaOH soln. proceeds as a microheterogeneous catalysis in accordance with the Langmuir theory of adsorption (cf. C. A. 10, 992). In acid solns. practically no decompu. takes place. P. H. Rathmann

A.S.B.S.A. METALLURGICAL LITERATURE CLASSIFICATION

E-77-770-723-000

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 NATIONAL BUREAU OF STANDARDS - METROLOGY

AL'TSHULER, O.V.

USSR/Physical Chemistry - Surface Phenomena. Adsorption. Chromatography. Ion Exchange, B-13

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 61207

Author: Chizhikov, D. M., Al'tshuler, O. V.

Institution: None

Title: On Adsorption of Selenium on Activated Carbons

Original

Periodical: Zh. fiz. khimii, 1956, 30, No 1, 220-222

Abstract: Study by means of  $\gamma$ -radioactive  $Se^{75}$  of Se adsorption under dynamic conditions on activated carbon AG and KAD from mixture of Se and S vapors in argon, obtained by evaporation of Se-S melts containing 0.016-5% Se. In all instances the Se/S ratio at the adsorbent is 2.5-3 times greater than in the melt and 5-6 times greater than in the vapors. With increase of temperature adsorption of Se decreases sharply. On desorption S is removed more completely. 15-20% Se are not removed even on heating to 1,000° and by action of different solvents:  $Na_2S$ , pyridine,  $H_2SO_4$ ,  $HNO_3$  and alkalis. This portion of

Card 1/2

Card 2/2

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137-1957-12-23487

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 12, p 93 (USSR)

AUTHORS: Ryabov, V. A., Zviadadze, G. N., Ap'tshuler, O. V., Chizhikov, D. M.

TITLE: The Reaction of Titanium With Its Tetrachloride (Vzaimodeystviye titana s yego tetrakhloridom)

PERIODICAL: Tr. In-ta metallurgii AN SSSR, 1957, Nr 1, pp 85-92

ABSTRACT: A study of the conditions necessary for the formation of the lowest chlorides produced by the reaction of Ti with  $TiCl_4$ . Twice-distilled  $TiCl_4$  was employed in the experiments. The powdered Ti, a metal obtained by means of magnesium-thermal process followed by vacuum distillation, contained 99.7 percent Ti. The partial pressure of the  $TiCl_4$  was computed from its loss in the vessel and from the volume of Ar passed in the course of the experiment. The purification of Ar was accomplished by passing it through a layer of Ti sponge heated to a temperature of  $700^{\circ} - 800^{\circ}C$ . Prior to the introduction of the  $TiCl_4$  vapors, Ar was blown through the cold reaction tube. The furnace was then turned on and the  $TiCl_4$  was introduced into the tube after the necessary experimental temperature was reached. After the

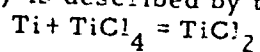
Card 1/2



137-1957-12-23487

• The Reaction of Titanium With Its Tetrachloride

completion of the reaction, the reaction products were extracted from the tube in an Ar stream and were then investigated. It was established that the reaction of Ti with  $TiCl_4$  is affected by the temperature and by the partial pressure of  $TiCl_4$ . At temperatures between 300 and 500° the reaction produces  $TiCl_2$ , whereas higher temperatures produce  $TiCl_3$  along with  $TiCl_2$ . The most likely reaction between Ti and  $TiCl_4$  in the range investigated (300 - 900°) is described by the formula:



G. S.

1. Titanium reaction
2. Tetrachloride-Applications

Card 2/2

AL'TSHULER, O.V.

137-1957-12-23279

Translations from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 12, p 60 (USSR)

AUTHORS: Chizhikov, D. M., Zviadadze, G. N., Al'tshuler, O. V.

TITLE: On the Evaporation of Selenium From Its Sulfur Alloys (Ob isparenii selena izyegosplavov s seroy)

PERIODICAL: Tr. In-ta metallurgii AN SSSR, 1957, Nr 1, pp 93-100

ABSTRACT: A presentation of experimental results of an investigation of the rate of evaporation of Se from its S alloys, as well as on the condensation of Se from a vapor phase composed of Se and S. Synthetic alloys of S and Se were employed in the experiment; they were obtained by adding appropriate quantities of both stable and active Se to molten S, while the latter was being constantly stirred. The measurement of the evaporation rate of the components of the S-Se alloys was carried out within a temperature range of 98-400°, both under atmospheric pressure and in a vacuum. The rate of evaporation of S and of Se in their alloys increases with temperature. In the sublimation of the solid alloy at 98° the composition of the vapor corresponds to the composition of the solid phase. In the evaporation of the liquid alloy the vapor phase contains approximately one-half as much Se as

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137-1957-12-23279

On the Evaporation of Selenium From Its Sulfur Alloys

the liquid phase. During the distillation of the alloy at low temperatures (under vacuum) and at higher temperatures (under atmospheric pressures) the ratio of the separation remains approximately constant ( $C_{\text{alloy}}/C_{\text{vapor}} = 1.3-2$ ). On the strength of the data obtained it was concluded that complex, polyatomic molecules, containing atoms of both components, are formed in the alloys of S and Se.

G. S.

1. Sulfur alloys-Selenium separation
2. Separation-Test methods
3. Separation-Test results

Card 2/2

AL'TSHULER, O. V., ZVIADADZE, G. H. and CHIZHIKOV, D. M. (Metallurgical Inst im  
A. A. Baykov AS USSR)

"The Use of Radioactive Selenium for Investigating the Sulfur-selenium System"

Isotopes and Radiation in Chemistry, Collection of papers of  
2nd All-Union Sci. Tech. Conf. on Use of Radioactive and Stable Isotopes and  
Radiation in National Economy and Science, Moscow, Izd-vo AN SSSR, 1958, 380pp.

This volume published the reports of the Chemistry Section of the  
2nd AU Sci Tech Conf on Use of Radioactive and Stable Isotopes and Radiation  
in Science and the National Economy, sponsored by Acad Sci USSR and Main  
Admin for Utilization of Atomic Energy under Council of Ministers USSR  
Moscow 4-12 Apr 1957.

AL'TSHULER, O. V.

AUTHORS: Al'tshuler, O. V., Subbotina, Ye. A., 78-3-5-23/39  
Afanas'yeva, A. F.

TITLE: The Separation of Niobium and Titanium by Means  
of the Ion Exchange Method (Razdeleniye niobiya  
i titana metodom ionnogo obmena)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol 3, Nr 5,  
pp 1192-1199 (USSR)

ABSTRACT: The separation of niobium and titanium by way of their  
complex-ions was achieved by means of applying ion-  
exchange. In order to determine the optimum work con-  
ditions for the separation of niobium-titanium, the  
isothermal lines of adsorption of both niobium and ti-  
tanium were defined and the coefficients of distribu-  
tion were determined. The elution from the exchange-  
column takes place completely in 5 n HCl. In 6 to  
8nHCl, niobium is hardly eluted. A mixture of HCl-  
-HF was found to be the best means of elution for nio-  
bium.

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The ion-exchange of niobium-titanium is carried out

The Separation of Niobium and Titanium by Means  
of the Ion Exchange Method

78-3-5-23/39

according to the following scheme:

- 1) Common adsorption of Nb and Ti from 2 n HCl;
- 2) Eluting of Ti with 6 to 7 n HCl;
- 3) Eluting of Nb by a mixture of HCl + HF.

In the investigations of the kinetics of the ion-exchange of niobium-titanium it was found that some complex-ions, the composition of which depends on the concentration of hydrochloric acid, exist in hydrochloric acids. Niobium and titanium form in mixed solutions complex-ions in which the two elements are represented, and the presence of these mixed complexes makes the separation niobium-titanium difficult.

The behaviour of tantalum in hydrochloric acid solution was also investigated and it was shown that tantalum is not of an ion exchange character. A course of separation for the production of purest niobium was elaborated.

There are 12 figures and 6 references, 1 of which is Soviet.

Card 2/3

7P-3-5-23/39

The Separation of Niobium and Titanium by Means of the Ion Exchange Method

SUBMITTED: May 7, 1957

AVAILABLE: Library of Congress

1. Niobium--Separation    2. Titanium--Separation    3. Ion  
exchange--Applications

Card 3/3

AL'TSHULER, O.V.; KHARAKHORIN, F.F.

Study of selenium regeneration from alkaline solutions. Zhur. prikl.  
khim. v. 31 no.5:800-801 My '58. (MIRA 11:6)  
(Selenium)



AL'TSHULER, O.V.; SUBBOTINA, Ye.A.

Part 2: Removing niobium and titanium impurities from tantalum by  
the ion-exchange method. Zhur.neorg.khim. 3 no.1:28-32 Ja '59.

(Tantalum)

(Ion exchange)

(MIRA 12:2)

5(2)

SOV/78-4-1-6/48

AUTHORS: Al'tshuler, O. V., Subbotina, Ye. A.

TITLE: II. The Purification of Tantalum From Niobium and Titanium Impurities by the Ion Exchange Method (II. Ochistka tantala ot primesey niobiya i titana metodom ionnogo obmena)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 1, pp 28-32 (USSR)

ABSTRACT: The paper under review describes new **process** conditions for the purification of considerable quantities of niobium and tantalum without the use of fluoric acid of high concentration. The anionites EDE-10 and AN-2F were used as adsorbents. The adsorption isothermal lines of niobium, tantalum, and titanium, and the dependence of the distribution coefficient of tantalum on the  $C_{HCl}$  concentration were determined and are shown in figures 1 and 2. It was found that tantalum from hydrochloric acid solutions is not adsorbed at ion exchangers. The non-ionogenic character of tantalum was confirmed with radioactive tantalum. It was found that in concentrated hydrochloric acid solutions tantalum is a non-dissociated colloidal solution.

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SOV/78-4-1-6/48

II. The Purification of Tantalum From Niobium and Titanium Impurities by the Ion Exchange Method

A new method of purifying and producing tantalum of highest purity from hydrochloric acid solutions was suggested. Purified tantalum only contains niobium traces (0.009% Nb and less than 0.05% titanium). The slight impurities in highly concentrated tantalum are adsorbed at the ion exchanger and tantalum remains in solution because of its minimum adsorptive capacity to anionites. There are 3 figures, 2 tables, and 5 references, 3 of which are Soviet.

SUBMITTED: October 24, 1957

Card 2/2

BLISHILLER, G.V.

PAGE 1 BOOK REFERENCE 507/1558 507/156-5

Abstracts and SER. Institute Metallurgii

Metallurgiya, metallovedeniye, fiziko-khimiya i malye issledovaniya (Physicochemical metallurgy, metallurgy and metall science) Moscow, Izdatel'stvo SSSR, 1961, 221 p. (Articles: Ital. Transl., 77p. 5) Enriched slip format. 2,000 copies printed.

Sponsoring Agency: Abstracts and SER. Institute Metallurgii (Inst. A.S. Bykov).

Orig. Ed.: I.P. Bardis, Akademicheskii (Decreased); Ed. of Publishing House: V.A. Etkov; Tech. Ed.: E.P. Polozov.

NOTE: This collection of articles is intended for metallurgists and metal researchers.

CONTENTS: The collection contains articles on metallurgy, metal science, and physicochemical metallurgy. Separate articles discuss the structure and properties of some metals and alloys. The effect of cold treatment and deformation on the properties of alloys are analyzed, and instruments and methods for the study of the metal absorption capacity of hydrogen oxide and carbon oxides.

Editor: I.B. and A.M. Smolin. Study of the metal absorption capacity of hydrogen oxide and carbon oxides.

Editor: Yu. V. A. Koshchepov, and A.M. Smolin. Effect of Deposition of Hydrogen Oxide on the Properties of Alloys, and Alloys on the Content and Composition of Oxide Inclusions in Steel.

Editor: A.M. Smolin. On the Problem of Utilizing the Results of Mechanical Tests for Evaluating the Technology of Smelting and Casting of Steel.

Editor: A.M. Smolin. On the Question of Crystallization of Iron-Alloy Systems in Iron, and of Oxides and Sulfides in Ores.

Editor: I.B. and A.M. Smolin. Mechanism of Ball-and-Rod Polishing and Intermetallic Exchange and a Comparison for Determining Case Compositions and Heat-Treatment Parameters.

Editor: V.S. Utilization of Sulfur Dioxide at Sintering Metallurgical Plants.

Editor: G.S. and Yu. I. Shalimov. Interaction of Sulfur Dioxide with the Oxides and Sulfides of Some of the Common Metals.

Editor: O.V. and G.S. Zverevs. Interaction of Sulfur Dioxide with Chromium Sulfide.

Editor: M. Yu. Z.A. Spitsynskiy, and L.I. Koshkin. Study of the Structure of the Intermetallic Phases of Some Magnesium-Base Alloys.

Editor: M. Yu. Z.A. Spitsynskiy, and L.I. Koshkin. Effect of Cold Work on the Properties of Magnesium-Copper and Magnesium-Copper-Nickel Alloys Under Various Aging Conditions.

Editor: I.B. and V.I. Kozlov. Dependence of Metal Enrichment on Change of Diffusion Sign During Cold Treatment.

Editor: I.B. and V.I. Kozlov. Dependence of Tensile Strength, Bonded Yield Point, and Specific Elongation on Sign Change of Plastic Deformation of Metal.

Editor: I.B. and V.I. Kozlov. Dependence of the Microstructure of a Metal on Change in the Plastic Deformation Sign.

Editor: V.O. Final Determinations of Simple Shear.

Editor: I.B. and G.S. Polozov. Study of the Heat Resistance of Platinum-Alloy Voids (Kerfing, Platinum, Chromium, and Alloys), by the Indentation Method.

Editor: G.V. and V.O. Gromov. Fatigue Curve of the

ROGINSKIY, S. Z.; AL'TSHULER, O. V.; YANOVSKIY, M. I.; MALININA, Ye. I.;  
MOROKHOVETS, A. Ye.

Preparation of radioactive cesium concentrates by the use of  
ion exchange glauconite columns. Radiokhimiya 2 no. 4:431-437  
'60. (MIRA 13:9)

(Cesium--Isotopes) (Glauconite)

ROGINSKIY, S.Z.; MALININA, Ye.V.; YANOVSKIY, M.I.; AL'TSHULER, O.V.;  
MOROKHOVETS, A.Ye.

Preparation of concentrates of radioactive cesium isotopes on  
heavy metal ferrocyanides precipitated from solutions with a  
high content of extraneous salts. Radiokhimiya 2 no.4:438-445  
'60. (MIRA 13:9)

(Cesium—Isotopes)

(Ferrocyanides)

AL'TSHULER, O.V.; VINOGRADOVA, O.M.; ROGINSKIY, S.Z.; YANOVSKIY, M.I.

Production of high purity hydrocarbons by means of heat displacing chromatography. Dokl. AN SSSR 140 no.6:1307-1309 0 '61. (MIRA 14:11)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR (for Roginskiy).

(Hydrocarbons)

S/828/62/000/000/008/017  
E039/E420

AUTHORS: Subbotina, Ye.A., Chizhikov, D.M., Al'tshuler, O.V.  
TITLE: The separation of the chlorides of titanium, niobium  
and tantalum by the ion exchange method  
SOURCE: Razdeleniye blizkikh po svoystvam redkikh metallov.  
Mezhvuz. konfer. po metodam razdel. blizkikh po svoyst.  
red. metallov. Moscow, Metallurgizdat, 1962, 98-106

TEXT: Continuing previous work on this subject a scheme for the separation of Nb and Ta in their complex ions is developed using anion exchange resins ЭДЭ-10 (EDE-10) and АН-2Ф (AN-2F). Nb and Ti are separated by dissolving their chlorides in concentrated HCl solution and passing through a column filled with anion exchange resin on which both metals are adsorbed. The column is then washed with 6 to 8 N HCl which removes nearly all the Ti. After further washing with 2 to 3 N HCl all the Ti is removed and about 60% of the Nb remains on the resin. This is removed by washing in dilute HCl containing 3 to 5 g/litre of Na. The Nb<sub>2</sub>O<sub>5</sub> precipitated from the final fraction contains < 0.1% Ti. A method is proposed for separating Nb and Ti and other elements  
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The separation of the chlorides ...

S/828/62/000/000/008/017  
E039/E420

from Ta, again based on the formation of complex anions in HCl solution and makes use of the different adsorption mechanism of the impurities on the resin compared with Ta. All the impurities form well adsorbed complex anions (Nb, Ti, Fe etc) and are completely adsorbed in the column while the Ta passes through. Ta with no Ti and Nb < 0.01% can be obtained in this way. The existence of cations, anions and neutral complexes of Ti, Nb and Ta is determined but their composition is not known. In a 0.4 to 12 N HCl solution there are not less than three forms of Ti (cation, anionic complex and neutral complex); not less than two forms of Nb (anionic complex and neutral complex) and not less than three forms of Ta (cation, anionic complex and undissociated molecules). The coefficient of self diffusion of Nb and Ta in HCl solution is determined and the equilibria and kinetics of cation and anion adsorption is studied. There are 8 figures.

Card 2/2

AL'TSHULER, O.V.; VINOGRADOVA, O.M.; ROGINSKIY, S.Z.; CHIRKOV, Yu.N.

Possibility of chromatographic separation in gas-liquid columns  
without the use of an inert gas carrier. Dokl. AN SSSR 152  
no.4:892-895 0 '63. (MIRA 16:11)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent  
AN SSSR (for Roginskiy).

05067-05

**TITLE:** New variants of the chromatographic preparation of gases and vapors of high purity

**SOURCE:** AN SSSR. Izvestiya. Seriya khimicheskaya, no. 2, 1965, 214-221

**TOPIC TAGS:** gas chromatography, gas purification, thermal displacement chromatography, radiochromatography, preparative chromatography

are presented. The method consists essentially of combining the chromatographic separation and chemical reaction in a single process.

cases and vapors. The potential of isotopic chromatography (radiochromatography)

Card 2/2 *so*

"A Comparison of the Effects of Hydrosoluble Theophylline Preparations (Euphyllin, Diprophyllin and Hydroxyethyltheophylline on the Smooth Musculature of Bronchi and Blood Vessels."

report presented at the 147th meeting of the Pharmacology and Toxicology Section of the Moscow Society of Physiologists, Biochemists and Pharmacologists, 22 Apr. 1958.

All-Union Institute for Research in Pharmaceutical Chemistry

(Farmakologiya i Toksikologiya, 21, no 6, Nov-Dec 58, p. 618)

MASHKOVSKIY, M.D., AL'TSHULER, R.A.

Promeran, a new diuretic. Med.prom. 12 no.12:44-46 D'58  
(MIRA 11:12)

1. Leningradskiy mediko-instrumental'nyy ordena Lenina zavod  
"Krasnogvardeyets."  
(UREA)  
(DIURETICS AND DIURESIS)

AL'TSHULNR, R.A.

Allacyl, a diuretic. Med.prom. 14 no.6:50-51 Ja '60.

(MIRA 13:6)

1. Vsesoyuznyy nauchno-issledovatel'skiy khimiko-farmatsevticheskiy institut imeni S. Ordzhonikidze.

(URACIL)

AL'TSHULER, R.A.

Pharmacology of 7-(oxy-alkyl)-substituted theophylline. Farm.i  
toks. 23 no.1:29-37 Ja-F '60. (MIRA 14:3)

1. Otdel farmakologii (zav. - prof. M.D.Mashkovskiy) Vsesoyuznogo  
nauchno-issledovatel'skogo khimiko-farmatsevticheskogo instituta  
imeni S.Ordzhonikidze.

(THEOPHYLLINE)



AL'TSHULER, R.A.

Flourinated hydrocarbons as substances for inhalation anesthesia.  
Med.prom. 15 no.5:37-38 My '61. (MIRA 14:6)

1. Vsesoyuznyy nauchno-issledovatel'skiy khimiko-farmatsevticheskiy  
institut imeni S.Ordzhonikidze.  
(HYDROCARBONS) (ANESTHESIA)

AL'TSHULER, R.A.

Etaphen. Med. prom. 15 no.9:44-45 S '61.

(MIRA 14:9)

1. Vsesoyuznyy nauchno-issledovatel'skiy khimiko-farmatsevtichskiy  
institut imeni S.Ordzhonikidze.

(ETHANE)

(CARDIOVASCULAR AGENTS)

AL'TSHULER, R.A.

Diprophylline, a water-soluble analog of theophylline. Med.prom.  
16 no.7:57-58 J1 '62. (MIRA 15:9)

1. Vsesoyuznyy nauchno-issledovatel'skiy khimiko-farmatsevticheskiy  
institut imeni Ordzhonikidze.  
(THEOPHYLLINE)

AL'TSHULER, R.A.

Pharmacological properties of fluothane (1,1,1-trifluoro-2-chloro-2-bromo ethane), a substance for inhalation anosthesia.  
Farm. i toks. 25 no.2:143-151 Mr-Ap '62. (MIRA 15:6)

1. Laboratoriya farmakologii (zav. - chlen-korrespondent ANU SSSR prof. M.D. Mashkovskiy) Vsesoyuznogo nauchno-issledovatel'skogo khimiko-farmatsevticheskogo instituta imeni S.Ordzhonikidze.  
(ETHANE) (ANESTHETICS)

MASHKOVSKIY, M.D.; AL'TSHULER, R.A.

Pharmacological properties of galanthamine iodomethylate.  
Farm. i toks. 25 nq.2:168-175 Mr-Ap '62. (MIRA 15:6)

1. Laboratoriya farmakologii (zav. - prof. M.D. Mashkovskiy)  
Vsesoyuznogo nauchno-issledovatel'skogo khimiko-farmatsevticheskogo  
instituta imeni S.Ordzhonikidze.  
(GALANTHAMINE)

AL'TSHULER, R.A.

Effect of fluothane anesthesia on the action of curarelike,  
ganglionic blocking and adrenominetic preparations. Farm. i  
toka. 25 no.6:662-667 N-D '62. (MIRA 17:8)

1. Laboratoriya farmakologii (zav. - chlen-korrespondent AMN  
SSSR prof. M.P. Mashkovskiy) Vsesoyuznogo nauchno-issledovatel'-  
skogo khimiko-farmatsevticheskogo Instituta imeni Ordzhonikidze.

AL'TSHULER R. H., EL'NIK V. I.

Protsessy zashivlenia pri nekotorykh formakh legochnogo tuberkuleza pod vlianiem iskusstvennogo pneumotoraksa. /Healing processes in certain forms of pulmonary tuberculosis following artificial pneumothorax/ Sovet. med. No. 6 June 51 p. 12-5.

1. Candidate Medical Sciences Al'tshuler; Candidate Medical Sciences Yol'nik. 2. Of the Institute of Tuberculosis of the Academy of Medical Sciences USSR (Director--Z. A. Lobedeva; Scientific Supervisor--Prof. A. Ye. Rabukhin).  
CML Vol. 20, No. 10 Oct 1951

AL'TSHULIR, Rakhil' Natanovna.

Academic degree of Doctor of Medical Sciences, based on her defense, 26 November 1954, in the Council of the Department of Clinical Medicine of the Academy of Medical Sciences, USSR, of her dissertation entitled: "Medicinal Pneumo-thorax in Patients with Limited Forms of Lung Tuberculosis."

Academic degree and/or title: Doctor of Sciences

SO: Decisions of VAK, List no. 12, 28 May 55, Byulleten' MVO SSSR, No. 15, Aug 56, Moscow, pp. 5-24, Uncl. JPRS/NY-537



AL'TSHULER, S.

4-4-22/22

SUBJECT: USSR/Astronavigation

AUTHOR: Al'tshuler, S.

TITLE: Butterflies and a Flying Bomb (Babochki i samolet - snaryad)

PERIODICAL: Znaniye - Sila, April 1957, #4, p 45 (USSR)

ABSTRACT: The author makes reference to an article in # 7 of this magazine of 1938, discussing the question why insects fly towards light and coming to the conclusion that the insects do it not because the light attracts them, but because they mistake the light for the far-off moon by which they are guided in their flight.

The author further compares the principle of the insects' flight with the flying of a pilotless aircraft or a flying bomb and states that the astronavigating system directing the airplane or flying bomb has two coupled short telescopes at its nose. One telescope is sensitive to light and must in any position of the bomb indicate to the other telescope - the leading one - the direction to the chosen star.

The selection of the star, time of flight and fixing the speed of the missile are done before the take-off so as to enable it to arrive at the assigned place and time.

Card 1/2

AL'TSHULER, S.

4-9-6/25

**AUTHORS:** Al'tshuler, S., and Radunskaya, I.  
**TITLE:** The Standard of Standards (Standart standartov)  
**PERIODICAL:** Znaniye - Sila, 1957, # 9, pp 15-17 (USSR)

**ABSTRACT:** In connection with the introduction of new standardization types in the USSR on 1 January 1957, the authors give a popular report on standardization deficiencies, in particular on the expenses arisen from standardization. The authors put the question whether it is possible to combine a maximum of standardization with a minimum of losses. They see the solution in forming mathematical series of preference numbers which might become the standard of standards.

All industrial branches used to stick to their traditional standards, but at present the method of preference numbers is going to replace them throughout the world.

There are 6 figures and 1 table.

**AVAILABLE:** Library of Congress  
Card 1/1

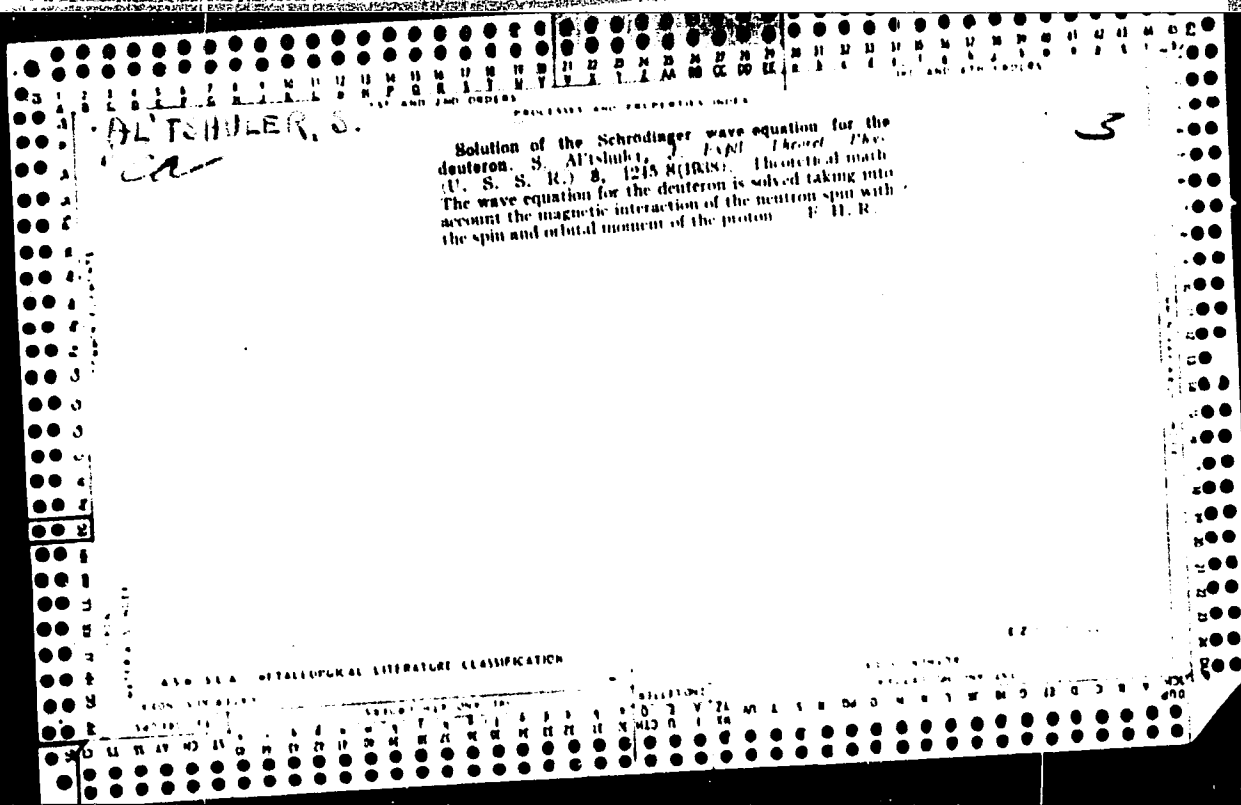


AL'TSHULER, S-A.

CA

The magnetic spin interaction between two particles  
S. A. Al'tshuler. *J. Exptl. Theoret. Phys. (U. S. S. R.)* 5,  
244 9(1955).<sup>22</sup> Math. theoretical. A solution of the non-  
relativistic wave equation for 2 particles attracted by both  
central forces and the magnetic interaction of the spins  
and of the expression for the angular wave function leads  
to the conclusion that when only magnetic forces act no  
stable states can exist. F. H. Rathmann

ASSOCIATED METALLURGICAL LITERATURE CLASSIFICATION



PROCESSING AND PROPERTIES INDEX

2

CA  
ALTSHULER, S.

A new method of investigating paramagnetic absorption. S. Altschuler, E. Zavalakh, and V. Koryrev. *J. Exptl. Theoret. Phys. (U.S.S.R.)* 16, 407-9 (1944).—The method is based on a very high sensitivity of the current in the generator circuit to the magnitude of absorption of high-frequency vibrations. The expts. were made at room temp. (301°K.) and at the temp. of liquid air (-81°K.). The following salts were used in the investigation:  $\text{NH}_4\text{NH}_2$ , alum, chrome alum, Al alum,  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ,  $\text{MnSO}_4$ ,  $\text{CoSO}_4 \cdot 7\text{H}_2\text{O}$ ,  $\text{NiSO}_4$ , and  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ . It was found that complete suppression of paramagnetic absorption for  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  occurs in fields of the order of 100 oersteds, and for  $\text{MnSO}_4$  in fields of the order of 1000 oersteds. The effect of complete suppression of absorption is inversely proportional to abs. temp. Galina M. Lebedeff

METALLURGICAL LITERATURE CLASSIFICATION

ABSTRACTS

INDEX DIVISION

EXPERIMENTAL DIVISION

ANALYTICAL DIVISION

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WELFARE

WORKERS UNION

Chem Abstracts

General and Physical Chemistry  
(2)

Theory of paramagnetic relaxation in perpendicular fields. S. A. Al'tshuler, B. K. Zavoiskii, and B. M. Kozirev (Kazan State Univ.). *Zhur. Eksp. Teor. Fiz.* 17, 1123-3 (1947).--Frenkel's (*ibid.* 15, 402(1945)) theory of magnetospin resonance, leading to the relation  $x''/x_0 = 2\nu_0^2\nu''/[(\nu_0^2 - \nu'')^2 + 4\nu_0^2\nu''^2]$  between the coeff.  $x''$  of paramagnetic absorption, the static susceptibility  $x_0$ , the frequency  $\nu_0$  of the Larmor precession of the spin in a const. field  $H$ , and the frequency  $\nu''$  of the weak alternating magnetic field perpendicular to  $H$ , is in conflict with results of Z. (C.A. 40, 6908) and of Shil'kov (C.A. 44, 3756) who have established, for the position of the max. of  $x''(H)$ , the condition  $H_0 = g\mu_B H / (g - \text{Landé factor, } \nu_0 = \text{Bohr magnetons, } H'' = H \text{ at the max.}),$  the constancy of the half-width of  $x''$ , and the "zero absorption" (i.e. a finite  $x''$  at  $H \rightarrow 0$ ) at  $\nu < 10^9$ . This conflict can be resolved by taking into account the effect of the interaction between the magnetic ions on the resonance curve. As a result of such interactions, the internal fields will broaden the resonance curve symmetrically on both sides, so that the position of the max. will remain unaffected, whereas the width will be detd. by the external field  $H_0$ . Semimacroscopic calcn. leads to the expression  $x''/x_0 = (\sqrt{S/2})(\nu_0/\nu'')e^{-(\nu_0 - \nu)'/\nu_0} + e^{-(\nu_0 + \nu)'/\nu_0}$ , with  $\nu_0 = g\mu_B H / h$ , valid for  $(\nu_0 - \nu) \ll \nu_0$ , whereas Frenkel's formula remains in force for  $(\nu_0 - \nu) \gg \nu_0$ . The values of  $H_0$ , calcd. by the authors' formula for  $\text{Cr}^{3+}$ ,  $\text{Mn}^{2+}$ , and  $\text{Cu}^{2+}$ , are in agreement with Van Vleck's formula (C.A. 31, 4850)  $H_0 = a\mu_B \sqrt{S(S+1)}/N$  (where  $S = \text{resulting spin, } N = \text{no. of magnetic ions per cc.})$  with  $a \approx 1$ .  $N$ . Then

1951

AL'TSHULER, S. A., KOZYREV, B. M. and TYABLIKOV, S. V.

"K. Horter, "Paramagnetic Relaxation", Moscow Foreign Literature Publishing House, 1949.



PA 169T108

AL'TSHULER, S. A.

USSR/Physics - Magnetism, Para- Nov 50

"Relation Between Paramagnetic Absorption and Susceptibility," S. A. Al'tshuler, Kazan State U

"Zhur Eksp. i Teoret Fiz" Vol XX, No 11, pp 1047-1050

Establishes general integral relations between high-frequency susceptibility  $\chi_1 X'$  and coefficient of absorption  $\chi_1 X''$  for the case where curves describing paramagnetic dispersion and absorption express dependence of  $X'$  and  $X''$

169T108

USSR/Physics - Magnetism, Para- (Contd) Nov 50

upon magnitude of applied static field H. These relations permit one, knowing  $X'$  (H), to find  $X''$  (H) and vice versa; they can also be useful for calibrating experimental curves of dispersion and absorption. Relations are verified with experimental curves obtained from various authors for certain frequencies. Submitted 3 Apr 50.

169T108

CA

2

Paramagnetic resonance absorption in crystalline powders of some rare earth compounds. S. A. Alifanov, V. Ya. Kurnev, and S. G. Salikhov. *Doklady Akad. Nauk S.S.S.R.* 70, 201-4 (1950); cf. preceding abstr.—The energy,  $Q$ , absorbed as a function of a const. magnetic field  $H$ , 200–3000 oersteds, superposed perpendicularly on a weak magnetic field oscillating at  $\nu_1 = 6.75 \times 10^8$  hertz, was detd. by the method of reaction on the generator. Curves with a max. were found with  $\text{Pr}_2(\text{SO}_4)_3 \cdot 8\text{H}_2\text{O}$ ,  $\text{Pr}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$ , and anhyd.  $\text{Pr}_2(\text{SO}_4)_3$ . For the 1st 2 salts, the position of the max. is the same,  $H = 1900$ ; dehydration shifts it to 700 oersteds. This confirms that the cubic symmetry of the cryst. elec. field in the hydrated sulfate and nitrate is due to  $\text{H}_2\text{O}$  molcs., and that dehydration lowers the symmetry of that field. Likewise, the curves of  $\text{Nd}_2(\text{SO}_4)_3 \cdot 8\text{H}_2\text{O}$  and  $\text{Nd}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$  nearly coincide; however, the position of the common single max., 700 oersteds, cannot very well be taken to indicate cubic symmetry of the cryst. elec. field, as a calcn. of the

transition probabilities between sublevels of  $\text{Nd}^{3+}$  in a cubic field predicts a series of lines of almost equal intensities. The same difficulty obtains with  $\text{Er}(\text{NO}_3)_3 \cdot 5\text{H}_2\text{O}$ , max. at  $H = 600$ .  $\text{Ce}(\text{CO})_3 \cdot 5\text{H}_2\text{O}$  has a max. at  $H = 700$ , as against  $H = 1650$  calcd. for the main max. for cubic symmetry; however, if a rhombic field is assumed to be superposed on the main cubic field, that line cannot appear except at very high  $H$ , and only the actually observed max. can be expected in the given range of  $H$ . The curve of  $\text{Sm}_2\text{O}_3$  has a max. at  $H = 1400$ , the theoretical interpretation of which is not clear. At  $\nu_1 = 2.38 \times 10^8$  hertz, the curves retain the same shape, only the maxima are shifted  $\nu_1/\nu_2$  times to lower  $H$ . N. Thon  $\gamma$ - $\text{Fe}_2\text{O}_3$  and high frequency. Friedrich Wagenknecht (Tech. Hochschule, Prag). *Naturwissenschaften* 36, 57 (1949).—Owing to its high elec. resistance ( $10^9$  ohm cm.) and its semiconductor properties  $\gamma$ - $\text{Fe}_2\text{O}_3$ , regular or spinel type, retains its ferromagnetism in a high-frequency a.c. field. From a limiting frequency (500 to 1000 kilohertz) on, the real permeability and the magnetic-loss angle begin to change. Frequencies up to 3331 kilohertz were used. The preps. of highest permeability were obtained from magnetites by the Haber and Kaufmann method (*Z. Elektrochem.* 7, 733 (1900)). Other means of prepn. gave lower permeability products.

B. J. C. van der Hoeven

CA

2

Effect of the nuclear spin on the resonance paramagnetic absorption in solutions of salts of manganese and copper.  
S. A. Al'tshuler, B. M. Koz'rev, and S. O. Salikhov

(Kazan Branch Acad. Sci. U.S.S.R.). *Doklady Akad. Nauk S.S.S.R.*, 71, 866-7 (1950).—Determ. of the magnetic field strength  $H_0$  at which paramagnetic relaxation losses in a weak magnetic field of frequency  $\nu$  superposed perpendicularly to the const. magnetic field  $H_0$ , are max., gives the Landé factor  $g$  from the relation  $\nu = g\mu H_0/h$ . An effect of the nuclear spin on the absorption curve could be expected under conditions where the coupling between the electron and the nuclear spin would not be completely broken by the external and internal magnetic fields. For the paramagnetic ions  $Mn^{++}$  and  $Cu^{++}$  in soln., such conditions arise at moderate  $H_0$  at relatively low  $\nu$  of the order of  $10^9$  hertz. At low concns., the conditions corresponding to the Zeeman effect in weak fields may be fulfilled, with the max. corresponding to the  $g$ -factor of the resulting spin of the nucleus and the electron envelope. Expts. with  $MnCl_2$  in aq. soln. at  $\nu = 2 \times 10^9$  gave, at concns. over 1  $M$ , one max. corresponding to  $g \approx 2$ ; at a concn. of 0.5  $M$ , there is one max., but corresponding to  $g \approx 1$ , as expected from the nuclear spin  $I = 5/2$  and the electronic spin  $J = 5/2$ . In the case of  $Cu^{++}$ , with  $I = 3/2$  and  $J = 1/2$ , the conditions of the Zeeman effect in medium fields are fulfilled, and the absorption curve (at  $\nu = 0.686 \times 10^9$ , concn. of  $Cu(NO_3)_2$ , 1.8  $M$ ) shows several weak max. N. Thon

Altshuler, S. A.

1 Jun 52

USSR/Physics - Magnetism

"Paramagnetic Resonant Absorption in Metals," S. A. Altshuler, V. Ye. Kurenev, S. G. Salikhov, Phys-Tech Inst, Kazan Affiliate, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol 84, No 4, pp 677-679

Paramagnetic resonant absorption was discovered by Ye. K. Zavoyskiy (Doctor's Dissertation 1944) in paramagnetic salts and in some metals. Author studies paramagnetic resonance in 21 various metals and tabulates the results. He found that the width of absorption curves of metals is of the same order as that of salts.  
Received 27 Feb 52

232T98

AL'TSHULER S. A.

238T97

USSR/Physics - Sound Absorption  
Paramagnetics

21 Aug 52

"Resonance Absorption of Sound in Paramagnetics,"  
S. A. Al'tshuler, 'Kazan' State U

"DAN SSSR" Vol 85, No 6, pp 1235-8

Mentions the problem of the possibility of experimentally investigating nuclear magnetic resonance with the aid of sonic oscillations. Concludes, however, that the possibility of observing nuclear effects is of small probability, since the nuclear effect is at least  $(m/b)^2$  times smaller than the electron effect. Submitted by Acad L. D. Landau 18 Jun 52.

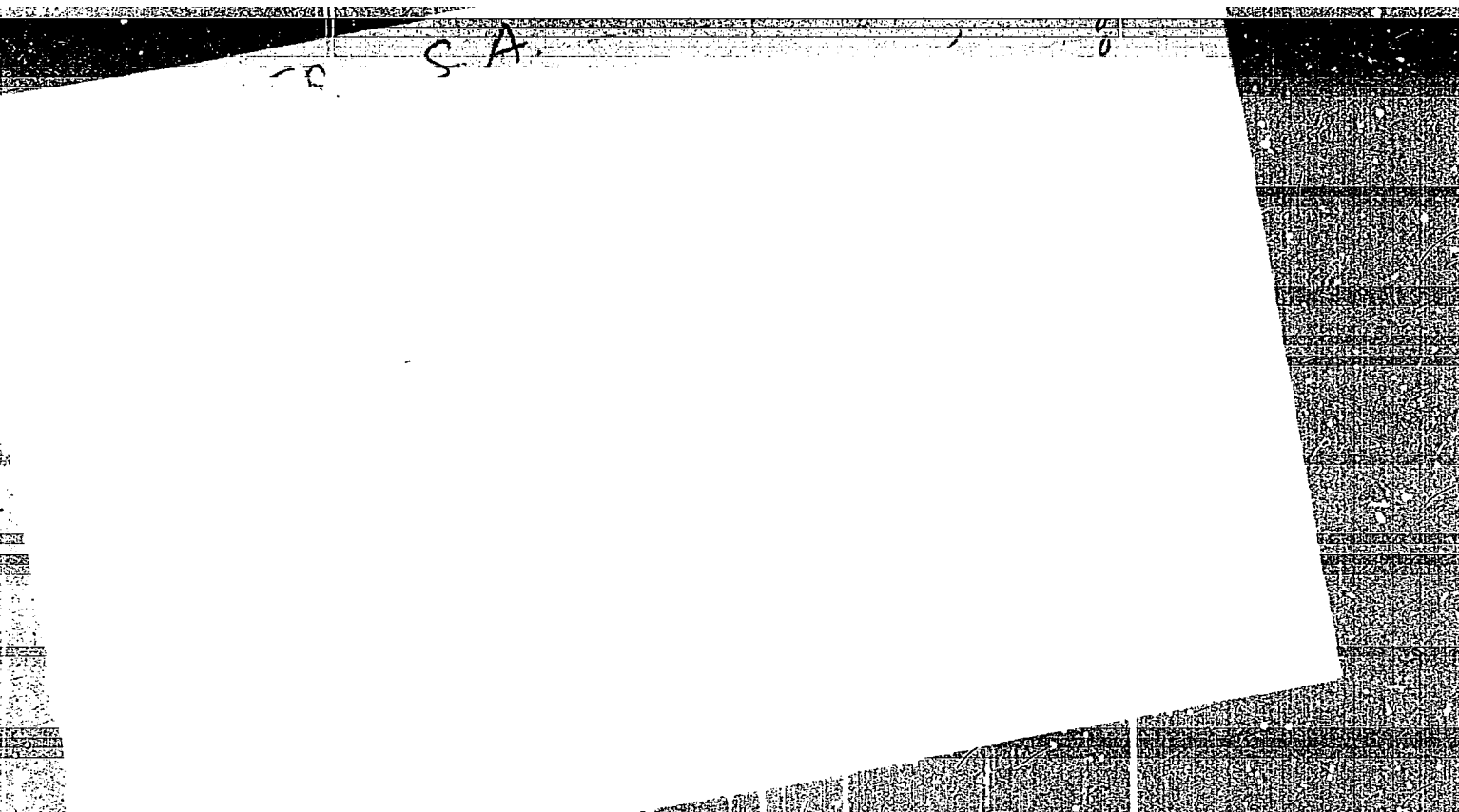
238T97

"APPROVED FOR RELEASE: 03/20/2001

CIA-RDP86-00513R000101210009-7

APPROVED FOR RELEASE: 03/20/2001

CIA-RDP86-00513R000101210009-7"



8878  
PERIODS OF PARAMAGNETIC LATTICE RELAXATION  
FOR THE HYDRATED SALTS OF RARE-EARTH ELE-  
MENTS. L.A. Akhmedov, Zhur. Khimii i Teor. Fiz. 24,  
No. 8, 897-901 (1968; in Russian).

It is calculated that the periods involved are of the order of  $10^{-10}$  to  $10^{-12}$  sec at room temperature, which agrees with experimental results. These periods are, in general, much shorter than those for the salts of the elements of the iron group. Several conclusions are drawn from the result that,

at room temperature, the period of lattice relaxation is shorter than that of spin relaxation. (Science Abstracts)

3-1-55  
R.M.L.



AL'TSHULER, S. A.

1287. Teoriya nekotorykh yavleniy paramagnitnogo rezonansa. M., 1954. 16s.  
22sm. )Akad. nauk SSSR. Fl2. in-t. in. P. N. lebedeva). 135 ekz. Bespl.--Bibliogr.  
v knotse knigi (10 Nazu.)--54-52150/.

SO: Knizhnaya Letopis, Vol. 1, 1955

USSR .

also discussed.

AL'TSHULER, Semen Aleksandrovich

(Kazan' State U imeni Ul'yancv-Lenin) - Academic degree of Doctor of Physical and Mathematical Sciences, based on his defense, 21 February 1955, in the Council of the Physics Inst imeni Lebedev of the Acad Sci USSR, of his dissertation entitled: "The Theory of Certain Phenomena of Paramagnetic Resonance."

Academic degree and/or title: Doctor of Sciences

SO: Decisions of VAK, List no. 27, 24 Dec 55, Byulleten' MVO SSSR, Uncl. JPRS/NY 548

AL'TSHULER, S. A.

"The Theory of Some Phenomena of Paramagnetic Resonance." Dr Phys-Math  
Sci, Physics Inst imeni Lebedev, Acad Sci USSR, Moscow, 1954. (KL, No 1, Jan 55)

Survey of Scientific and Technical Dissertations Defended at USSR Higher  
Educational Institutions (12)  
SO: Sum. No. 55b, 24 Jun 55

AL'TSHULER, S. A.  
USSR/Physics - Ultrasonics

FD-1866

Card 1/1      Pub. 146-6/21

Author      : Al'tshuler, S. A.

Title      : Resonance absorption of ultrasound in paramagnetic salts

Periodical : Zhur. eksp. i teor. fiz, 28, 38-48, January 1955

Abstract   : The author gives the theory of resonance absorption of ultrasound in various paramagnetic salts on the assumption that spin-lattice interaction is effected by means of modulation of the internal electric field of the crystal by elastic oscillations of the lattice. He calculates the coefficient of absorption of sound  $\sigma$  in salts of the elements of the iron group (titanium-cesium and chromium alum), in salts of the rare-earth elements (cerium nitrate, praseodymium ethyl sulfate), in salts whose magnetic ions are in the S-state (iron alum). In some cases the coefficient  $\sigma$  is so considerable that the effect of paramagnetic absorption of sound is easily observable. Twelve references, including two USSR; N. S. Garif'yanov, DAN SSSR, 84, 923, 1952; Ye. K. Zavoy'skiy, Sov. Phys., 10, 197, 1946.

Institution: Kazan State University

Submitted : March 1, 1954

AL'TSHULER, S.A.

USSR/Physics - Nuclear resonance

FD-1887

Card 1/1 Pub. 146-7/21

Author : Al'tshuler, S. A.

Title : Theory of electron and nuclear paramagnetic resonance under the influence of ultrasound

Periodical : Zhur. eksp. i teor. fiz. 28, 49-60, January 1955

Abstract : The author gives a theory of resonance absorption of ultrasound in various classes of paramagnetics (salts, rare-earth metals, salt solutions, gases, substance possessing nuclear paramagnetism). He considers various mechanisms governing the spin-lattice interaction which are able to cause the observed effect. The values of the calculated coefficients of absorption indicate that in a number of substances the effect can easily be observed; in other cases it is possible to utilize indirect methods of investigation. Fifteen references, two USSR: G. Ya. Glebashev, Dissertation, Kazan State University, 1954; Ye. K. Zavoykiy, ZhETF, 17, 155, 1947.

Institution: Kazan State University

Submitted : March 1, 1954

λ  
AL'TSHULER, S.A. (Kazan')

Study of paramagnetic resonance at Kazan University. Uch.zap.Kaz.  
un. 115 no.10:20 '55. (MLRA 10:5)  
(Nuclear magnetic resonance)

ALTSHULER, S. A., AVAKUMOV, V. I., and SHEKUN, L. G., (Kazan)

"Resonance Paramagnetic Absorption of Ultrasound in Some Salts of Rare-Earth and Iron groups of Elements," a paper submitted at the International Conference on Physics of Magnetic Phenomena, Sverdlovsk, 23-31 May 56.



"APPROVED FOR RELEASE: 03/20/2001

CIA-RDP86-00513R000101210009-7

APPROVED FOR RELEASE: 03/20/2001

CIA-RDP86-00513R000101210009-7"

AL'TSHULER, S.A.

AUTHORS: Savoykiy, E.K., Al'tshuler, S.A. and Kozyrev, B.M.

TITLE: Paramagnetic Resonance (Paramagnitnyy rezonans)

PERIODICAL: Izvestiya Akademii Nauk, Vol. XX, #11, pp 1199-1206  
1956, USSR, Seriya fizicheskaya

ABSTRACT: The authors describe the history of discovery of paramagnetic resonance and the subsequent progress of its study in the USSR. The phenomenon of paramagnetic resonance was discovered by Zavoykiy (1) in 1944. The experimental and theoretical study of this phenomenon has been developed along three main directions:

- a. Determination of paramagnetic resonance spectra in various substances, in which connection Zavoykiy (15) discovered the existence of weak lines corresponding to  $\Delta M > 1$  transitions, where M is the magnetic quantum number of the electronic spin. The hyperfine structure of paramagnetic resonance lines has been extensively investigated by many scientists.

Card 1/4

1/3

TITLE: Paramagnetic Resonance (Paramagnitnyy rezonans)

c. Determination of the magnitude of spin-lattice interaction:

Shaposhnikov (53) advanced a general thermodynamical theory, including spin-spin relaxation. His formulae were excellently confirmed by experiments. Al'tshuler (57) generalized on Waller's theory of spin-lattice relaxation in the case of arbitrary spin. Neprimerov (61) measured the rotation of the polarization plane of cm waves under the effect of a constant magnetic field. His results showed that there exists a close connection between the Faraday phenomenon in paramagnetics and the dispersion of susceptibility in the resonance region. Al'tshuler (62) developed a theory of resonance absorption of ultra-sound in paramagnetics. Al'tshuler's computations showed that both electronic and nuclear acoustic paramagnetic resonances can in some cases be observed experimentally.

Card 3/4

3/3

AUTHOR : Al'tshuler, S.A.

TITLE : On the Theory of Paramagnetic Spin-Lattice Relaxation  
(K teorii paramagnitnoy spin-reshetochnoy relaksatsii)

PERIODICAL : Izvestiya Akademii Nauk, V. XX, # 11, 1207-1214,  
Nov 1956 (USSR), Seriya fizicheskaya

ABSTRACT : The author reconsiders Waller's theory of spin-lattice relaxation in the case of atoms with large magnetic moments and in high density of particles with magnetic moments and generalizes upon this theory.

It is shown in chapter 2, that paramagnetic lattice relaxation in a number of substances is determined by magnetic interaction of atoms. The theoretical formula for the relaxation time of non-diluted salt gives the value  $\tau \approx 10^{-5}$ , whereas experiments indicate the value  $\tau \approx 10^{-7}$ . The author holds the agreement as satisfactory.

Chapter 3 deals with relaxation caused by exchange forces. In substances with a high density of magnetic ions, exchange forces essentially alter the statical susceptibility and width of paramagnetic resonance lines. A detailed

Card 1/3

**TITLE** : On the Theory of Paramagnetic Spin-Lattice Relaxation  
(K teorii paramagnitnoy spin-reshetochnoy relaksatsii)  
fine splitting of energetic levels exceeds the splittings  
caused by the crystal field. In these cases, the hyper-  
fine structure of energetic levels may have an essential  
effect on the time of spin-lattice relaxation.  
There are 13 references, of which 5 are Slavic (Russian)

**INSTITUTION:** State University imeni V.I. Ul'yanov-Lenin in Kazan'.

**PRESENTED BY:**

**SUBMITTED** : No date.

**AVAILABLE** : At the Library of Congress

Card 3/3

NEPRIMKROV, N.N.; SHARAGIN, A.G.; NUZHIN, M.T., prof., otv. red.; MARKOV, M.T., prof., zamestitel' otv. red.; KASHTANOV, S.G., prof., red.; ARBUZOV, B.A., akademik, red.; AL'TSHULER, S.A., prof., red.; LIVANOV, N.A., prof., red.; NORDEN, A.P., prof., red.; PISAREV, V.I., prof., red.; TIKHVINSKAYA, Ye.I., prof., red.; BARYSHNIKOV, V.G., dots., red.; KOLESNIKOVA, Ye.A., dots., red.; KOLOBOV, N.V., dots., red.; MOROZOV, D.G., dots., red.; KHARITONOV, A.P., dots., red.; YUDIN, I.N., red.; SAMITOV, Yu.Yu., red.

[Investigations of wells and development of preventive paraffin control methods] Issledovanie skavazhiny i razrabotka preventivnykh metodov bor'by s-parafinom. Kazan' 1957. 108 p. (Kazan. Universitet. Uchenye zapiski, vol. 117, no.3). (MIRA 11:5)

1. Rektor Kazanskogo gosudarstvennogo universiteta (for Nuzhin).
  2. Prorektor po nauchnoy rabote Kazanskogo gosudarstvennogo universiteta (for Markov).
  3. Prorektor po uchebnoy rabote Kazanskogo gosudarstvennogo universiteta (for Kashtanov).
  4. Sekretar' partkoma Kazanskogo gosudarstvennogo universiteta (for Yudin).
- (Oil wells) (Petroleum engineering)

AL 15110-1-1, 011  
24(7)

p. 3 PHASE I BOOK EXPLOITATION SOV/1365

L'vov. Universytet

Materialy X Vsesoyuznogo soveshchaniya po spektroskopii. t. 1:  
Molekulyarnaya spektroskopiya (Papers of the 10th All-Union  
Conference on Spectroscopy. Vol. 1: Molecular Spectroscopy)  
[L'vov] Izd-vo L'vovskogo univ-ta, 1957. 499 p. 4,000 copies  
printed. (Series: Its: Fizychnyy zbirnyk, vyp. 3/8/)

Additional Sponsoring Agency: Akademiya nauk SSSR. Komissiya po  
spektroskopii. Ed.: Gazer, S.L.; Tech. Ed.: Saranyuk, T.V.;  
Editorial Board: Landsberg, G.S., Academician (Resp. Ed., Deceased),  
Neporent, B.S., Doctor of Physical and Mathematical Sciences,  
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Fabrikant, V.A., Doctor of Physical and Mathematical Sciences,  
Kornitskiy, V.G., Candidate of Technical Sciences, Rayskiy, S.M.,  
Candidate of Physical and Mathematical Sciences, Klimovski, L.K.,  
Candidate of Physical and Mathematical Sciences, Miliyanchuk, V.S.,  
Candidate of Physical and Mathematical Sciences, and Glauberman,  
A. Ye., Candidate of Physical and Mathematical Sciences.

Card ~~1/30~~

1/3

Papers of the 10th All-Union (Cont.) Sov/1365

**PURPOSE:** This collection of articles is intended for scientists working in the field of spectroscopy and for engineers and laboratory analysts who use spectroscopic methods in their work.

**COVERAGE:** This collection of articles is concerned with theoretical, experimental, and technical problems in molecular spectroscopy. The application of molecular spectroscopy to various fields of theoretical research is described in articles covering chemical structure, kinetics, catalysis, theory of the chemical bonding, properties of crystals, effect of radiation on substance, etc. Good coverage is also given to the use of spectroscopy in organic and inorganic technology including the study of petrochemicals, polymers, glass, phosphate, boron compounds, etc. Each article is followed by references. The text includes tables and figures.

Card ~~2/30~~

2/3



48-6-12/23

SUBJECT: USSR/Physics of Magnetic Phenomena  
 AUTHORS: Al'tshuler, S.A., Zaripov, M.M. and Shekun, L.Ya.  
 TITLE: Resonance Paramagnetic Absorption of Ultrasound in Some Salts  
 of Rare Earth Elements (Rezonansnoye paramagnitnoye pogloshchen-  
 iye ul'trazvuka v nekotorykh solyakh redkozemel'nykh elementov)  
 PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1957, Vol 21,  
 # 6, pp 844-848 (USSR)  
 ABSTRACT: The magnitude of the acoustic paramagnetic resonance effect can  
 be estimated by the formula:

$$\sigma = \frac{4\pi^2 N \gamma^2}{\rho v^3 K T} (F_{\alpha\beta})^2$$

where  $\rho$  - is the density of a paramagnetic materials,

$T$  - is its temperature,

$v$  - is the velocity of sound propagation in it,

$N$  - is the number of magnetic particles in the unit of  
 volume,

$\gamma_{\frac{1}{2}}$  - is the half-width of an absorption line,

$\gamma$  - is the ultrasonic frequency,

$F_{\alpha\beta}$  - is the matrix element of an operator calculated by

Card 1/3

48-6-12/23

TITLE:

Resonance Paramagnetic Absorption of Ultrasound in Some Salts  
of Rare Earth Elements (Rezonansnoye paramagnitnoye pogloshchen-  
iye ul'trazvuka v nekotorykh solyakh redkozemel'nykh elementov)

the formula

$$F_{\alpha\beta} = \sum r^2 \left( \frac{\partial U}{\partial x} \right)_{\alpha\beta}$$

where U - is the interaction energy with a neighboring partic-  
le of the magnetic atom under consideration  
r - is the separation between the given particles, and  
x - is the r-projection on the direction of sound propa-  
gation.

Ultrasonic absorption coefficients for longitudinal waves were  
calculated by the above formulae for  $\text{Pr}^{3+}$ ,  $\text{Eu}^{3+}$ ,  $\text{Tb}^{3+}$ ,  $\text{Ho}^{3+}$  and  
 $\text{Tm}^{3+}$ , and it was established that the maximum absorption must  
occur in europium in an excited state.

The phenomenon of paramagnetic resonance absorption, caused by  
transitions between sub-levels of hyperfine structure, will be  
intermediate in its magnitude between the phenomena of electro-  
nic and nuclear paramagnetic resonance.

Frequencies of the order of  $10^7$  cycles can be used for the ex-  
perimental discovery of the absorption effect, if ultrasound is

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48-6-12/23

TITLE: Resonance Paramagnetic Absorption of Ultrasound in Some Salts of Rare Earth Elements (Rezonansnoye paramagnitnoye pogloshcheniye ul'trazvuka v nekotorykh solyakh redkozemel'nykh elementov) absorbed due to transitions between hyperfine structure components.

The article contains 3 figures, and 1 table. There are 7 references, 4 of which are Russian.

ASSOCIATION: Kazan' State University imeni Ul'yanov-Lenin

PRESENTED BY:

SUBMITTED: No date indicated.

AVAILABLE: At the Library of Congress.

Card 3/3

AL'TSHULER, S.A., professor.

Paramagnetic resonance. Priroda 46 no.2:14-24 P '57. (MIRA 10:3)

1. Kazanskiy gosudarstvennyy universitet im.V.I. Il'yanova(Lenina).  
(Nuclear magnetic resonance)

AL'TSHULER, S. A.

53-3-4/6

AUTHORS: Al'tshuler, S.A., Kozyrev, B.M.

TITLE: The Paramagnetic Resonance of Electrons (Elektronnyy paramagnitnyy rezonans)

PERIODICAL: Uspekhi Fiz. Nauk , 1957, Vol. 63, Nr 3, pp. 533 - 573 (USSR)

ABSTRACT: The following survey is arranged as follows: 1.) Introduction: Paramagnetic resonance and the history of its discovery, paramagnetic resonance as part of the theory of magnetism, paramagnetic resonance and spectroscopy, experimental methods. 2.) The spectra of ion crystals: The hydrated salts of the elements of the iron group, the superfine structure of the spectra of paramagnetic resonance, the salts of rare earths, covalent binding; the 3d-, 4d-, 5d-transition groups, the actinides, the experimental results concerning the spectra of ion crystals, the salts of the ions of the iron group (3d), the compounds of the elements of the palladium group (4d), and the platinum group (5d), the compounds of the group of rare earths (4f), the compound of the ions of the actinide group. 3.) The shape of the lines of paramagnetic resonance in ion crystals: Spin-spin interaction, spin-lattice interaction. 4.) Electrolyte solutions. 5.) The free radicals.

Card 1/2

24(5)

AUTHORS:

Al'tshuler, S. A., Valiyev, K. A.

SOV/56-35-4-17/52

TITLE:

On the Theory of Longitudinal Relaxation in Liquid Solutions of Paramagnetic Salts (K teorii prodol'noy relaksatsii v zhidkikh rastvorakh paramagnitnykh soley)

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 4, pp 947 - 958 (USSR)

ABSTRACT:

In their introduction the authors discuss the papers already published and dealing with the theory of longitudinal (spin-lattice) relaxation in paramagnetic salt solutions; in the USSR B.M.Kozyrev (Ref 4) is occupied with this problem. The present paper deals with theoretical investigations in salt solutions of elements of the groups of iron and rare earths. Calculations are based on the assumption that, like in the case of ion crystals, the liquid solution contains paramagnetic complexes. The normal vibrations of these complexes are disturbed by the Brown (Broun) motion; this causes variation of the

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On the Theory of Longitudinal Relaxation in Liquid  
Solutions of Paramagnetic Salts

SOV/56-35-4-17/52

electric field in which the paramagnetic ions occur. This variation, in turn, influences the spin-orbital interaction of the electrons of the paramagnetic ion, and may lead to a re-orientation of its magnetic moment, causing relaxation transitions between various steady states. It is shown that, if the interval between the low Stark (Shtark) ion sublevels is  $\delta \approx 2kT$ , there exist two relaxation times, which are caused by 1) transitions between various Stark (orbit)-levels without changing the direction of spin, and 2) transitions within a Stark level with changed spin orientation. The breadth of the paramagnetic resonance line is due to transitions of the first type. Theoretical results are in good agreement with experimental data concerning copper-, chromium-, and manganese salt solutions. In conclusion, the authors thank B.M.Kozyrev for discussing results. There are 5 figures and 21 references, 11 of which are Soviet.

Card 2/3

On the Theory of Longitudinal Relaxation in Liquid  
Solutions of Paramagnetic Salts

SOV/56-35-4-17/56

ASSOCIATION: Kazanskiy gosudarstvennyy universitet (Kazan' State  
University) Kazanskiy pedagogicheskiy institut (Kazan'  
Pedagogical Institute)

SUBMITTED: March 18, 1958

Card 3/3



ALTSHULER, S. A.

RUMANIA / Physical Chemistry--Molecule.  
Chemical bond.

B-4

Abs Jour : Referat Zhur--Khimiya, No. 11, 1959, 37655

Author : Altsuler, S. A.; and Kozirev, B. M.

Inst : ~~Not given~~

Title : Electronic Paramagnetic Resonance

Orig Pub : An Rom-Sov Ser Mat-Fiz, 12, No. 3, 68-113  
(1958) (in Rumanian)

Abstract : See RZhKhim, 1958, 35051.

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10

AL'TSHULER, S.A., red.; KOZYREVA, B.M., red.; KARIMOVA, R.A., red.

[Paramagnetic resonance; papers delivered at the Conference  
on Paramagnetic Resonance] Paramagnitnyi rezonans; doklady.  
Kazan' Izd-vo Kazanskogo univ., 1960. 209 p.  
(MIRA 15:11)

1. Soveshchaniye po paramagnitnomu rezonansu, Kazan', 1959.  
(Paramagnetic resonance and relaxation)

AL'TSHULER, S.A.

Progress of physics at Kazan University after the Great October  
Socialist Revolution. Uch. zap. Kaz. un. 120 no.7:3-13 '60.  
(MIRA 14:9)

(Kazan University--Physics)

PHASE I BOOK EXPLOITATION

SOV/5774

Al'tshuler, Semen Aleksandrovich, and Boris Mikhaylovich Kozyrev

Elektronnyy paramagnitnyy rezonans (Electron Paramagnetic Resonance)  
Moscow, Fizmatgiz, 1961. 368 p. 10,000 copies printed.

Ed.: B. L. Livshits; Tech. Ed.: K. F. Brudno.

PURPOSE: This book is intended for senior students, aspirants, and scientific personnel in the fields of physics, radio engineering, chemistry, and biology.

COVERAGE: According to the annotation the book is the initial attempt to present a complete review of investigations in the field of electron paramagnetic resonance [EPR]. It is based on the literature published prior to 1959. The phenomenon of EPR is said to have been discovered in 1944 by the Soviet physicist Ye. K. Zavoyskiy. The authors stress its importance and value as a method of physical investigation in solid-state physics,

Card ~~1/8~~

23117

S/181/61/003/005/022/042  
B136/B201

24,7900 (1163, 1395, 1482)

AUTHORS: Al'tshuler, S. A., Bashkirov, Sh., and Leushin, A. M.

TITLE: Theory of acoustic paramagnetic resonance in crystals containing ions of the iron group

PERIODICAL: Fizika tverdogo tela, v. 3, no. 5, 1961, 1501-1504

TEXT: The authors have calculated the coefficient of resonance absorption  $\sigma$  of ultrasonics in crystals; in which the paramagnetic ion of the iron group is surrounded by the octahedron of the nearest diamagnetic particles. If the spin Hamiltonian for the paramagnetic ions is known,  $\sigma$  may be calculated for transitions between spin levels and for an arbitrarily oriented magnetic field using methods of the paramagnetic spin-lattice relaxation theory. For  $S > 1/2$ , the quadratic spin operator  $F$  enters the formula for the said coefficient:  $\sigma_{\alpha\beta} = Pqv^2 |\langle \alpha | F | \beta \rangle|^2$ , where  $\alpha$  and  $\beta$  are the spin levels between which a transition takes place;  $P$  is given by

$$P = \frac{9\pi^2 N}{kT v^2} \left( \frac{g\mu_B}{R^2} \right)^2 \left( \frac{r^2}{R^2} \right)^2. \quad (2)$$

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Theory of acoustic ...

N is the number of paramagnetic centers per unit volume, d is the crystal density, v and  $\nu$  are the velocity and frequency of ultrasonics, R is the equilibrium distance between the paramagnetic ion and its diamagnetic

neighbors (charge e'),  $\overline{r^2}$  is the mean square distance of the 3d electron from the nucleus; q is a structure constant, and  $\nu_{1/2}$  is the resonance-absorption-line width.  $\hat{P} = \sum_{i,k=x,y,z} a_{ik} \hat{S}_i \hat{S}_k$ . (4) is valid here.

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Theory of acoustic ...

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B136/B201

Ni<sup>2+</sup> in a tetragonal field

$$a_{xx} = -a_{yy} = 3(\lambda_y \Phi_y - \lambda_x \Phi_x),$$

$$a_{zz} = 3(\lambda_x \Phi_x + \lambda_y \Phi_y - 2\lambda_z \Phi_z),$$

$$a_{xy} = a_{yx} = -\frac{16}{35}(\lambda_x \Phi_y + \lambda_y \Phi_x),$$

$$a_{zz} = a_{zz} = -\frac{16}{35}(\lambda_x \Phi_x + \lambda_y \Phi_y),$$

$$a_{yz} = a_{zy} = -\frac{16}{35}(\lambda_y \Phi_z + \lambda_z \Phi_y),$$

Cr<sup>3+</sup> in a trigonal field

$$a_{xx} = -a_{yy} = \lambda_y \Phi_y - \lambda_x \Phi_x + 0.54(\lambda_y \Phi_x + \lambda_x \Phi_y - \lambda_z \Phi_z - \lambda_z \Phi_z),$$

$$a_{zz} = 4.62(\lambda_x \Phi_x + \lambda_y \Phi_y - 2\lambda_z \Phi_z),$$

$$a_{xy} = a_{yx} = -\lambda_x \Phi_y - \lambda_y \Phi_x + 3.08(\lambda_x \Phi_x + \lambda_y \Phi_y) - 0.54(\lambda_x \Phi_x + \lambda_x \Phi_x + \lambda_y \Phi_y + \lambda_y \Phi_y),$$

$$a_{zz} = a_{zz} = \lambda_x \Phi_x - \lambda_y \Phi_y + 0.54(\lambda_x \Phi_y + \lambda_y \Phi_x) - 3.54(\lambda_x \Phi_x + \lambda_x \Phi_x),$$

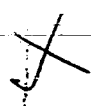
$$a_{yz} = a_{zy} = -\lambda_x \Phi_z + \lambda_y \Phi_y - 0.54(\lambda_x \Phi_y + \lambda_y \Phi_x) + 3.54(\lambda_y \Phi_x + \lambda_x \Phi_y).$$

(4)

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S/181/61/003/005/022/042  
B136/B201



Theory of acoustic ...

If, however,  $S = 1/2$  ( $Ti^{3+}$ ,  $Cu^{2+}$ , etc.), the operator  $\hat{P}$  may be used to express the absorption coefficient as a linear function of the spin components. Estimations of  $S$  for these two cases are given in Tables 1 and 2. The striking difference between the values is, however, not so remarkable when considering how strongly the spin-lattice relaxation times differ for different ions. Calculations are performed for ideal crystals. The defects which are always present in the practice, require that sound waves scattered by the defects be taken into account. If the sound-wave amplitude is independent of the frequency, lattice vibrations caused by the scattered waves will depend on the spin system to a much greater extent than do vibrations caused by plane waves. This has been shown by Kochelaev (Ref. 3): DAN USSR, 131, 1053, 1960). If  $S > 1/2$ ,  $\sigma$  will become independent of frequency; if, however,  $S = 1/2$ ,  $\sigma \sim \nu^2$ . An experimental verification have to be based upon the following considerations: If it is conducted at a low temperature, at which the spin-lattice relaxation can be explained by single-phonon processes, it will not be possible to measure the absolute value of the absorption for ultrasonics, because the saturation factor depends upon the ratio of the transition probability between spin levels under the action of ultrasonics to the probability of a relaxation transi-

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Theory of acoustic ...

S/181/61/003/005/022/042  
B136/B202

tion which is caused by thermal vibrations of the lattice. Instead, it is possible to clarify the dependence of resonance absorption on direction and polarization of sound waves and the magnetic field strength. There are 2 tables and 3 references: 2 Soviet-bloc and 1 non-Soviet-bloc. The most recent reference to English-language publication reads as follows: E. Van Vleck, Phys. Rev., 57, 426, 1940.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet imeni V. I. Ul'yanova-Lenina (Kazan' State University imeni V. I. Ul'yanov-Lenin)

SUBMITTED: October 21, 1960

Card 5/5

09227

S/056/61/040/001/035/037  
B102/B212

24.7900 (1147, 1158, 1160)

AUTHORS: Al'tshuler, S. A., Zaripov, M. M.

TITLE: Theory of the paramagnetic resonance of Ti and Co ions in corundum

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40, no. 1, 1961, 377-379

TEXT: Experimental investigations of paramagnetic resonance in  $Al_2O_3$  crystals with different paramagnetic impurities has been interpreted to the effect that the Ti and Co ions in these crystals possess magnetic properties differing from other compounds. The authors of the present "Letter to the editor" examined this problem theoretically and showed that all experimental results concerning paramagnetic resonance spectra and spin-lattice relaxation time can be easily explained. For Ti in corundum an anomalously large anisotropic factor ( $g_{||} = 1.067$ ,  $g_{\perp} < 0.1$ ) has been measured, and the spin-lattice relaxation time  $T_1$  did increase from  $T_1 = 5 \cdot 10^{-8}$  to 0.1 sec in the

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89229

S/056/61/040/001/035/037  
B102/B212

Theory of the paramagnetic...

transition from 9 to 1.55°K. If it is assumed that the trigonal component of the crystal field has a much stronger spin-orbit interaction, and if the cubic and trigonal components are considered at the same time, and, moreover, if the constant of the trigonal field is taken to be negative, then it is possible to explain those data. The spin-orbit interaction splits the orbital ground level into two Kramers' spin doublets (interval  $\delta = 70 \text{ cm}^{-1}$ ), and one obtains  $g_{\perp} = 0$  and  $g_{\parallel} = 1.07$ . If the importance of the covalent coupling between the metal ion and the surrounding oxygen atoms is taken into account then one finds that  $g_{\perp}$  for the Ti ion has to be somewhat dif-

ferent from zero. Considering the very strong spin-lattice interaction one obtains, due to the main role of two-phonon processes:  $T_1 \sim T^{-7}$ . Theoretical values for  $\text{Co}^{2+}$  ions agree with experimental results if the constants of the trigonal field are changed somewhat in the spin Hamiltonian

$$\chi = D \left[ S_z^2 - \frac{1}{3} S(S+1) \right] + g_{\parallel} H_z S_z + g_{\perp} \beta (H_x S_x + H_y S_y) + A I_z S_z + B (I_x S_x + I_y S_y),$$

the spin-orbit interaction in second perturbation theoretical approximation

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S/056/61/040/001/035/037  
B102/B212

Theory of the paramagnetic....

being taken into account, the change being such that the initial splitting of the spin quadruplet is  $2D = 24 \text{ cm}^{-1}$ ; ( $S = 3/2$ ). It has been established experimentally that the spin-lattice coupling of  $\text{Co}^{2+}$  ions is much stronger at  $25^\circ\text{K}$  than that of  $\text{Cr}^{3+}$  ions; at helium temperatures, conversely,  $T_1$  of  $\text{Cr}^{3+}$  ions was much shorter than  $T_1$  of  $\text{Co}^{2+}$  ions. This can be also explained if we consider that at higher than helium temperatures the spin-lattice coupling will be strong and is governed by two-phonon processes, while at temperatures below helium temperature it will be governed by single-phonon processes which are related to transitions between spin-levels of the lower Kramers doublet. There are 4 references: 2 Soviet-bloc and 2 non-Soviet-bloc. .

ASSOCIATION: Kazanskiy gosudarstvennyy universitet (Kazan' State University)

SUBMITTED: November 2, 1960

Card 3/3

30397

S/053/61/075/003/002/005  
B125/B104

24,1800 (1063, 1144, 1482)

AUTHORS: Al'tshuler, S. A., Kochelayev, B. I., Leushin, A. M.

TITLE: Paramagnetic sound absorption

PERIODICAL: Uspekhi fizicheskikh nauk, v. 75, no. 3, 1961, 459 - 499

TEXT: This is a review of papers on paramagnetic sound absorption, published in the years 1951 to 1961. It is divided into the following chapters: introduction; paramagnetic resonance absorption of sound; crystals containing ions of the iron group; ions with the effective spin  $S' > 1/2$ ; effect on  $Ni^{2+}$  ions on an MgO crystal; ions with the effective spin  $S' = 1/2$ ; crystals containing ions of rare-earth elements; crystals containing paramagnetic ions in the S-state; Waller's mechanism; acoustic paramagnetic resonance and spin-lattice relaxation in ionic crystals; metals; experimental studies of electron-induced acoustic paramagnetic resonance; nuclear acoustic paramagnetic resonance; experimental studies of nuclear acoustic paramagnetic resonance; shape of the acoustic paramagnetic resonance line; pulse methods used to investigate acoustic paramagnetic resonance; non-resonant paramagnetic absorption of sound; some conclusions  
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30397

S/053/61/075/003/002/005  
B125/B104

Paramagnetic sound absorption

of the authors: All the effects under consideration are similar to the action of an r-f electric field on paramagnetics. All the principal effects produced by an electromagnetic field in paramagnetics (resonance, spin induction, spin echo, relaxation absorption) can be obtained by means of a sound field. Paramagnetic sound absorption may occur in almost every substance in which also paramagnetic absorption of an r-f electromagnetic field is observable. There are no indications of spin-phonon interaction in solid, free radicals. In liquid and gaseous paramagnetics, paramagnetic sound absorption is weak. Studies of paramagnetic sound absorption can give additional information on the properties of matter, especially on the properties of spin-phonon interaction. The selection rules to be applied to acoustic paramagnetic resonance are different from those to be used for transitions induced by an electromagnetic field. In general, effects produced by sound are by several orders of magnitude stronger than effects induced by an electromagnetic field. The authors refer to Ye.K. Zavoyaskiy, B. I. Kochelayev (FTT, 2, 1423 (1960), DAN SSSR 131, 1053 (1960)), A. R. Kessel' (ZhETF 36, 1451 (1959)). There are 5 figures, 5 tables and 68 references: 28 Soviet and 40 non-Soviet. The three most recent references

X

Card 2/3

30397

S/053/61/075/003/002/005  
B125/B104

Paramagnetic sound absorption

to English-language publications read as follows: M. Menes, D. I. Bolef,  
J. Phys. Chem. Solids 19, 79 (1961); C. Kittel, Phys. Rev. Lett. 6, 449  
(1961); E. B. Tucker, Phys. Rev. Lett. 6, 547 (1961).

4

Card 3/3

AL'TSHULER, S.A.; BASHKIROV, Sh.Sh.; ZARIPOV, M.M.

Paramagnetic resonance and spin-lattice relaxation of  $Ti^{3+}$  ions  
in corundum. Fiz.tver.tela 4 no.12:3367-3372 D '62.

(MIRA 15:12)

1. Kazanskiy gosudarstvennyy universitet im. V.I.Ul'yanova-  
Lenina.

(Paramagnetic resonance and relaxation)  
(Titanium) (Corundum)



9,2574 (also 4205)  
24.6810

44248  
S/056/62/043/006/064/067  
B141/B102

AUTHOR: Al'tshuler, S. A.

TITLE: Mechanism of the paramagnetic spin-lattice relaxation in ionic crystals at low temperatures.

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 6(12), 1962, 2318-2319

TEXT: Difficulties in the Kronig-Van Vleck theory can be avoided if it be assumed that during paramagnetic spin-lattice relaxation at low temperatures the mechanism of the pair exchange is of primary importance. The authors maintain that pair exchange relaxation occurs only in crystals where the paramagnetic particles are sufficiently concentrated, the spin-spin interaction in those with lower concentration not being enough for the energy transfer from the individual particles to the pairs. In rubies, two different mechanisms of spin-lattice relaxation were established, corresponding to different temperature dependences of the relaxation time. In crystals of medium paramagnetic-ion concentration, the following relaxation mechanism is established. S and S' are the spins of the

+

Card 1/2 @ cursory

Mechanism of the paramagnetic...

S/056/62/043/006/064/067  
B141/B102

interacting particles,  $J(r)$  the exchange integral,  $r$  the distance between the particle,  $2D$  the initial splitting of the spin levels in the lattice field and  $R$  the distance where  $J(R) = D$ . Particles for which  $r < R$ , form pairs. The spin-lattice interaction, which is explained by the exchange forces  $J < D$ , depends strongly on the concentration of the paramagnetic particles but not on the magnetic field strength. The probability of the relaxative transition of the particles from the spin level  $i$  to the level  $j$  is

$$A_{ij} = \frac{8\pi^2}{3h^3 \rho v^3} \sum_{r>R} r^2 \left(\frac{\partial J}{\partial r}\right)^2 \sum_{k,l} \frac{E_{ik,l}^2}{1 - \exp(E_{ik,l}/kT)} |\langle l, k | SS' | i, l \rangle|^2.$$

where  $\rho$  is the crystal density,  $v$  is the sound velocity,  $E_{ik,j}$  the energy change of the particle pairs on the transition  $ik \rightarrow jl$ .

ASSOCIATION: Kazanskiy gosudarstvennyy universitet (Kazan' State University)

SUBMITTED: October 6, 1962

Card 2/2

L 10019-63 EPF(c)/EWA(k)/EWP(k)/BDS/EWT(1)/3W2/EEC(b)-2/ES(t)-2--APFTC/  
ASD/ESD-3/RADC/APGC/AFWL/SSD--Pr-4/Pf-4/P1-4/Pc-4--GG/K/WG/EH/JHB  
ACCESSION NR: AP3001293 S/0181/63/005/006/1697/1699

89  
88

AUTHOR: Al'tshuler, S. A.; Mineyeva, R. M.

TITLE: Broadening of paramagnetic resonance lines as a result of indirect exchange interaction

SOURCE: Fizika tverdogo tela, v. 5, no. 6, 1963, 1697-1699

TOPIC TAGS: paramagnetic resonance, spin-lattice relaxation, ionic crystals, chromium ions in ruby

ABSTRACT: A hypothesis of Al'tshuler (ZhETF, 43, 2318, 1962) on the mechanism of paramagnetic resonance in magnetically diluted crystals is supported and developed by comparing available experimental data on chromium ions in ruby with results of detailed calculations by the moment method. The findings confirm that it is the indirect exchange interaction between paramagnetic particles which plays the dominant role in ionic crystals both in the mechanism of spin-lattice relaxation and in the broadening of resonance lines. The effects of crystal-field splitting are discussed, and

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L 10019-63  
ACCESSION NR: AP3001293

it is shown that, contrary to suggestions of other authors, neither dipole interactions nor lattice defects can fully account for the line widths observed. Orig. art. has: 8 formulas.

ASSOCIATION: Kazan'skiy gosudarstvennyy universitet im. V. I. Ul'yanova-Lenina  
(Kazan' State University)

SUBMITTED: 13Feb63    DATE ACQ: 01Jul63    ENCL: 00  
SUB CODE: 00    NO REF SOV: 005    OTHER: 004

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2/2