Paramagnetic Resonance in Magnetically   76967
Diluted Systems   SOV/56-37-6-7/55

author with alum (cf. Zhur. eksp. i teoret. fiz.,
35, 612, 1958). It was further shown that the

$\chi_s''(H_{\parallel})$ curves could be "compensated" by each other
depending on the temperature of the sample, the fre-
quency of the magnetic field, or the concentration
of the magnetic ions. In this case the total absorption
curve was independent of $H_{\parallel}$. S. A. Al'tshuler and
B. M. Kozyrev participated in the discussion of this
work. There are 2 tables; 2 graphs; and 15 references,
12 Soviet, 2 Dutch, 1 U.S. The U.S. reference is:
W. A. Andersen, L. H. Piette, J. Chem. Phys. 30, 591,
1959.

ASSOCIATION: Phys.-Tech. Inst. of the Kazan Branch of the Acad.
                 Sciences USSR (Fiziko-tekhnicheskiy institut kazanskogo
                 filiala Akademii nauk SSSR)

SUBMITTED: July 4, 1959
Card 5/5

24.2110,24.2200,24.7900,   76969
16.8100,5(4)   SOV/56-37-6-9/55

AUTHORS: Avvakumov, V. I., Garif'yanov, N. S., Kazyrev, B. M.,
                Tishkov, P. G.

TITLE: Paramagnetic Resonance and Paramagnetic Relaxation in
                Electrolyte Solutions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki,
                1959, Vol 37, Nr 6, pp 1564-1569 (USSR)

ABSTRACT: Measurements were made of the paramagnetic resonance
                and paramagnetic relaxation in aqueous solutions of
                MnO_3, $MnCl_2$, $Cr(NO_3)_3$, and $Cu(NO_3)_2$. An analysis of the
                experimental results showed that the complex $Cu^{2+}Y_6$ has
                a structure of bipyramid stretched in the direction of
                one of the symmetry axes of the fourth order (cf.
                V. I. Avvakumov, Zhur. eskp. i teoret. fiz., 37, 1017,
                1959). This effect for the hexahydrate complex in liquid
                solutions is dynamic in nature (cf. B. M. Kozyrev,
Card 1/4   Faraday Soc. Discussions, 19, 135, 1955). This means that

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·Relaxation in Electrolyte Solutions   SOV/56-37-6-9/55

in a given position of the ligand along the axes in
a rectangular system of coordinates, the bipyramidal
complex can be stretched in the direction of any
three coordinates of the axes. All states in this
case are energetically identical. In order to pass
from one state into another, the system must overcome
a potential barrier, which for the hexahydrate complex

~ 1000 cm^{-1}. It was calculated that the transfer
proceeds at a frequency of $\sim 10^{11}$sec^{-1}. At the
same frequency the returning of the electron density
of the magnetic ion also takes place. This leads to
an averaging of the g-factor. The electric field of
the violet modification of the salt $\left[Cr(H_2O)_6 \right]^{3+}$ has

in the main a cubic symmetry which, because of the ef-
fect of the particles of the second coordinational
medium, contains an admixture of the fields of lower
symmetry. The fluctuation of the fields caused by
Card 2/4   these particles is sufficiently slow. The existence
of such fields was confirmed by comparing the observed

Paramagnetic Resonance and Paramagnetic
Relaxation in Electrolyte Solutions

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SOV/56-37-6-9/55

width of lines in solutions with the period of the
spin-lattice relaxation for 0.1 M solutions of
Cr^{3+}(ΔH = 200 G, $\rho_1 \sim 10^{-8}$ sec). These fields are
weaker than the axial fields in solid chromium alum,
because the total spectral width in powdered alum is
considerably wider than the width of a single line
observed in solutions. In the green modification of
Cr^{3+} salts, the paramagnetic resonance line is still
wider because the complex $\left[Cr(H_2O)_4X_2\right]^+$ is less
symmetrical. The magnetic complexes of Mn^{2+} in diluted
solutions have nearly a pure cubic symmetry, whereas
in nonaqueous $MnCl_2$ solutions there were observed very
wide resonance lines at a given relaxation period.
This was explained by the presence of a strong axial
component of the crystal field, which is caused by the
presence of ionic molecules of the type $X^- - Mn - X^-$.
The experimental values ρ_1 for a given magnitude of H_o
in the case of $Mn(NO_3)_2$ gradually increased upon dilution:

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Paramagnetic Resonance and Paramagnetic   76969
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approximately 50-60% with a change in the concentration
by several moles up to 0.25 M. The anion had a small
effect on the magnitude of this phenomenon. These
data accord with the theory of S. A. Al'tshuler and
K. A. Valiev (cf. Zhur. eksp. i teoret. fiz., 35, 974,
1958). The text contains a diagram of the setup;
4 graphs; and 14 references, 10 Soviet, 1 Dutch,
1 U.K., 2 U.S. The U.K. and U.S. references are:
(1) U. Opik, M. H. L. Pryce, Proc. Roy. Soc., A238,
425, 1957; (2) B. R. McGarvey. J. Phys. Chem., 61,
1232, 1957; (3) H. J. Mc Connell. J. Chem. Phys., 25,
709, 1956.

ASSOCIATION: Phys.-Tech. Inst. of the Kazan Branch of Acad.
Sciences USSR (Fiziko-tekhnicheskiy institut kazanskogo
filiala Akademii nauk SSSR)

SUBMITTED: July 6, 1959

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5 (3, 4)

AUTHORS: Arbuzov, A. Ye., Academician,   SOV/20-126-4-23/62
Valitova, F. G., Garif'yanov, N. S., Kozyrev, B. M.

TITLE: Paramagnetic Resonance of α,α-Diphenyl-β-picryl-hydrazyl Obtained From Different Solvents (O paramagnitnom rezonanse α,α-difenil-β-pikrilgidrazila, poluchennogo iz razlichnykh rastvoriteley)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 4, pp 774-776 (USSR)

ABSTRACT: The data given by various authors on the width of the line of the paramagnetic resonance of the compound (DPhPH) mentioned in the title, vary considerably: from ~ 1 to ~ 6 Oersted. In order to explain this fact, the first author suggested to deal with the subject mentioned in the title. DPhPH was produced according to the method described in reference 3 which differs from the Goldschmidt method (Ref 4). The solvents used were: benzene, toluene, xylene (isomeric mixture), pyridene, bromoform, carbon tetrachloride, chloroform and carbon disulfide. For the method of measuring the resonance see reference 5. The values of the width of the lines of the paramagnetic absorption $(\Delta H)_{1/2}$ mentioned in the title, show

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Paramagnetic Resonance of α,α-Diphenyl-β-picryl-
hydrazyl Obtained From Different Solvents   SOV/20-126-4-23/62

that the nature of the solvent has a considerable influence
on the width of the line. Naturally this leads to the
conclusion that the molecules of the solvent form part of the
crystalline lattice of the DPhPH (Refs 6-9). In no case
however, there is a guarantee that the experimenter dealt
with chemically pure compounds. The data of table 1 show that
the solvents used here, are divided into two groups, according
to their influence on the width of the line: a. compounds of
the cyclic type, b. compounds containing no cycles. In
DPhPH specimens of the group a, a narrowing of the absorption
line takes place, in consequence of cooling and of an increase
of their frequency. Group b. in such cases shows a widening
of this line. On the whole it may be said that the specimens
of group a. despite of their broader lines, are more
magnetically isotropic than the specimens of group b. All this
has to be considered as something more or less provisional.
The observed dependences can only be explained after further
investigation. Furthermore both DPhPH groups show a different
influence of the atmospheric oxygen on the breadth of line.
On the whole widening of the line by means of O_2 is reversible.

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Paramagnetic Resonance of α,α-Diphenyl-β-picryl-
hydrazyl Obtained From Different Solvents

Finally experiments of the authors are described in which
one solvent (chloroform) was replaced by another (benzene).
The crystals developed by chloroform, showed wider lines after
they had been recrystallized with benzene. With a reverse
sequence of the solvents used, the crystals maintained the
line of a benzene specimen. Thus it seems that the affinity
of benzene and DPhPH is stronger than that of chloroform. If
DPhPH is used as a standard for defining the number of
paramagnetic centres in different substances, it has to be
done very carefully. Only a DPhPH preparation from a certain
solvent may be used. In the case of a DPhPH synthesis from
other solvents, the exact details of the experiment have to
be given, or the experimenter will get various results.
There are 1 table and 13 references, 3 of which are Soviet.

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Paramagnetic Resonance of α,α-Diphenyl-β-picryl-   SOV/20-126-4-23/62
hydrazyl Obtained From Different Solvents

ASSOCIATION: Fiziko-tekhnicheskiy institut Kazanskogo filiala Akademii
nauk SSSR (Institute of Physics and Technology of the
Kazan' Branch of the Academy of Sciences, USSR)
Khimicheskiy institut Kazanskogo filiala Akademii nauk SSSR
(Institute of Chemistry of the Kazan' Branch of the Academy
of Sciences, USSR)

SUBMITTED: May 13, 1959

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S/058/61/000/010/048/100
A001/A101

24,7900

AUTHOR: Garif'yanov, N.S.

TITLE: Paramagnetic relaxation in magnetic-diluted systems

PERIODICAL: Referativnyy zhurnal.Fizika, no.10, 1961, 164, abstract 10V365 (V sb.
             "Paramagnitn. rezonans", Kazan', Kazansk. un-t, 1960, 99)

TEXT: The author investigated the dependence of the b/C constant on the
strength of magnetic dipole-dipole interactions by the parallel field method. In-
vestigations were carried out at frequencies 300 - 1.6 Mc at $T = 90^\circ K$ with speci-
mens containing Cr^{3+}, Fe^{3+}, Cu^{2+}, Mn^{2+} and VO^{2+}. It was found out that with de-
creasing magnetic interaction, the b/C value decreases to a very low magnitude
so that the share of heat capacity, whose origin is due to splitting of levels in
an electric field, is absent. It follows hence that the effective spin of Cr^{3+},
Fe^{3+} and Mn^{2+} is equal to $S' = \frac{1}{2}$. Moreover, in parallel fields were discovered
the lines of fine and superfine structure, corresponding to the case of interme-
diate and weak fields. Experimental curves of spin-spin absorption agree with
theoretical predictions.   V. Avvakumov
[Abstracter's note: Complete translation]

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/8. 8100

213
S/126/60/009/04/004/033
E032/E435

AUTHORS: Garif'yanov, N.S. and Il'yasov, A.V.

TITLE: Magnetic Resonance in Sodium Alloys

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 4, pp 503-506 (USSR)

ABSTRACT: Measurements are reported of the electron paramagnetic resonance in sodium and cesium alloys. The measurements were carried out on 300 and 9430 Mc/s at 295 and 90°K. The specimens were prepared in an argon atmosphere. In order to prevent the distortion of the lines due to the incomplete penetration of the high frequency field, the alloy was dispersed in paraffin, the particles being 4 μ in diameter (on the average). The sodium was 99.95% pure and contained about 0.04% of potassium. The width ΔH in the original sodium, measured as full width at half height, was 16 oe at 295°K and 9 oe at 90°K (Fig 1). These results are in agreement with those reported by Feher and Kip (Ref 3) and Gutowsky and Frank (Ref 4). Measurements on 300 Mc/s showed that ΔH for the electron paramagnetic resonance curve for Na-Cs is independent of the

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Magnetic Resonance in Sodium Alloys

concentration of cesium up to 0.5 at %.   This is
indicated in Fig 2. This result is in good agreement
with Elliott's theory (Ref 5).   Fig 2 shows the full
width at half height of the electron paramagnetic
resonance curve for different concentrations of sodium
and cesium. Measurements have also been made of the
nuclear magnetic resonance in sodium alloys. The alloys
investigated were   Na-K,   Na-Hg, and   Na-Cs.   The ratio
of the Knight shift ΔH to the resonance value of the
magnetic field H were measured.   The results obtained
are as follows:

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E032/E435

Magnetic Resonance in Sodium Alloys

The Knight shift in sodium alloys
(without correction for the chemical shift)

Alloy	Concentration of atoms in the alloy, %		$\Delta H/H$, %
	Na	K	
Na-K	100	0	0.1161
	99.4	0.6	0.1160
	93.8	6.2	0.1213
	63	37	0.1287
	36	64	0.1450
	Na	Hg	
Na-Hg	97.2	2.8	0.1142
	89.7	10.3	0.1122
	85.9	14.1	0.1131
	83.0	17.0	0.1149
	81.0	19.0	0.1121

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Magnetic Resonance in Sodium Alloys

	79	21	0.1152
	77	23	0.1138
Na-Hg	75	25	0.1157
	70	30	0.1151

	Na	Cs	
	99.7	0.3	0.1125
	99.5	0.5	0.1128
	99.4	0.6	0.1124
Na-Cs	99.1	0.9	0.1152
	98.7	1.3	0.1129
	94.2	5.8	0.1288

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Magnetic Resonance in Sodium Alloys

        There are 3 figures, 1 table and 11 references,
        4 of which are Soviet and 7 English.

ASSOCIATION: Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR
        (Physico-Technical Institute of the Kazan Branch AS USSR)

SUBMITTED: July 13, 1959

Card 5/5

AVVAKUMOV, V.I.; GARIF'YANOV, N.S.; SEMENOVA, Ye.I.

Electron paramagnetic resonance and paramagnetic relaxation in
liquid and supercooled Ti^{+++} salt solutions. Zhur.eksp.i teor.fiz.
39 no.5:1215-1220 N '60.   (MIRA 14:4)

1. Kazanskiy filial AN SSSR.
   (Paramagnetic resonance and relaxation) (Titanium salts)

GARIF'YANOV, N. S., KOZYREV, B. M., TIMEROV, R. Kh., and USACHEVA, N. F. (Kazan)

"Parmagnetic resonance in the Solutions of Vanadyl Salts"

report submitted for the 10th AMPERE Colloquim, Leipzig, DDR, Sept. 1961

25698   S/181/61/003/007/020/023
         B104/B203

24.7900

AUTHORS: Avvakumov, V. I., Garif'yanov, N. S., Salikhov, S. G., and
             Semenova, Ye. I.

TITLE: Paramagnetic resonance in $TiCl_3 \cdot 6H_2O$ and $Ti_2(SO_4)_3 \cdot 4H_2O$
             layers

PERIODICAL: Fizika tverdogo tela, v. 3, no. 7, 1961, 2111 - 2114

TEXT: In a previous paper (ZhETF, 39, 11, 1215, 1960), the authors had
studied the paramagnetic resonance absorption of $TiCl_3 \cdot 6H_2O$ and
$Ti_2(SO_4)_3 \cdot 4H_2O$ salts dissolved in glycerin and alcohol at T = 77^0, 200^0,
and 300^0K. They had found an anisotropy of the g-factor. Here, they
report on experiments with powdery (fine-crystalline) specimens. The ex-
periments were made at 9594 Mc/sec and 270 Mc/sec at 77^0 and 200^0K, with
the same salts as indicated above and with specimens in which these salts
were dissolved in   diamagnetic Al salts at ratios of Ti:Al = 1:10 and
Ti:Al = 1:100. The results shown in Fig. 1a reveal that the g-factor
of Ti^{3+} is anisotropic at 77^0K; g_1 = 1.91 and g_2 = 1.84. On heating,

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this line becomes symmetrical, and disappears completely above 200°K. Between T = 77°K and a temperature T_{up}, the form of this line is temperature dependent. T_{up} is supposed at 100 - 120°K. At T = 200°K, the line is symmetrical, the g-factor is 1.91±0.02, and the half-width of the line ΔH = 376 oersteds. At 270 Mc/sec, this line is symmetrical at T = 77°K, and the half-width is 81 oersteds. The dissolved specimens (1:100) have, at the higher frequency at 77°K, in contrast to the undissolved specimens, a symmetrical line with g_{eff} = 1.91±0.02 at a width ΔH = 203 oersteds. At 270 Mc/sec, this line is narrower (ΔH = 38 oersteds). With further dilution of the solution, g_{eff} and the line width remain constant. g_{eff} = 1.91±0.02 was determined on $Ti_2(SO_4)_3 \cdot 4H_2O$ at the higher frequency at 77°K (undissolved specimen). Here, the line is symmetrical, the width is 209 oersteds (Fig. 2a). Also here, the line width does not depend on temperature in a certain temperature range. T_{up} is estimated with 200°K.

Above this temperature, this line becomes wider and disappears. In contrast to the above-mentioned chloride, the line width is almost equal at

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Paramagnetic resonance...

both frequencies. In the solution 1:10, the line width is 147 oersteds at the higher frequency, and 26.5 oersteds at the lower one. In a discussion of the results, it is stated that the line width at the higher frequency is determined by the anisotropy of the g-factor. The symmetry of lines of dissolved specimens at higher frequencies is explained by inhomogeneities of the intercrystalline field. The authors conclude that the line width of the undissolved specimens is determined by magnetic dipole-dipole interactions. The dependence of the line width on the concentration of magnetic particles is given as a proof. Since the paramagnetic resonance absorption can be observed at 77°K and over, the authors conclude that the lower orbital triplet of Ti^{3+}, which in the ground state is in a field with cubic symmetry, is strongly split by fields of lower symmetry. If the Ti^{3+} ion is in an octahedral environment, the crystal field can have no axial symmetry but only trigonal symmetry. It is also possible that the Ti^{3+} ion is in a tetrahedral environment. The authors thank S. A. Al'tshuler and B. M. Kozyrev for a discussion of the results. There are 2 figures and 4 references: 1 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Kazanskiy filial AN SSSR (Kazan' Branch of the AS USSR)
Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova-

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25698
S/181/61/003/007/020/023
B104/B203

Paramagnetic resonance...

Lenina (Kazan' State University imeni V. I. Ul'yanov-Lenin)

SUBMITTED: January 7, 1961 (initially),
             February 27, 1961 (after revision)

Fig. 1: Curves for the paramagnetic   Fig. 2: Curves for the para-
resonance absorption of undissolved   magnetic resonance absorption
$TiCl_3 \cdot 6H_2O$.   of undissolved $Ti_2(SO_4)_3 \cdot 4H_2O$.

Legend: (a) 9594 Mc/sec; (b) 270 Mc/sec.   Legend as in Fig. 1.
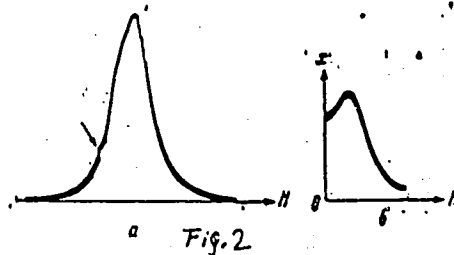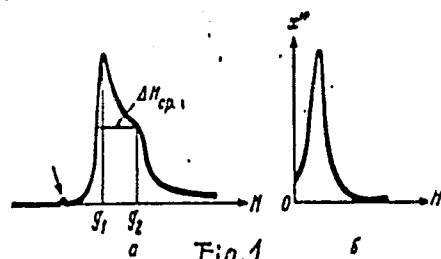
Card 4/4

GARIN, N.S., kand.med.nauk (Moskva)

"Epidemiology, diagnosis, and prevention of anthrax" by, E.I.
Shliakhova. Reviewed by N.S.Garin. Zdravookhranenie 4 no.3:
58-59 My-Je '61.   (MIRA 16:7)
              (ANTHRAX) (SHLIAKHOVA, E.I.)

IL'YASOV, A.V.; GARIF'YANOV, N.S.; RYZHMANOV, Yu.M.

Paramagnetic electron resonance in some types of natural crude and in its heavy fractions. Khim.i tekh.topl.i masel 6 no.1:28-31 Ja '61.
(MIRA 14:1)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR i Institut organicheskoy khimii AN SSSR.
(Petroleum—Spectra)

AVVAKUMOV, V.I.; GARIF'YANOV, N.S.; SEMENOVA, Ye.I.

Electron paramagnetic resonance in trivalent titanium halides.
Fiz. met. i metalloved. 12 no.4:624 O '61.   (MIRA 14:11)

1. Kazanskiy filial AN SSSR.
                              (Titanium halides)

KUKHTIN, V.A.; GARIF'YANOV, N.S.; OREKHOVA, K.M.

Addition of complete ester of phosphorous and phosphinous acids
to conjugated systems. Part 11: Interaction between trialkyl
phosphites and p-quinones. Zhur. ob. khim. 31 no.4:1157-1165
Ap '61.   (MIRA 14:4)

1. Kazanskiy filial nauchno-issledovatel'skogo kinofotoinstituta.
                    (Phosphorous acid)
        (Benzoquinone)   (Naphthoquinone)

23724

S/057/61/031/006/008/019
B116/B203

$24,7900 (1144, 1147, 1163)$

AUTHORS: Garif'yanov, N. S., Il'yasov, A. V., and Ryzhmanov, Yu. M.

TITLE: Electron paramagnetic resonance in some types of soot

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 6, 1961, 694-698

TEXT: The authors studied the electron paramagnetic resonance (EPR) in various heat-treated types of soot at frequencies of $\nu_1 = 300$ and ν_2 = 9450 Mc/sec in the temperature range of -193 to 300°C. They determined the relaxation times for gas conduit soot by the saturation method at 300 Mc/sec according to ГОСТ 785-49 гр 598 (GOST 785-49 column 598) as dependent on the temperature of the sample and the heat treatment. The measuring method used had been described earlier by N. S. Garif'yanov and B. M. Kozyrev (Ref. 3: ZhETF, 30, 272, 1956). The heat treatment consisted in heating to a certain temperature (maximum temperature 1200°C) without air access, with a holding time of 1 hr. The heat-treated soot was wetted with vaseline oil to eliminate the distortions on the EPR line at ν_2 and to obtain equal saturations of these lines on the whole sample

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Electron paramagnetic resonance in ...

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at ν_1. The samples were heated to 140°C (after heat treatment) without additional air removal by suction to eliminate the adsorbed molecular oxygen. The authors investigated by the EPR method: furnace soot, gas conduit soot, and nozzle soot. Measurements were made in "oil" samples with sucked-off air at ν_1 = 300 and ν_2 = 9450 Mc/sec, and at -193, 20, and 300°C. A measurable effect was only observed with gas conduit soot. Results are tabulated. The authors found a strong dependence of the resonance line width ΔH on the temperature of heat treatment, and a weaker dependence on the temperature of the sample and on ν. For all gas conduit soot samples, the splitting factor g was 2.003. The EPR curves show a Lorentz shape. The higher the heat treatment temperature and the temperature of the sample, the less the lines show saturation. The spin-lattice relaxation time T_1 and the spin-spin relaxation time T_2 were determined at ν_1 by means of the saturation method for gas conduit soot samples from which the oxygen had been removed (Table 2). The strong concentration of paramagnetic centers, the equality of relaxation times ($T_1 \approx T_2$), and the small line width in samples of gas conduit soot (in

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B116/B203

Electron paramagnetic resonance in ...

heat treatment up to $900^{\circ}C$) suggest an exchange interaction between un-paired electrons. Evidently, the exchange is maintained also with a change in the temperature of the sample from -193 to $300^{\circ}C$, since also here $T_1 \approx T_2$. The Lorentz shape of the EPR curves also suggests an exchange interaction between paramagnetic centers. R. L. Collins, M. D. Bell and G. Kraus (Ref. 1: J. appl. phys., 30, 56, 1959) attempted to explain the rapid change of ΔH with increasing heat-treatment temperature up to $900-1000^{\circ}C$ by the strong anisotropy of the g-factor. For anisotropic lines, the width of ΔH must depend very strongly on the frequency. The ΔH measured (Table 1)(at ν_1 and ν_2 differing by a factor of 30) differ only slightly. The data obtained confirm the assumption by J. Uebersfeld (Ref. 2: Ann. Phys., 13, 391, 1956). They explain the widening of the line by the reduction of T_1 due to the collision of unpaired electron with carriers. The fact that no EPR were found with furnace soot and nozzle soot is explained by the circumstance that these types of soot are subjected to heating up to about $1200^{\circ}C$ already during their formation. The temperature dependences of the lines in the gas conduit soot samples

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Electron paramagnetic resonance in ...

have not been explained so far. The presence of the adsorbed oxygen in ordinary and in heat-treated gas conduit soot samples reduces the relaxation times T_1 and T_2. The air is sucked off with difficulty from gas conduit soot samples exposed to air for a long time; therefore, the EPR line is wider in such samples as compared with fresh samples. There are 1 figure, 2 tables, and 9 references: 5 Soviet-bloc and 4 non-Soviet-bloc. The references to the English-language publications read as follows: N. Bloembergen, S. Wang. Phys. Rev., 93, 72, 1954; J.Uebersfeld and E. Erb. J. Chem. Phys., 51, 328, 1954.

ASSOCIATION: Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR i Institut organicheskoy khimii AN SSSR Kazan' (Physico-technical Institute of the Kazan' Branch of the AS USSR and Institute of Organic Chemistry of the AS USSR Kazan')

SUBMITTED: February 19, 1960

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Electron paramagnetic resonance in ...

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B116/B203

Table 1

1) Температура TO, °C	ΔH, эрст. 2)				4) Число пара- магнитных центров на 1 г
	ν₁ = 300 мггц 3)		ν₂ = 9450 мггц 3)		
	−193° C	20° C	300° C	20° C	
20	1.4	2.3	3.2	3	8.8 · 10²⁰
650	1.2	2.1	2.5	2.5	5.7 · 10²⁰
800	1.6	2.5	3.6	3.1	1.1 · 10²⁰
850	2.4	3.6	5	4.1	8.1 · 10¹⁹
900	4.8	7.5	12	8	6 · 10¹⁶

Table 1. Legend: (1) Temperature of heat treatment, °C, (2) oersteds,
(3) Mc/sec, (4) number of paramagnetic centers per g.

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Electron paramagnetic resonance in ...

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Table 2

Температура газо- канальной сажи, °C	$T_1 \cdot 10^6$ сек. (2)			$T_1 \cdot 10^6$ сек. (2)			T_1/T_1		
	20 °C	300 °C	−193°C	20 °C	300 °C	−193°C	20 °C	300 °C	−193°C
20	2.5	1.7	4	6.8	5.2	18.9	2.7	3	4.7
650	2.8	2.2	4.7	8.9	12.8	19.8	3.1	5.8	4.4
800	2.2	1.6	3.6	13.7	3.2	14.7	6.2	2	4.7
850	1.6	1.1	2.3	3.1	8.9	5.6	1.9	7	1.5
900				(3) Плохо насыщается					

Table 2. Legend: (1) Temperature of gas conduit soot, °C, (2) seconds,
(3) saturates with difficulty.

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27382

S/056/61/041/002/003/028
B102/B205

24,7900

AUTHORS: Garif'yanov, N. S., Semenova, Ye. I.

TITLE: Hyperfine structure of electron paramagnetic resonance
             lines in subcooled solutions of Ti^{+++} salts

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41,
             no. 2 (8), 1961, 337 - 339

TEXT: Following a series of publications (ZhETF, 39, 1215, 1960; ZhETF,
37, 1551, 1959, etc.) the authors report on investigations of the hyper-
fine structure of epr lines in liquid and subcooled solutions of $Ti_2(SO_4)_3$,
enriched in Ti^{47} and Ti^{49} to 43.3 and 71.5%, respectively. Measurements
in liquid alcoholic and glycerin solutions of Ti^{+++} were made at
ν = 9430 Mc/sec and T = 295°K, and in subcooled glycerin solutions at
ν = 450 - 270 Mc/sec and T = 77°K. The solutions had concentrations of

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27182

S/056/61/041/002/003/028
B102/B205

Hyperfine structure of...

~0.05 mole/l. The measuring technique has been described earlier. At 9430 Mc/sec and 77°K it was not possible to achieve resolution of the hyperfine structure in subcooled glycerin solutions, since the absorption lines were broad and the splitting constants small. At $\nu = 450$ Mc/sec, however, resolution could be achieved in the presence of strong magnetic fields. At this frequency and at a temperature of 77°K, the hyperfine structure of epr lines of the $^{47}Ti^{+++}$ solution consisted of five peaks (cf. Fig. 1a), which indicates that the nuclear spin, I, of this ion equals 5/2. The hyperfine splitting constant A is ~30 oe, and can be determined from the resolution of the hyperfine-structural peaks. At $\nu = 450$ Mc/sec and T = 77°K, the $^{49}Ti^{+++}$ ion in a subcooled glycerin solution exhibits seven peaks (Fig. 1b). Accordingly, the nuclear spin I amounts to 7/2 and $|A|$~30 oe. At 9430 Mc/sec and T = 295°K, the hyperfine structure of the epr lines of Ti^{49} in an alcoholic $Ti_2(SO_4)_3$ solution will not be resolved. The

Card 2/3

27162

Hyperfine structure of...

S/056/61/041/002/003/028
B102/B205

epr line consists of two components, one broad and the other narrow. A
graphical analysis showed the hyperfine splitting constant to be $|a| \approx 12$ oe.
In liquid solutions $|a| = (A+2B)/3$. By substituting the values of A and B
obtained from the data on the hyperfine structure into the last-mentioned
formula, one finds $|a| \approx 11$ oe. ($|B| \sim 2$ oe). There are 1 figure and 7 refer-
ences: 5 Soviet and 2 non-Soviet. The two references to English-language
publications read as follows: R. H. Sands. Phys. Rev. 99, 1292, 1955; C. D.
Jeffries. Phys. Rev. 92, 1262, 1953.

ASSOCIATION: Kazanskiy filial Akademii nauk SSSR (Kazan' Branch of the
              Academy of Sciences USSR)

SUBMITTED: March 8, 1961

Card 3/3

GARIF'YANOV, N.S.; KOZYREV, B.M.; TIMEROV, R.Kh.; USACHEV, N.F.

Electron paramagnetic resonance in concentrated aqueous solutions of VO^{2-}. Zhur.eksp.i teor.fiz. 41 no.4:1076-1078 O '61.
(MIRA 14:10)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala Akademii nauk SSSR.
    (Paramagnetic resonance and relaxation) (Vanadium oxides)

GARIF'YANOV, N.S.

Superfine structure of the electron paramagnetic resonance line in aqueous solutions of V^{2+} salts. Dokl.AN SSSR 138 no.3:612-613 My '61.

(MIRA 14:5)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR. Predstavleno akademikom A.Ye.Arbuzovym.

(Paramagnetic resonance and relaxation)   (Vanadium salts)

GARIF'YANOV, N.S.; SEMENOVA, Ye.I.

Paramagnetic electron resonance in some aqueous complexes of Ti^{3+} salts. Dokl. AN SSSR 140 no.1:157-158 S-O '61.   (MIRA 14:9)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR.
Predstavleno akademikom A.Ye.Arbuzovym.
              (Titanium compounds--Spectra)

GARIF'YANOV, N.S.; FEDOTOV, V.N.

     Electron paramagnetic resonance in solutions of ammonium oxopentachloromolybdate. Zhur.strukt. khim. 3 no.6:711-712 '62.
                           (MIRA 15:12)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR.
          (Ammonium molybdate—Spectra)

S/181/62/004/001/016/052
B125/B104

AUTHORS: Garif'yanov, N. S., Fedotov, V. N., and Timerov, R. Kh.

TITLE: Measurement of spin-lattice relaxation times in undercooled Ti^{3+} solutions by the method of continuous saturation

PERIODICAL: Fizika tverdogo tela, v. 4, no. 1, 1962, 96 - 98

TEXT: The longitudinal spin-lattice relaxation time T_1 in undercooled glycerol solutions of $TiCl_3 \cdot 6H_2O$ as a function of the concentration of Ti^{3+} ions has been measured at $\nu = 270$ Mc/sec and $77°K$ by the method of continuous saturation. T_1 was calculated from Bloch's formula

$$Z = \left[1 + 0.25 \gamma^2 H_1^2 T_1 T_2\right]^{-1},$$ where Z is the saturation factor, γ is the gyromagnetic ratio, H_1 is the h-f field amplitude, and T_2 is the transverse relaxation time. H_1 was also determined with standard samples of $\alpha\alpha$-diphenyl picryl hydrazyl, and T_2 was calculated from the experimental width of the absorption curve. The dependence of T_1 on the Ti^{3+} concentration,

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Measurement of spin-lattice...

S/181/62/004/001/016/052
B125/B104

which can be seen from the measured values, is probably due to the change in symmetry of the intracrystalline electric field at the magnetic Ti^{3+} ion and to cross relaxation processes. The concentration dependence of T_1 of the Ti^{3+} ions in undercooled solutions containing 4 and 2 moles/l of $CoCl_2 \cdot 6H_2O$ was also studied. The shape of the e.p.r. lines is of the Lorentz type, and their width is virtually independent of the concentration. Saturation could not be achieved because of the considerable shortening of T_1. The slight dependence of ΔH on the concentration of Ti^{3+} ions and the Lorentz shape of the absorption lines are due to the fact that the Ti^{3+} ions are in the local alternating magnetic field of rapidly relaxing magnetic Co^{2+} ions. The variation in the line width ΔH, which can be estimated from $\Delta H \sim M_z^1 \tau + \Delta H_1$, and the spin-lattice relaxation times in undercooled solutions of $TiCl_3 \cdot 6H_2O$ containing 4 and 2 moles/l of $CoCl_2 \cdot 6H_2O$ are by no means due to the change in symmetry of the neighbor-

Card 2/3

Measurement of spin-lattice...

hood of the magnetic Ti^{3+} ion. $M'_z = (4/5)g^2_{Ti}g^2_{Co}\beta^4 S_{Co}(S_{Co}+1)\sum \langle r^{-6}_{1j} \rangle$ is the mean square deviation of the local field generated by Co^{2+} ions from H_o, τ is the spin-lattice relaxation time of Co^{2+} ions, and ΔH_1 is the contribution of dipole-dipole interactions between Ti^{3+} ions. The liquids containing Co^{2+} ions behave toward dipole-induced line broadening like true liquids. There are 2 tables and 6 references: 4 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: I. P. Goldslorugh, M. Mandel a. G. E. Pake. Phys. Rev. Lett., 4, 13, 1960; I. H. Van Vleck. Phys. Rev., 57, 426, 1952, 1940.

ASSOCIATION: Kazanskiy filial AN SSSR (Kazan' Branch AS USSR)

SUBMITTED: July 11, 1961

Card 3/3

S/181/62/004/009/017/045
B108/B186

AUTHOR: Garif'yanov, N. S.

TITLE: Electron paramagnetic resonance of Cr^{5+} in glasses

PERIODICAL: Fizika tverdego tela, v. 4, no. 9, 1962, 2450 - 2453

TEXT: The e.p.r. lines of boron glass, silicate glass, and low-temperature glycerol glass, containing quinquavalent chromium were studied, with the frequencies of 9320, 450, and 260 Mcps at various temperatures between 77 and 295°K. Glycerol glass was obtained at 77°K after boiling $(NH_4)_2Cr_2O_7$ or $K_2Cr_2O_7$ crystals in glycerin. The boron and silicate glasses were prepared by melting them together with $(NH_4)_2Cr_2O_7$ or $K_2Cr_2O_7$ and Cr_2O_3 or $KCr(SO_4)_2$, respectively. Narrow and symmetric lines with $g = 1.98$ were discovered on the frequencies 260 and 450 Mcps. At 9320 Mcps, width and shape of the lines are affected by the anisotropy of the g-factor. An anisotropic hyperfine structure of the e.p.r. lines was observed in glycerin glass, which proves the presence of quinquavalent chromium in the glass.

Card 1/2

Electron paramagnetic resonance...

S/181/62/004/009/017/045
B108/B186

The hyperfine spectrum can be described by a spin Hamiltonian of the form $\mathcal{H} = g_{\parallel}\beta H_z S_z + g_{\perp}\beta(H_x S_x + H_y S_y) + A I_z S_z + B(I_x S_x + I_y S_y)$, where $I = 0$ for even isotopes, and $I = 3/2$ for Cr^{53}, $S = 1/2$, $A = 37$ oe, $B = 12$ oe, $g_{\parallel} = 1.99$, $g_{\perp} = 1.97$. The time T_1 of spin-lattice relaxation was determined on 260 Mcps and $77^\circ K$ by the method of continuous saturation: at $T_1 \sim 10^{-7}$ sec for boron glass, and at $T_f \sim 10^{-5}$ sec for glycerol glass. There is 1 figure.

ASSOCIATION: Kazanskiy filial AN SSSR (Kazan' Branch AS USSR)

SUBMITTED: April 20, 1962

Card 2/2

S/181/62/004/011/047/049
B108/B186

AUTHORS: Garif'yanov, N. S., Timerov, R. Kh., and Usacheva, N. F.

TITLE: e.p.r. in undercooled solutions containing Mn^{2+} and Gd^{3+} ions

PERIODICAL: Fizika tverdogo tela, v. 4, no. 11, 1962, 3344-3345

TEXT: The authors studied the e.p.r. spectra of Mn^{2+} and Gd^{3+} ions in glasses to gain information on the local electrical fields around the magnetic ions. The measurements were made at $77^\circ K$ on the frequencies 9320 and 260 Mcps. The samples were boron glass and solutions of the above ions in glycerol, ethanol, methanol, and butanol. From the observed ratio of the intensities of the transitions $|M,m> \leftrightarrow |-M,m\pm1>$ and $|M,m> \leftrightarrow |-M,m>$ the authors calculated the constant D of spin level splitting of Mn^{2+} in an axial field. In methanol, D was 140. The other solvents showed similar values. The calculations were based on a formula established by B. Bleaney and R. S. Rubins (Proc. Phys. Soc., 77, 103, 1961)., Under the assumption that the Hamiltonian

$$\mathcal{H} = g\beta(H_x S_x + H_y S_y + H_z S_z) + B_2^0 P_2^0 + B_2^2 P_2^2 + B_4^0 P_4^0 + B_6^0 P_6^0 + B_6^6 P_6^6 \quad \text{for the ion}$$

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epr in undercooled solutions ...

S/181/62/004/011/047/049
B108/B186

in the $^8S_{7/2}$-state, in an axisymmetric electrical field, is applicable when the external magnetic field is perpendicular to the electrical field, its solution gives: $b_2^o = 3B_2^o = 0.068$ cm^{-1} and $b_4^o = 60B_4^o = 0.004$ cm^{-7} for methanol. In glycerol, only the transition

$\frac{1}{2} \leftrightarrow -\frac{1}{2}$ with the splitting factor $g = 1.99$ and $\delta H = 100$ oe was observed, the frequency used being 9320 Mcps. On 260 Mcps, all the glasses containing Gd^{3+} showed only the transition $+\frac{1}{2} \leftrightarrow -\frac{1}{2}$ with $g = 4.7$ and the line width $\delta H = 70$ oe. There are 2 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR
               (Physicotechnical Institute of the Kazan' Branch AS USSR)

SUBMITTED: July 16, 1962

Card 2/2

S/181/62/004/012/025/052
B104/B102

AUTHORS: Garif'yanov, N. S., and Fedotov, V. N.

TITLE: Electron paramagnetic resonance in supercooled WCl_5 solutions

PERIODICAL: Fizika tverdogo tela, v. 4, no. 12, 1962, 3537-3539

TEXT: The e.p.r. lines of supercooled and liquid solutions of WCl_5 in ethanol, glycerol and hydrochloric acid were investigated at 450 and 9320 Mc/sec and at 77 and 295°K. The WCl_5 concentrations were $\sim$ 0.01 mole/liter. In the solution of hydrochloric acid a symmetric e.p.r. line of the isotopes $W^{180, 182, 184, 186}$ having Gaussian form ($\delta H = 18 \pm 2$ oe, $g = 1.7$) was observed at 450 Mc/sec and 77°K. In the supercooled ethanol solution the line was slightly asymmetric. It was not possible to dissolve the hyperfine structure. At 9320 Mc/sec and 77°K the tungsten e.p.r. line is strongly asymmetric. The line shape is typical for such ions as have anisotropic g-factors. Glycerol: $g_{\parallel} = 1.79$, $g_{\perp} = 1.757$; hydrochloric acid: $g_{\parallel} = 1.78$; $g_{\perp} = 1.756$; ethanol:

Card 1/2

Electron paramagnetic resonance ...

$g_{\parallel} = 1.77$; $g_{\perp} = 1.718$. The constants of the spectroscopic splitting
are (in the same order as the solvents) 216, 220 and 148 $\pm$ 20 oe, i.e.
> 150, > 150, -- oe. There are 1 figure and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR
               (Physicotechnical Institute of the Kazan' Branch AS USSR)

SUBMITTED: July 9, 1962

Card 2/2

S/051/62/013/002/003/014
E032/E314

39866

5 5210

AUTHORS: Garif'yanov, N.S., Danilova, A.V. and
Shagidullin, R.R.

TITLE: Electron paramagnetic resonance and absorption
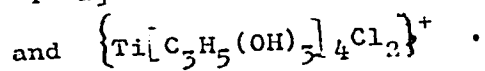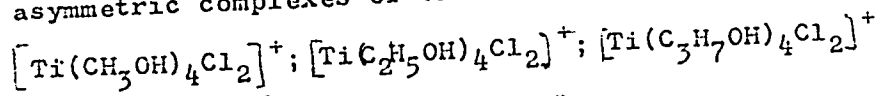spectra in the visible region of alcohol and glycerin
solutions of Ti+++

PERIODICAL: Optika i spektroskopiya, v. 13, no. 2, 1962,
212 - 215

TEXT: A study is reported of EPR lines of the green and
violet modifications of $TiCl_3 \cdot H_2O$ solutions. Glycerin and
absolute alcohols (methyl, ethyl and isopropyl) were used as
the solvents. The specimens were rapidly sealed in thin glass
capillaries since alcohol solutions of Ti+++ salts were found
to be unstable and oxidized to Ti++++. Measurements were carried
out at ν = 9320 Mc/s using the standard radiospectrometer
PБ -1301 (RE-1301) at 400, 295 and 77 °K. The line width δH was
determined as the distance between the maximum and minimum of the
first derivative of the absorption curve. The results of line-
width measurements and the spectroscopic splitting factor at

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S/051/62/013/002/003/014
E032/E314

Electron paramagnetic ....

$T = 295$ °K are given in Table 1. The intensity of the EPR lines in liquid violet glycerin and alcohol solutions is very low compared with the intensity due to green glycerin solutions. It is therefore considered that the EPR lines of liquid violet solutions are exclusively due to a small amount of green asymmetric complexes of the form:

$$\left[Ti(CH_3OH)_4Cl_2\right]^+; \left[Ti(C_2H_5OH)_4Cl_2\right]^+; \left[Ti(C_3H_7OH)_4Cl_2\right]^+$$

$$\text{and} \quad \left\{Ti\left[C_3H_5(OH)_3\right]_4Cl_2\right\}^+ \quad .$$

In supercooled alcohol and glycerin violet solutions of Ti^{+++} there is a large low-symmetry field component due to particles in the second coordination sphere (the motion is frozen). For this reason, in the super-cooled state each paramagnetic Ti^{+++} ion in violet solutions contributes to the intensity of the EPR lines. At room temperature, on the other hand, owing to the long spin lattice relaxation time, Ti^{+++} does not significantly contribute to the intensity of the EPR lines. As the room temperature is

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S/051/62/015/002/003/014
E032/E314

Electron paramagnetic ....

approached the component of low-symmetry electric fields at the
Ti^{+++} ion tends to average out and electron paramagnetic
absorption is almost entirely due to green asymmetric complexes.
This phenomenon has been used to determine the percentage concen-
tration of green complexes in violet solutions on the nature of
the solvent, and the results are given in Table 2. The assumed
mechanism was then checked by carrying out spectroscopic absor-
ption measurements, using the CФ-2M (SF-2M) spectrophotometer.
It was found that the absorption spectra in the visible region
are in good agreement with the above interpretation of the
EPR spectra. There are 2 tables.

SUBMITTED: June 9, 1961

Card 5/5

S/056/62/042/005/001/050
B125/B108

AUTHORS: Garif'yanov, N. S., Kozyrev, B. M., Timerov, R. Kh.,
Usacheva, N. F.

TITLE: Electron paramagnetic resonance in dilute vanadyl chloride
solutions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42,
no. 5, 1962, 1145 - 1148

TEXT: The authors used a РЭ-1301 (RE-1301) type radio-spectrometer
operating on a frequency of 9320 Mcps to study the dependence of the
hyperfine line width δH of the electron paramagnetic resonance spectrum
of dilute $VOCl_2$ solutions on temperature and viscosity of the medium. It
was found that less electrical conductivity produced more symmetrical
resonance lines. The following results are valid for symmetrical peaks
and $VOCl_2$ aqueous solutions of 0.02 mole/l. The dependence of the width
of the peaks (see reference) on the nuclear spin projection m_I is given by
$\delta H = a_1 + a_2 m_I + a_3 m_I^2$. The coefficients a_1, a_2, a_3 determine the width

Card 1/3

Electron paramagnetic resonance in...

of each peak of the hyperfine structure and are related to the anisotropic parameters Δg and b of the VO^{2+} ion spin Hamiltonian. The dependence of δH on m_I becomes less sharp when temperature is increased.and consequently viscosity is reduced. When $\omega_o^2 \tau_c^2 \ll 1$, the ratio a_2/a_3 is independent of temperature and viscosity. τ_c is the characteristic time of the correlation function of the Brownian motion. a_1 depends on temperature to a lesser extent than a_2 and a_3. This indicates that the relaxation mechanism (differing from the McConnel-mechanism) is predominant in a_1 and consequently also in that part of the half-width of the hyperfine structure components which is independent of the nuclear spin orientation. The most probable mechanism is that suggested by S. A. Al'tshuler and K. A. Valiyev (ZhETF, 35, 947, 1958). A double hyperfine structure is observed in some liquid solutions of $VOCl_2$, if $(\Delta g \beta H/\hbar)\tau_c \gg 1$ and $b\tau_c \gg 1$. There are 2 figures and 1 table. The most important English-language reference is: R. N. Rogers, G. E. Pake, J. Chem. Phys., 33, 1107, 1960.

Card 2/3

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39475
S/056/62/043/002/003/053
B102/B104

AUTHORS: Garif'yanov, N. S., Fedotov, V. N.

TITLE: Electron paramagnetic resonance in liquid and supercooled solutions of pentavalent molybdenum

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 2(8), 1962, 376-381

TEXT: The Mo^{5+} ion is among the least studied paramagnetic ions. The authors studied the epr spectra for 450 and 9320 Mc/sec and 295, 220, and 77°K on $MoOCl_3$ (dissolved in acetone or ethanol), $MoCl_3$ (in glycerol), and Mo^{5+} in borax beads. Width, shape, and hyperfine structure of the Mo^{5+} epr lines were investigated, and the spin-lattice relaxation time T_1 measured for 260 Mc/sec by using the saturation technique and Bloch's formula. The epr spectrum can be well described by the axisymmetric Hamiltonian

$$\chi = g_{||} \cdot \beta H_z S_z + g_\perp \beta(H_x S_x + H_y S_y) + A I_z S_z + B(I_x S_x + I_y S_y) \text{ with } S=1/2, I=5/2;$$

$A=83$ oe, $B=52\pm0.3$ oe, $g_\perp=1.940$, $g_{||}=1.965$. At 450 Mc/sec, all samples

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Electron paramagnetic resonance in ...

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B102/B104

show narrow symmetric epr lines. The wide lines at 9320 Mc/sec in ethanol and borax bead are due to the anisotropy of the g factor. The hyperfine structure peaks can be described by

$$\bar{H} = H_0^c - am - \frac{a^2}{2H_0}\left[I(I+1)-m^2\right] - \frac{a^2}{2H_0}(2M-1) : H_0 = h\nu/g \;,$$

a is the hyperfine splitting constant, m and M are respectively the magnetic quantum numbers of nucleus and shell electron; $a = 56 \pm 0.3$ Oe, $g = 1.945 \pm 0.002$. This holds for $MoOCl_3$ in supercooled and liquid ethanol solutions for the isotopes Mo^{95} and Mo^{94}; $\nu = 9320$ Mc/sec. The ratio of the nuclear magnetic moments is equal to that of the splitting constants (for $Mo^{95,97}$): $\mu_{97}/\mu_{95} = a_{97}/a_{95} = A_{97}/A_{95} = B_{97}/B_{95} = 1.02$. The spin-lattice relaxation time was $T_1 \sim 10^{-6}$ sec, the spin-spin relaxation time $T_2 \sim 10^{-8}$ sec. The Mo^{5+} concentrations were 0.005, 0.01, 0.05, and 0.2 moles/liter. The relaxation mechanism in the liquid state can be well

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Electron paramagnetic resonance in ...

S/056/62/043/002/003/053
B102/B104

described by the theory of Al'tshuler and Valiyev (ZhETF, 35, 947, 1958), and that in the solid state by Van Vleck's theory (Phys. Rev. 57, 426, 1940). There are 1 figure and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut Kazanskogo filiala Akademii nauk SSSR (Physicotechnical Institute of the Kazan' Branch of the Academy of Sciences USSR)

SUBMITTED: January 13, 1962

Card 3/3

S/056/62/043/005/054/058
B125/B104

AUTHORS: Garif'yanov, N. S., Yafayev, N. R.

TITLE: The paramagnetic electron resonance of Zr^{3+} in glass bodies

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43,
no. 5(11), 1962, 1978-1979

TEXT: The method of paramagnetic electron resonance (450 and 9320 mc/sec)
was used to investigate silicate glass bodies containing Zr^{3+}
($20Na_2O.70 SiO_2 \cdot 10ZrO_2$) in mol%) at 77 and $295^{\circ}K$. The narrow and
symmetric line of the glass bodies investigated at 450 Mc/sec and $77^{\circ}K$ has
the spectroscopic splitting factor $g = 1.89 + 0.01$ and the width $\delta H = 5$ oe.
The line width increases monotonically as the temperature rises from 77 to
$295^{\circ}K$, at which value a signal of the paramagnetic electron resonance
ceased to be observed. A broad and symmetric line of the paramagnetic
electron resonance with $g_{eff} = 1.906 \pm 0.002$ and $\delta H = 126 \pm 6$ oe was
observed at the frequency 9320 Mc/sec at $77^{\circ}K$. It is assumed that in the
glass specimens investigated the magnetic ion Zr^{3+} has an octahedral

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The paramagnetic electron resonance .. $S/056/62/043/005/054/058$ $B125/B104$

surrounding which is formed by 6 oxygen ions. The $Zr^{3+}(4d^1, S=1/2)$ energy levels are similar to the $Ti^{3+}(3d^1, S=1/2)$ levels. The fivefold degenerate orbital level of these ions is split into a lower triplet and an upper doublet by the octahedral field of the Zr^{3+} ions. The width of the line having the frequency $\nu = 450$ Mc/sec of the paramagnetic electron resonance can be explained by the relaxation mechanism of Van Vleck. In addition to that mechanism the shape and width of the line having 9320 MC/sec are due to the anisotropy of the g-factor and to various strong distortions of the oxygen octahedron. The line with 9320 Mc/sec arises from the super-position of many lines having various g-factors and can be described by a spin-Hamiltonian of the form

$$\hat{H} = \sum_i (g_{xi}\beta H_x \hat{S}_x + g_{yi}\beta H_y \hat{S}_y + g_{zi}\beta H_z \hat{S}_z).$$ The line of the

paramagnetic resonance of Zr^{91} showed no hyperfine structure.

ASSOCIATION: Fiziko-tekhnicheskiy institut Kazanskogo filiala Akademii nauk SSSR (Physicotechnical Institute of the Kazan' Branch of the Academy of Sciences USSR)

Card 2/3

The paramagnetic electron resonance ...

S/056/62/043/005/054/058
B125/B104

SUBMITTED: August 4, 1962

Card 3/3

FEDOTOV, V.N.; GARIF'YANOV, N.S.; KOZYREV, B.M.

Electron paramagnetic resonance in Nb4+. Dokl.AN SSSR 145
no.6:1318-1320 Ag '62.
(MIRA 15:8)

1. Kazanskiy filial AN SSSR. Predstavleno akademikom B.A.
Arbuzovym.
(Niobium chloride) (Magnetic resonance and relaxation)

S/020/62/147/002/012/021
B106/B101

AUTHORS: Garif'yanov, N. S., Kozyrev, B. M., Semenova, Ye. I.

TITLE: Electron paramagnetic resonance in compounds of bivalent
            silver

PERIODICAL: Akademiya nauk SSSR.. Doklady, v. 147, no. 2, 1962, 365-367

TEXT: The e. p. r. spectra of some compounds of bivalent silver were
studied in order to confirm experimentally the strong covalent bond between
silver and the ligands which has been postulated by K. D. Bowers (Proc.
Phys. Soc. A, 66, 666 (1953)) for $\left[Ag(Py)_4\right]S_2O_8$, and to ascertain the strong
exchange interactions between the 4d-electrons, which are expected in
analogy to Cu^{II} compounds. Results: Fine crystalline $Ag(C_5H_5N)_4S_2O_8$ (A)
showed at 450 Mcps and $77^\circ K$ a peak with $g = 2.15$, $\delta H = 26$ oerst. This, and
also the independence of the coefficient of paramagnetic susceptibility
χ of H_0 indicate an exchange interaction between the 4d electrons. At
9320 Mcps, 77 and $295^\circ K$ a line with $g_\parallel = 2.17 \pm 0.01$, $g_\perp = 2.08 \pm 0.01$ was

Card 1/2

Electron paramagnetic resonance in ...   S/020/62/147/002/012/021
B106/B101

recorded. Aqueous solutions of A gave at $77^{\circ}K$ a curve with $g_{\parallel} = 2.16 \pm 0.01$, $g_{\perp} = 2.06 \pm 0.01$, and with 11 superposed peaks of the hyperfine structure. This spectrum is explained by the covalent bond of the Ag (II) ion with the pyridine molecules containing a nitrogen atom with $I = 1$. Solid solutions of A with the isomorphic cadmium compound did not make it possible to resolve the hyperfine structure, but undercooled solutions of $Ag(NO_3)_2 \cdot xH_2O$ in HNO_3, and $Ag(ClO_4)_2$ in $HClO_4$ showed at $77^{\circ}K$, 9320 Mcps an anisotropic well resolved doublet with $g_{\parallel} = 2.337$, $g_{\perp} = 2.071$, contrasting with the data by J. A. McMillan, B. Smaller (Chem. Phys. 35, 1698 (1961)). There is 1 figure.

ASSOCIATION: Fiziko-tekhnicheskiy institut Kazanskogo filiala Akademii nauk SSSR (Physicotechnical Institute of the Kazan' Branch of the Academy of Sciences USSR)

PRESENTED: June 25, 1962, by A. Ye. Arbuzov, Academician

SUBMITTED: June 21, 1962

Card 2/2

GARIF'YANOV, N.S.; USACHEVA, N.F.

Electron paramagnetic resonance in liquid solutions containing Gd^{3-}.
Zhur.strukt.khim. 4 no.6:916-918 N-D '63.   (MIRA 17:4)

1. Kazanskiy filial AN SSSR.

YAFAYEV, N.R.; GARIF'YANOV, N.S.; YABLOKOV, Yu.V.

Electron paramagnetic resonance of V^{5+} ions in glasses.
Fiz. tver. tela 5 no.6:1673-1677 Je '63.   (MIRA 16:7)

1. Gosudarstvennyy opticheskiy institut imeni S.I. Vavilova,
Leningrad.

YAFAYEV, N.R.; GARIF'YANOV, N.S.

Electron paramagnetic resonance of Nb^{4+} ions in silicate glasses.
Fiz. tver. tela 5 no.10:3025-3026 O '63.   (MIRA 16:11)

1. Gosudarstvennyy opticheskiy institut im. S.I. Vavilova, Leningrad.

L 18578-63   EWT(1)/EWP(q)/EWT(m)/BDS/EEC(b)-2   AFFTC/ASD/ESD-3/IJP(C)
Pi-4/Pq-4   GG/JD/WH/JG

ACCESSION. NR: AP3001289   s/0181/63/005/006/1673/1677

AUTHORS: Yafayev, N. R.; Garif'yanov, N. S.; Yablokov, Yu. V.

TITLE: Electron paramagnetic resonance of W sup 5+ ions in glass

SOURCE: Fizika tverdogo tela, v. 5, no. 6, 1963, 1673-1677

TOPIC TAGS: electron paramagnetic resonance, W, glass, silicate glass, phosphate glass, g-factor, hyperfine structure, silica tetrahedron

ABSTRACT: The electron paramagnetic resonance of pentavalent W ions was studied in silicate and phosphate glasses at frequencies of 9320 and 440 megacycles and at temperatures of 295 and 77K. At the low frequency and low temperature all specimens displayed narrow symmetrical lines with a g-factor of about 1.6, the shape of the lines being approximately gaussian. With gradual elevation of temperature the lines grew constantly broader and the position of maximum absorption did not change. At the high frequency and at 77K, broad, almost symmetrical, lines were obtained in silicate glasses, but narrower and more asymmetrical lines were found in phosphate glasses. The shapes of the lines and the values of the g-factors did not change for silicate glasses on attaining room temperature. In the phosphate glasses, however, the lines grew broader on

Card 1/2

L 18578-63

ACCESSION NR: AP3001289

the rise in temperature, and the asymmetry became less clearly defined. These results are explained on the assumption that the W ions are located within the silica tetrahedrons. But more experimental work is needed to determine the position precisely. At the 440 megacycle frequency hyperfine structure was detected from the W^{183} isotope. In the glasses examined by the authors the signal of electron magnetic resonance was observed only from pentavalent W, which has an electron spin of $\frac{1}{2}$. For other paramagnetic ions of W having a spin greater than $\frac{1}{2}$, the lines of electron paramagnetic resonance in glasses should be blurred by the fine structure. Orig. art. has: 2 figures, 1 table, and 1 equation.

ASSOCIATION: Gosudarstvenny*y opticheskiy institut im. S. I. Vavilova, Leningrad (State Optical Institute)

SUBMITTED: 04Feb63   DATE ACQ: 01Jul63   ENCL: 00

SUB CODE: PH   NO REF SOV: 004   OTHER: 005

Card 2/2

S/072/63/000/003/001/004
B101/B186

AUTHORS: Garif'yanov, N. S., Candidate of Physics and Mathematics, Rubtsov, N. I., Physicist, Ryshmanov, Yu. M., Physicist

TITLE: E.p.r. spectra in silicate glasses containing three-valent titanium

PERIODICAL: Steklo i keramika, no. 3, 1963, 11-12

TEXT: The e.p.r. spectra of some silicate glasses containing 0-20% TiO_2 were taken at 9320 and 450 Mc/sec. Results:

glass	TiO_2,%	450 Mc/sec H,oerst. 300°K	450 Mc/sec H,oerst. 77°K	450 Mc/sec g factor	9320 Mc/sec H,oerst. 300°K	9320 Mc/sec H,oerst. 77°K	9320 Mc/sec g factor
N-519	0	-	-	-	-	-	-
N-519	1	-	-	-	-	-	-
N-519	10	-	7	1.9	-	-	-
N-519	15	9	13	1.9	71	71	1.946
N-519	20	-	8	1.9	-	-	-
no.6	7.5	-	5	1.9	-	-	-
no.11	4	-	-	-	-	-	-

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E.p.r. spectra in silicate glasses ...   S/072/63/000/003/001/004
                                           B101/B186

It was found in an earlier paper (ZhETF, 1960, v.39) that supercooled
solutions of Ti^{3+} compounds have similar e.p.r. spectra. It is
therefore concluded that when the glass is melted, the Ti^{4+} is partially
reduced to Ti^{3+}. In M-519(M-519) glass the octahedral crystal field,
formed by six oxygen atoms, splits the five-fold orbital level of Ti^{3+}
into an upper doublet and a lower triplet. The low-symmetry fields pro-
duced by distortions of the oxygen octahedron and by particles of the
second sphere of coordinates split the orbital triplet into a lower
singlet and doublet. Since the narrow e.p.r. line in M-519 glass
containing 15% TiO_2 is observed even at room temperature, the value Δ
of the splitting of the orbital triplet must be rather high. The
resonance line at 450 Mc/sec in glasses containing 7.5, 10 and 20% TiO_2
is observed only at $77^\circ K$. This is explained by the fact that in this
case the Ti^{3+} ions are in a symmetric field and the e.p.r. line becomes
so wide at room temperature that it cannot be observed any more. The
strong broadening of the line at 9320 Mc/sec is explained by the
presence of two local fields. This causes a superposition, leading to

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E.p.r. spectra in silicate glasses ...

S/072/63/000/003/001/004
B101/B186

a broad e.p.r. peak independent of temperature. The Ti^{3+} concentration in M-519 glass (15% TiO_2) was found to be 3% by comparing the area of the e.p.r. curves at $77^\circ K$ in supercooled solutions of Ti^{3+} of known concentration with the areas of the e.p.r. spectra for the glasses. The paramagnetic ion content of the glasses can be determined quantitatively in this way. There are 1 figure and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR
(Physicotechnical Institute of the Kazan' Branch AS USSR)
(N.S. Garif'yanov); Saratovskiy filial Instituta stekla
(Saratov Branch of the Institute of Glass)(M.I. Rubtsov);
Institut organicheskoy khimii AN SSSR (Institute of
Organic Chemistry AS USSR)(Yu.M.Ryzhmanov)

Card 3/3

GARIF'YANOV, N.S.; MAC'HOV, R.K.; TSACHEVA, N.Y.

Rapid method for the quantitative determination of Gd^{3+} in rare earth salt solutions. Zhur. anal. khim. 18 no.2:283-284 F '63.
(MIRA 17:10)

1. Kazan Branch of the Academy of Sciences of the U.S.S.R. and Kazan State University.

ACCESSION NR: AP4009100   . S/0056/63/045/006/1819/1821

AUTHOR: Garif'yanov, N. S.

TITLE: Hyperfine interaction in Re(VI)

SOURCE: Zhurnal eksper. i teoret. fiziki, v. 45, no. 6, 1963,
1819-1821

TOPIC TAGS: rhenium, rhenium 185, rhenium 187, low temperature
glass, sulfuric acid glass, dioxane glass, rhenium oxychloride,
electron paramagnetic resonance, EPR spectrum, EPR fine structure,
hyperfine splitting, hfs splitting constant, spectroscopic splitting
factor

ABSTRACT: Following earlier investigations of tetravalent rhenium
(Low and Llewellyn, Phys. Rev. v. 110, 842, 1958), the author has
studied at 9320 Mc/sec and 77°K the anisotropic hyperfine structure
of electron paramagnetic resonance lines of Re^{185} and Re^{187} in low-

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ACCESSION NR: AP4009100

temperature sulfuric acid and dioxane glasses containing 0.1 mole/liter of Re(VI) in the form of $ReOCl_4$. The analysis of the hfs spectra yielded values 480 and 400 Oersteds for the parallel and transverse hfs anisotropic constants and values 1.90 and 1.77 for the parallel and transverse hfs splitting factor. An increase in the hyperfine interaction with the nucleus with increasing principal quantum number of the single d-electron of the unfilled shell of the iron group metals is confirmed by these results. Orig. art. has: 1 figure.

ASSOCIATION: Fiziko-tekhnicheskiy institut Kazanskogo filiala Akademii nauk SSSR (Physicotechnical Institute, Kazan' Branch, Academy of Sciences SSSR)

SUBMITTED: 14Jun63	DATE ACQ: 02Feb64	ENCL: 01
SUB CODE: PH	NO REF SOV: 009	OTHER: 004

Card 2/3

GARIF'YANOV, N.S.; IL'YASOV, A.V.; YABLOKOV, Yu.V.

Electron paramagnetic resonance in liquid and supercooled solutions
of some free radicals. Dokl. AN SSSR 149 no.4:876-879 Ap '63.
(MIRA 16:3)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR i
Institut organicheskoy khimii AN SSSR, g. Kazan'. Predstavleno
akademikom A.Ye.Arbuzovym.
(Radicals (Chemistry)--Spectra)

L 10831-63   EPF(c)/EWP(j)/EWT(l)/EWT(m)/BDS--AFFTC/ASD--Pr-4/Pc-4--RM/WW/JW/
ACCESSION NR: AP3000754   S/0020/63/150/003/0588/0591   JFW

AUTHOR: Il'yasov, A. V.; Garif'yanov, N. S.; Timerov, R. Kh.

TITLE: The nature of spin-lattice interaction in magnetically weak free radicals

SOURCE: AN SSSR. Doklady, v. 150, no. 3, 1963, 588-591

TOPIC TAGS: electron paramagnetic resonance, time of spin, lattic relaxation, Alpha, Alpha-diphenyl-Beta-picryl-hydrazyl

ABSTRACT: The electron paramagnetic resonance (e.p.r.) was studied in solutions of free radicals of Alpha, Alpha-diphenyl-Beta-picryl-hydrazyl and 2,2,6,6,- tetramethylpentamethylene nitric oxide in methanol, ethanol, benzene, toluene and mixtures of these in glycerin and in water. A study of solid (supercooled) solutions (10^{-2} to 10^{-3} mol/l) indicated the time of spin lattice relaxation was independent of concentration and nature of solvent. The mechanism proposed by I. V. Aleksandrov and G. M. Zhidomirov (Zh. E. T. F., 41, 127, 1961) provides for relaxation time in solid solutions of free radicals. Experiments run at elevated temperatures indicated that collisions (brownian movement) in polar solvents (solvated radicals) were less effective on relaxation than in non-polar solvents (non-solvated radicals). Intensification of signal is not proportional to increase

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L 10831-63
ACCESSION NR: AP3000754

3

in concentration of radicals, but much greater. This supports proposal by McConnel
(J. chem. phys. 25, 709, 1956) that isolated radicals have too long a relaxation
time and are therefore saturated by small forces of the high frequency field and do
not contribute to the e.p.r. signal. In these dilute solutions the mechanism is
considerably dependent on the nature of the solvent. "The authors express thanks
to B. M. Kozyrev for discussion of the results." Orig. art. has: 3 equations, 1
table, 1 figure.

ASSOCIATION: Fiziko-tekhnicheskiy institut Kazanskogo filiala Akademii nauk SSSR
(Physical-Technical Institute of the Kazan Branch of the Academy of Sciences SSSR).
Institut organicheskoy khimii Akademii nauk SSSR Kazan (Institute of Organic Chem-
istry, Academy of Sciences SSSR)

SUBMITTED: 06Feb63   DATE ACQD: 21Jun63   ENCL: 00

SUB CODE: 00   NO REF SOV: 006   OTHER: 004

ch/W
Card 2/2

GARIF'YANOV, N.S.; KUCHERYAVENKO, N.S.; FEDOTOV, V.N.

Study of some solutions of pentavalent molybdenum by the
electron paramagnetic resonance method. Dokl. AN SSSR 150
no.4:802-804 Je '63.   (MIRA 16:6)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR.
Predstavleno akademikom B.A. Arbuzovym.
            (Molybdenum compounds—Spectra)

GARIF'YANOV, N. S.; FEDOTOV, V. N.; KUCHERYAVENKO, N. S.

Electron paramagnetic resonance and nuclear spin echo in oxyfluoride solutions of pentavalent molybdenum. Izv AN SSSR Ser Khim no. 4:743-745 Ap '64.   (MIRA 17:5)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR.

GARIF'YANOV, N.S.; TOKAREVA, L.V.

Use of the paramagnetic resonance method in studying the crystallization
of glasses. Fiz. tver. tela 6 no.5:1453-1456 My '64.

(MIRA 17:9)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR.

ACCESSION NR: AP4034943

AUTHORS: Garif'yanov, N. S.; Zaripov, M. M.

TITLE: The study of glass by electron paramagnetic resonance at low frequencies

SOURCE: Fizika tverdogo tela, v. 6, no. 5, 1964, 1545-1546

TOPIC TAGS: glass, electron paramagnetic resonance, g factor, fine structure

ABSTRACT: The authors studied electron paramagnetic resonance in sulfate and borate glasses, (containing about 0.01 mole/liter of Cr and Gd) in the frequency range 100-600 megacycles and at 300 and 77K. The g factor in the sulfate glass at 77K and in Cr-bearing borate glass at 300 and 77K ranged between 3.00 and 2.95, depending on the frequency. An absorption line with g = 5.33, independent of frequency, was observed in Gd-bearing sulfate glass at 77K. A line with g = 4.70, independent of frequency and temperature, was observed in borate glass. A study of electron paramagnetic resonance spectra indicates the observed effects to be due to the Cr^{3+} and Gd^{3+} ions. It is noted that partially allowed fine structure was observed at frequencies of about 10 kilomegacycles in the EPR spectrum of Gd^{3+}-bearing borate glass; in low-temperature glasses a broad line with g = 1.99 was found.
Card 1/2

ACCESSION NR: AP4034943

Orig. art. has: 1 figure, 1 table, and 2 formulas.

ASSOCIATION: Kazanskiy fiziko-tekhnicheskiy institut AN SSSR (Kazan Physicotechni-
cal Institute, AN SSSR); Kazanskiy gosudarstvennyy universitet im. V. I.
Ul'yanova-Lenina (Kazan State University)

SUBMITTED: 09Dec63

SUB CODE: MT   NO REF SOV: 002

ENCL: 00

OTHER: 001

Card 2/2

VOZDVIZHENSKIY, G.S.; GUDIN, N.V.; SHAPNIK, M.S.; GARIF'YANOV, N.S.;
    IL'YASOV, A.V.

Electron paramagnetic resonance study of the electrode processes
of copper complexes with organic amino derivatives. Zhur. fiz.
khim. 38 no.6:1682-1685 Je '64.   (MIRA 18:3)

1. Kazanskiy khimiko-tekhnologicheskiy institut imeni Kirova
i Institut organicheskoy khimii AN SSSR, Kazan'.

ACCESSION NR: AP4019213   S/0056/64/046/002/0501/0504

AUTHORS: Garif'yanov, N. S.; Kamenev, S. Ye.

TITLE: Hyperfine structure of the EPR lines of the V-50 and V-51 isotopes

SOURCE: Zhurnal eksper. i teor. fiz., v. 46, no. 2, 1964, 501-504

TOPIC TAGS: vanadium 50, vanadium 51, electron paramagnetic reso-nance, liquid solution EPR lines, supercooled solution EPR lines, hyperfine structure, isotropic hyperfine structure, anisotropic hyperfine structure, hyperfine structure constants, nuclear moment ratio

ABSTRACT: The isotropic and anisotropic hyperfine structure of the EPR lines of the V^{4+} ion was investigated in liquid and in super-cooled solutions. The measurements were made at 9,320 Mcs and at 295 and 77K and the solvents were 20% HF and 30% HCl. The constants

Card 1/3

ACCESSION NR: AP4019213

of the isotropic and anisotropic hyperfine structures were found to be

$$A_\parallel^{51} = 202 \pm 10\,Oe, \quad A_\perp^{51} = 76 \pm 5\,Oe;$$
$$A_\parallel^{50} = 78 \pm 5\,Oe, \quad A_\perp^{50} = 31 \pm 5\,Oe.$$

Within the limits of experimental error, the ratios of the isotropic and anisotropic hfs constants of V^{50} and V^{51}, calculated with allowance for the spins, turned out to be equal to the ratios of the corresponding nuclear moments. In addition, the local electric fields of the ion V^{4+} remain unchanged, on going from the liquid to the supercooled state. "The authors take this opportunity to thank Professor S. A. Al'tshuler for a discussion of of the results and Moskovskaya mezhoblastnaya kontora "Izotop" (Moscow Interregional Isotope Office) for rapidly supplying high-grade enriched vanadium

Card. 2/3

ACCESSION NR: AP4019213

compound." Orig. art. has: 2 figures and 4 formulas.

ASSOCIATION: Kazanskiy gosudarstvenny*y universitet (Kazan' State
University)

SUBMITTED: 06Aug63   DATE ACQ: 27Mar64   ENCL: 00

SUB CODE: PH   NO REF SOV: 002   OTHER: 008

Card 3/3

GARIF'YANOV, N. S.

Study of some complexes of pentavalent chromium by electron par-
amagnetic resonance. Dokl. AN SSSR 155 no. 2 385-388 Mr '64.
(MIRA 17:5)

1. Fir·ko-tekhnicheskiy institut Kazanskogo filiala AN SSSR.
    P·edstavleno akademikom A. Ye. Arbuzovym.

GARIF'YANOV, N.S.;   KOZYREV, B.M.; FEDOTOV, V.

   Electron paramagnetic resonance in thiocyanate complexes of
   Mo (V) and W (V). Dokl. AN SSSR 156 no. 3:641-643 '64.
                                          (MIRA 17:5)

   1. Kazanskiy fiziko-tekhnicheskiy institut AN SSSR. Predstavleno
   akademikom A. Yu.Arbuzovym.

LEZHNEV, N.N.; KOZYREV, B.M.; GARIF'YANOV, N.S.; RYZHMANOV, Yu.M.;
     NOVIKOVA, I.S.

     Probable mechan'sm underlying the reaction of carbon black with
     phenyl-2-naphthylamine and mercaptobenzothiazole (captax). Dokl.
     AN SSSR 159 no.5:1127-1130 D '64   (MIRA 18:1)

     1. Nauchno-issledovatel'skiy institut shinnoy promyshlennosti
     i Kazanskiy fiziko-tekhnicheskiy institut AN SSSR. Predstavleno
     akademikom M.M. Dubininym.

GARIF'YANOV, N.S.; KOZYREV, B.M.; FEDOTOV, V.N.

Electron paramagnetic resonance in Mo (V) complexes with diethyl-
phosphorodithioic acid. Teoret. i eksper. khim. 1 no.1:118-122 Ja-
F '65.   (MIRA 18:7)

1. Kazanskiy fiziko-tekhnicheskiy institut AN SSSR.

GARIF'YANOV, N.S.; KOZYREV, B.M.

Electron paramagnetic resonance in solutions of diethyl
dithiophosphate of bivalent copper. Zhur.strukt.khim. 6
no.5:772-775 S-O '65.
(MIRA 18:12)

1. Kazanskiy fiziko-tekhnicheskiy institut AN SSSR. Submitted
January 25, 1965.

L 51552-65   EWT(1)/EWT(m)/EPF(c)/EWP(j)/EEC(t)/T   Po-4/Pi-4   IJP(c)

WW/GG/RM

ACCESSION NR: AP5010762   UR/0181/65/007/004/1274/1275

                                                          34
                                                          33
AUTHOR: Garif'yanov, N. S.; Kharakhash'yan, E. G.   (3
                                        21
TITLE: Electron paramagnetic resonance in supercooled solutions of Fe(III),
Ru(III), and Os(III)

SOURCE: Fizika tverdogo tela, v. 7, no. 4, 1965, 1274-1275

TOPIC TAGS: supercooled solution, low temperature glass, electron paramagnetic
resonance, g factor, spin Hamiltonian, spin lattice relaxation

ABSTRACT: The electron paramagnetic resonance method was used to investigate low-
temperature glass containing octahedral complexes with strong covalent bonds:
$K_3Fe(CN)_6$--$3d^5$, Na_3RuCl_6--$4d^5$, and Na_3OsCl_6--$5d^5$. The measurements were made at
frequencies 200 and 9320 Mcs at 4.2K. The solvents were glycerine for the ferri-
cyanide and weak hydrochloric acid for the ruthenium and osmium double chlorides.
At 300 Mcs, narrow asymmetric EPR lines were observed, with a spectroscopic split-
ting factor close to 2. The g-factor values were 2.3 ± 0.1, 2.0 ± 0.1, and 1.8 ±
± 0.1 for Fe(III), Ru(III), and Os(III), respectively. At 9320 Mcs, no EPR lines
could be observed in the investigated glasses. It is deduced from the measurements

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L 51552-65
ACCESSION NR: AP5010762

that the investigated substances have very strong anisotropy of the g-factor, which
governs the EPR line width even at 300 Mcs. The anisotropy of the g-factor is ap-
parently smaller in the Na_3OsCl_6 complexes than in the others. It is pointed out
in the conclusion that in view of the strong dependence of the spin-lattice relaxa-
tion time on the concentration, it can be assumed that exchange pairs are produced
in these glasses. The existence of these pairs in single-crystal $K_3(Fe, Co)(CN)6$
was established earlier by A. M. Prokhorov and V. B. Fedorov (ZhETF v. 46, 1937,
1934). Orig. art. has: 1 figure, 2 formulas, and 1 table.

AS :IATION: Kazanskiy fiziko-tekhnicheskiy institut AN SSSR (Kazan' Physiotech-
nical Institute AN SSSR)

SUBMITTED: 20Nov64   ENCL: 00   SUB CODE: NP, SS

NR REF SOV: 003   OTHER: 004

Card 2/2

GARIF'YANOV, N.S.; USACHEVA, N.F.

Superfine structure of electron paramagnetic resonance lines
in supercooled solutions of VO²⁺ and Cu²⁺. Zhur. fiz. khim.   (MIRA 18:12)
38 no.5:1367-1369 My '64.

1. Kazanskiy filial AN SSSR.   Submitted March 23, 1963.

VOZDVIZHENSKIY, G.S.; GUDIN, N.V.; SHAPNIK, M.S.; IL'YASOV, A.V.;
    GARIF'YANOV, N.S. (Kazan')

Electron paramagnetic resonance study of electrode processes in
aqueous solutions of copper complexes. Zhur. fiz. khim. 39 no. 1:
64-67 Ja '65
                                        (MIRA 19:1)

1. Institut organicheskoy khimii AN SSSR, Kazan'. Submitted
January 10, 1964.

L 24761-66   EWT(m)/EWP(j)/T   RM

ACC NR: AP6015540   SOURCE CODE: UR/0379/65/001/001/0118/0122

AUTHOR: Garif'yanov, N. S.; Kozyrev, B. M.; Fedotov, V. N.

ORG: Kazan' Physicotechnical Institute, AN SSSR (Kazanskiy fiziko-tekhnicheskiy institut AN SSSR)

TITLE: Electron paramagnetic resonance in complexes of Mo(V) with diethyldithiophosphoric acid

SOURCE: Teoreticheskaya i eksperimental'naya khimiya, v. 1, no. 1, 1965, 118-122

TOPIC TAGS: electron parametric resonance, complex molecule, molybdenum, organic phosphorus compound, solvent extraction

ABSTRACT: The EPR method was used to study complexes of pentavalent molybdenum with diethyldithiophosphoric acid. The experiments were conducted at frequencies of 9320 megacycles and 300 megacycles at room temperature and at 77°K. The complexes were prepared by the action of diethyldithiophosphoric acid on aqueous solutions of oxyfluoride, oxychloride, oxybromide, and oxysulfate of Mo(V), strongly acidified by HF, HCl, HBr, or H_2SO_4. The EPR spectra were investigated in both polar and nonpolar solvents, capable of extracting Mo(V) complexes from the initial solution, namely: carbon tetrachloride, benzene, toluene, diethylester, and ethanol. The EPR spectra of complexes of M(V) dissolved in excess diethyldithiophosphoric acid were also studied. It was concluded that the complex studied has the form of an axially distorted octahedron. The authors thank I. P. Lipatova for her carrying out the infrared spectra measurements in liquid solutions. Orig. art. has: 1 figure and 2 formulas. [JPRS]

SUB CODE: 07, 20 / SUBM DATE: 20Nov64 / ORIG REF: 004

Card 1/1

ACC NR: AP7003537   SOURCE CODE: UR/0386/67/005/001/0024/0025

AUTHOR: Garif'yanov, N. S.; Khabibullin, B. M.; Kharakhash'yan, E. G.; Bezzubov, A.L.

ORG: Kazan' Physicotechnical Institute, Academy of Sciences SSSR (Kazanskiy fiziko-tekhnicheskiy institut Akademii nauk SSSR)

TITLE: Electron paramagnetic resonance in lithium containing impurities of group IIB metals

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 5, no. 1, 1967, 24-25

TOPIC TAGS: lithium, electron paramagnetic resonance, spin orbit relaxation, spin orbit interaction, conduction electron, epr spectrum, line width

ABSTRACT: To check whether the main mechanism of spin relaxation is spin-orbit interaction of the conduction electrons with the impurity atoms, the authors investigated the effect of small admixtures of Zn, Cd, and Hg on the EPR line width of Li. The initial material was ~99% pure LE-1 lithium (measured relaxation time $T_1 = 9.4 \times 10^{-9}$ sec). The alloy was prepared in an atmosphere of pure helium and dispersed by ultrasound in dehydrated paraffin to an average particle size ≤ 8 μ. The measurements were made at 9320 MHz and room temperature. It follows from the experimental data that the peak line width δH increases linearly with increasing c in the investigated concentration interval. An estimate shows that the spin-orbit interaction of electrons with the impurity atoms in the metal does not differ in order of magnitude from its value

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ACC NR: AP7003537

for the free atom. Consequently, the expected effect of screening the spin-orbit in-
teraction by conduction electrons is nonexistent. The contrary is more likely, that
if the presented estimates are correct the redistribution of the electron density
near the impurity atom leads to an antiscreening effect which apparently has a ten-
dency to grow with increasing Z. The authors thank Professor B. M. Kozyrev for con-
tinuous interest in the work and valuable advice. Orig. art. has: 1 figure, 1 for-
mula, and 1 table.

SUB CODE: 20/   SUBM DATE: 20Oct66/   OTH REF: 004

Card 2/2

L 46834-66   EWT(1)/EWP(e)/EWT(m)/EWP(t)/ETI   IJP(c)   JD/WW/GG/WH

ACC NR: AR6013643

SOURCE CODE: UR/0058/65/000/010/D075/D075

AUTHOR: Garif'yanov, N. S.; Zaripov, M. M.

REF SOURCE: Sb. Itog. nauchn. konferentsiya Kazansk. un-ta za 1963 g. Sekts.: paramagnitn. rezonansa, spektroskopii i fiz. polimerov, radiofiz., astron., bion. Kazan, 1964, 6

TITLE: The study of EPR of Cr^{3+} and Gd^{3+} in glasses at low frequencies

SOURCE: Ref. zh. Fizika, Abs. 10D540

TOPIC TAGS: EPR, Hamiltonian

TRANSLATION: Experimental and theoretical studies of EPR of Cr^{3+} and Gd^{3+} in a number of different supercooled solutions and glasses were conducted at frequencies of 100 Mhz. It is shown that the weak field condition obtains at these frequencies. The theoretical interpretation is based on an assumption that the rhombic component of the spin Hamiltonian is large compared to the others. A good agreement between calculated values and experimental data was obtained.

SUB CODE: 20/   SUBM DATE: none

Card 1/1   blg

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Nerves of the ductus arteriosus in dogs [with summary in English].
Biul.eksp.biol. i med. 46 no.7:93-97 Je '58   (MIRA 11:7)

1. Iz kafedry normal'noy anatomii (zav. - prof. B.M. Sokolov)
Ryazanskogo meditsinskogo instituta imeni akademika I.P. Pavlova.
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            (DUCTUS ARTERIOSUS, innervation,
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The ability of adsorbed chlorophyll to photosensitize oxidation-
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