30060
S/048/61/025/011/004/031
B108/B138

Coexistence of the ferroelectric and...

Neel temperature of the substance containing no nonmagnetic ions. Experimental and theoretical results agree well. The calculated magnetic moment is too high, which indicates that the magnetic ordering of the ions is not complete. There are 4 figures, 1 table, and 9 references: 4 Soviet and 5 non-Soviet. The three most recent references to English-language publications read as follows: Orgel L. E., J. Chem. Soc., no. 12, 3815 (1959); Gilleo M. A., J. Phys. Chem. Solids, 13, 33 (1960); Fang P. H. et al., Bull. Amer. Phys. Soc., ser. II, 5, no. 1, part 1, 57 (1960)

ASSOCIATION: Institut poluprovodnikov Akademii nauk SSSR (Institute for Semiconductors of the Academy of Sciences USSR)

Card 4/6

15 2660
24.2200 (1144, 1147, 1137)

30075
S/048/61/025/011/021/031
B117/B102

AUTHORS: Smolenskiy, G. A., Polyakov, V. P., and Yudin, V. M.

TITLE: Magnetic properties of some ferrimagnetics with perovskite and garnet-type structure

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 25, no. 11, 1961, 1396-1398

TEXT: The earlier shown possibility (Ref. 1: Smolenskiy, G. A., Isupov, V. A., Kraynik, N. N., Agranovskaya, A. I., Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 25, no. 11, 1961, 1333) of producing ferrimagnetics as solid solutions with perovskite structure by ions in the octahedral sublattice was checked on $LaFeO_3$ - $Sr(Ni_{0.5})O_3$ solid solutions. Polycrystalline specimens were prepared from the pulverized metal oxides by double annealing in air at 1100°C (2 hr) and 1350°C (4 hr). An X-ray structural analysis performed by A. G. Tutov showed that homogeneous solid solutions with perovskite structure will form in the examined system, with most of the compounds containing only little of the second phase. The magnetic moments were determined by the Faraday method

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S/048/61/025/011/021/33
B117/B102

Magnetic properties of some .

using Mohr's salt as a standard. The inhomogeneous magnetic field had a sufficiently large region of constant gradient. Between the poles it reached 8000 oe. The specimens were pressed into spheres 1-3 mm in diameter, depending on the magnitude of the magnetic moment of the substance. The measurements were made in the temperature range between -196° and +850°C. H = 0 was found for magnetization by extrapolation according to the linear law of m = f(H). The phase transitions were strongly diffuse in the examined solid solutions, and one must therefore speak of a Curie range instead of a Curie point. Magnetization was examined as a function of concentration of the second component. It was established that ions are not completely ordered if the content of the second component attains up to 55 mole%. If it is more than 55 mole%, it may be assumed that the statistical ion distribution curve in octahedral sublattices of the solid solutions is disturbed, or that there is a second phase. In addition, two series of garnet-structure solid solutions were examined.

1) $(1-x)\left\{Y_3\right\}\left[Fe_2\right](Fe_3)O_{12} - x\left\{Ca_3^{2+}\right\}\left[Fe_2\right](Si_3^{4+})O_{12}$;

2) $(1-x)\left\{Y_3\right\}\left[Fe_2\right](Fe_3)O_{12} - x\left\{YCa_2^{2+}\right\}\left[Fe_2\right](Fe_2Y^{3+})O_{12}$.

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30075
S/048/61/025/011/021/031
B117/B102

Magnetic properties of some

Calculations by M. A. Gilleo (Ref. 3, see below) for determining magnetic moments of mixed garnets were checked with these examples. The specimens were prepared from the metal oxides. The first system was pre-annealed at 1050°-1100°C (1 hr), and the second at 1000°C (1 hr). Final annealing took place at 1250°-1400°C in the first case, and at 1200°-1300°C in the second (1 hr each). A. G. Tutov controlled the formation of solid solutions by X-ray analysis. The lattice parameters became smaller with increasing content of the second component. A $YCa_2Fe_3VO_{12}$ composition was not obtained as a single phase. In case of low concentrations of the second component, magnetization was calculated from the equation $\sigma_{ext.} = \sigma_\infty (1 - a/H^2_{int.})$, and at high concentrations, from $\sigma_{ext.} = \sigma_0 + \chi H_{int.}$. The curves obtained showed a relatively good agreement with experimental results. A greater divergence is observable in the first system around the minimum. Ye. S. Sher is thanked for having provided the specimens, and A. G. Tutov for having studied them. There are 4 figures and 3 references: 1 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: Fresia E. J., Katz E., Ward, R., J. Amer. Chem. Soc., 81, 16, 4783 (1959); ~~Ref.~~

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30074
S/048/61/025/011/020/031
B117/B102

15 2660

AUTHORS: Smolenskiy, G. A., and Andreyev, A. A.

TITLE: A study of ferrimagnetics with magnetoplumbite and garnet structure in strong pulsed magnetic fields

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 25, no. 11, 1961, 1392-1395

TEXT: The authors determined the saturation magnetization and the spin configuration at room temperature and at liquid-nitrogen temperature of a large group of rare-earth hexoferrites which were synthesized in the authors' laboratory in the Institut poluprovodnikov Akademii nauk SSSR (Institute of Semiconductors of the Academy of Sciences USSR). They also examined the non-collinear orientation of spins in rare-earth garnets. Pulsed magnetic fields (up to 150 koe) were produced by discharge of a capacitor battery over a solenoid. The pulse duration was $2 \cdot 10^{-3}$ sec. In a 0.5 cm^3 volume, the field inhomogeneity did not exceed a few percents. Two balanced coils were connected in series, and the sample, spherical or cylindrical, of a volume of up to 50 mm^3, was inserted into

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30874
S/048/61/025/011/020/031
B117/B102

A study of ferrimagnetics . . .

one of them. An oscilloscope indicated the signals. The maximum error of measurement was 7%. To maintain the required electric neutrality, a trivalent rare-earth ion (or Bi^{3+} ion) to replace Ba^{2+}, and a bivalent Ni^{2+}, Mg^{2+}, Co^{2+} ion or others to replace Fe^{3+}, were introduced simultaneously. A large group of solid solutions on barium hexoferrite base, including new compounds of the type $M^{3+}Fe^{3+}_{12}M^{2+}O_{19}$ with magnetoplumbite structure, were obtained in this way. The solid solutions $(1-x)\,Ba^{2+}Fe^{3+}_{12}O_{19} - xM^{3+}Fe^{3+}_{11}M^{2+}O_{19}$ were examined. $M^{3+} = La^{3+}$ Pr^{3+} or Bi^{3+}; $M^{2+} = Co^{2+}$ or Ni^{2+}. Synthesis took place by solid phase reaction. Pre-annealing was carried out at 1100°C, and final annealing at 1250°C. For compositions with bismuth oxide, these temperatures were reduced as far as 800°C and 970°-1100°C, respectively. A. G. Tutov performed the X-ray structural analysis. Magnetization measurements showed that saturation magnetization drops with a rise of the content of the second component. The differential susceptibility determined by the hysteresis loop was low in strong fields. This points to a collinear orientation of the magnetic moments. When the second component is introduced, the

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A study of ferrimagnetics ..

coercive force of the solid solutions is multiplied, when comparing with barium hexoferrite. The drop of saturation magnetization following the introduction of rare earth ions can only be explained in that the magnetic moment of these ions is probably oriented in antiparallel to the total moment of the remaining ions. If so, the magnetic moment is easily calculated (in Bohr's magnetons per formula unit of the solid solution): $m = 4(1 - x)m_{Fe^{3+}} + x(3m_{Fe^{3+}} + m_{M^{2+}} - m_{M^{3+}})$. $m_{Fe^{3+}}$, $m_{M^{2+}}$, and $m_{M^{3+}}$ are the magnetic moments of the Fe^{3+}, M^{2+}, and M^{3+} ions. When the orbital moments of the rare earth ions are also taken into account; the results agree fairly well with the experimental data. Y, Eu, Ho, and Er garnets as well as solid solutions on holmium base were studied in connection with the umbrella-shaped or conical magnetic structure of Ho^{3+} ions recently established (Ref. 3, see below) by a neutron diffraction study. Ho and Er garnets as well as solid solutions on holmium base excel, in contrast to Y and Eu garnets, by a high differential susceptibility both at room temperature and at 77°K. In case of holmium garnet, it is of the same order of magnitude both above and beneath the compensation point (136°K).

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B117/B102

A study of ferrimagnetics . .

It is therefore little probable that its magnitude could depend upon the para process of the relatively weakly bound magnetic sublattice of rare-earth ions. The umklapp process of magnetic moments expected due to a relatively weak exchange coupling of the sublattice could not be established, in the case of Ho garnet, in fields of up to 150 koe neither at room temperature nor at 77°K. Ye. S. Sher is thanked for having provided the samples, and A. G. Tutov for having studied them. There are 2 figures and 3 non-Soviet references. The two references to English-language publications read as follows: Moruzzi V. L., Shafer M. W., J. Amer. Ceram. Soc., 43, 7 (1960); Ref. 3. Herpin A., Coehler W. C., Meriel P., Bull. Amer. Phys. Soc., 11, 5, 457 (1960).

ASSOCIATION: Institut poluprovodnikov Akademii nauk SSSR (Institute of Semiconductors of the Academy of Sciences USSR)

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24.2200 (1137, 1144, 1164)
15.2660

30077
S/048/61/025/011/023/031
B117/B102

AUTHORS: Smolenskiy, G. A., Chang Tsung, and Sher, Ye. S.

TITLE: Frequency and temperature dependences of initial permeability of ferrites with garnet structure

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 25, no. 11, 1961, 1402-1407

TEXT: The frequency and temperature dependence of the magnetic permeabilities μ' and μ'' of ferrites with garnet structure were studied. Both high-density polycrystalline specimens, and single crystals were used. (Polycrystalline yttrium-ferrite of a resistivity of $\varrho \sim 10^6$ ohm·cm and air-sintered at 1450°C displayed a relaxation of the dispersion of μ' at room temperature.) With rising temperature the maximum of $\mu'(f)$ is shifted toward higher frequencies. In the state of remanent magnetization, μ' is considerably lower than the state of zero magnetization. The magnetic spectrum of polycrystalline resistivity ferrites ($\sim 10^{10}$ ohm·cm) differs significantly from the spectrum of ferrites with a low resistivity. The high resistivity is obtained by introducing MnO which leads to formation

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Frequency and temperature ..

of donor-acceptor pairs. Introduction of CuO allows to reduce the sintering temperature. In this case, a temperature rise shifts the maximum of μ" toward lower frequencies (domain boundary resonance). High-resistivity single crystals display a similar effect, but their resonant frequency is at room temperature by one order of magnitude lower than that of polycrystalline specimens. The magnetic spectra of high-resistivity ferrites were almost independent of the state of magnetization. Magnetic spectra of one and the same specimens were examined when changing resistivity by heat treatment in various gaseous media. Measurements were made prior to and after heat treatment on toroidal single-crystal specimens. At low temperatures, resistivity was found to be inversely proportional to the initial permeability. It is pointed out that annealing might change μ' due to a change of the domain structure as defects form or disappear. Independently of resistivity, these ferrite single crystals have low dielectric constants, a fact which was first established by Ya. M. Ksendzov. Up to now it was assumed that all ferrites with low μ should have a high ε, which was explained by macroheterogeneities of the specimens. In addition to yttrium ferrite, solid solutions based on it were examined. Values of initial permeability are presented in Table 2 for several solid solutions. As may be seen, μ'

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Frequency and temperature ...

in case of yttrium ferrite or of rare-earth ferrites does not grow larger unless diamagnetic ions are introduced into the octahedral sublattice. There are 6 figures, 2 tables, and 2 Soviet references.

Legend to Table 2: (1) content, mole%; (2) first component; (3) second component; (4) final annealing; (5) maximum temperature, °C; (6) holding time, hr; (7) initial low-frequency permeability at 20°C.

X.

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24 7900

S/181/62/004/005/003/055
B102/B104

AUTHOR: Smolenskiy, G. A.

TITLE: Thermodynamic theory of crystals with ferroelectric and ferromagnetic properties

PERIODICAL: Fizika tverdogo tela, v. 4, no. 5, 1962, 1095 - 1098

TEXT: L. D. Landau's and Ye. M. Lifshits' theory of phase transitions (Statisticheskaya fizika - Statistical physics - GTTL, M.-L., 1951) is used to investigate the thermodynamic properties of crystals which possess both ferroelectric ferro- or antiferromagnetic properties. Their discovery was reported in Izv. AN SSSR, ser. fiz. 11, 1733, 1961. Depending on the ordering of spins and electric dipoles these crystals are designated as ferroelectric-ferromagnetic, ferroelectric-antiferromagnetic, antiferroelectric-ferromagnetic, etc. Ferroelectric-ferromagnetic crystals are considered here in the neighborhood of the transition points without allowing for anisotropy and internal stresses. It is assumed that the crystal under consideration is homogeneous and that the ferroelectric and

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43142
S/181/62/004/011/049/049
B108/B186

AUTHORS: Smolenskiy, G. A., Yudin, V. M., and Sher, Ye. S.

TITLE: A new group of antiferromagnetics with K_2NiF_4-type structure

PERIODICAL: Fizika tverdogo tela, v. 4, no. 11, 1962, 3350-3351

TEXT: Compounds of the type $A_2^{3+}B^{2+}O_4$ (A^{3+} = La^{3+}, Ce^{3+}, Pr^{3+}, Nd^{3+}; B^{2+} = Ni^{2+}, Co^{2+}) are antiferromagnetic when either the ions B or both the ions B and A have magnetic moments. Crystals of this type are assumed to consist of perovskite-type layers mutually displaced. When only the B have magnetic moments, interaction will occur through one or two oxygen atoms (B-O-B or B-O-O-B). When also the ions A have magnetic moments, interaction may be indirect or direct (A-O-A, A-O-B, A-A). The temperature dependence of the magnetic susceptibility χ of the compounds La_2NiO_4 and Nd_2NiO_4 was examined over the range 77-1100°K. The specimens were obtained by solid-phase reaction at 1200°C of the materials La_2O_3, Nd_2O_3, and NiO. The temperature Θ, obtained by extrapolation of $1/\chi(T)$ from high-temperature

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regions, equals 500°K for La_2NiO_4 and 440°K for Nd_2NiO_4. The effective magnetic moments as determined from the inclination of the $1/\chi(T)$ curve is 3.7 Bohr's magnetons for La_2NiO_4 and 7.5 Bohr's magnetons for Nd_2NiO_4. The dependence $\chi(T)$ is linear at high temperatures but tends to a maximum corresponding to phase transition on approaching the Neel point. This is characteristic of weak ferromagnetics. The antiferromagnetic behavior of the substances in question can be inferred from the negative sign of the temperature θ; however, a weak ferromagnetism may arise as the result of relativistic interactions. There are 2 figures.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad (Institute of Semiconductors, AS USSR, Leningrad)

SUBMITTED: July 26, 1962

S/181/62/004/012/033/052
B125/B102

AUTHORS: Mitsek, A. I., and Smolenskiy, G. A.

TITLE: The thermodynamic theory of seignettoelectric ferromagnetic materials

PERIODICAL: Fizika tverdogo tela, v. 4, no. 12, 1962, 3581-3592

TEXT: A theory of seignettoelectric ferromagnetic materials is established by generalizing the thermodynamic theories of ferromagnetism and ferroelectricity. The portion of the thermodynamic potential $\Phi_y = \Phi_{y\cdot y} + \Phi_{э\cdot y} + \Phi_{м\cdot y} + \Phi_{\sigma}$ (1.1) that depends on the equilibrium components of the deformation tensor u_{ij} is composed of the isotropic contribution

$$\Phi_{y.y.}=\frac{1}{2}\left(c_{11}-\frac{1}{2}c_{12}\right)u_{ii}u_{ii}+\frac{1}{4}c_{12}(\Delta\omega)^2+\frac{1}{4}c_{44}u_{ij}u_{ij},\ (i\neq j) \quad (1.2),$$

the free electroelastic energy

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The thermodynamic theory of ...

$$\Phi_{e.y.} = qP^2\Delta\omega + q_1P_i^2u_{ii} + \frac{1}{2}q_2P_iP_ju_{ij}, \quad (i \neq j) \tag{1.3},$$

the free magnetoelastic energy

$$\Phi_{m.y.} = LM^2\Delta\omega + L_1M_i^2u_{ii} + \frac{1}{2}L_2M_iM_ju_{ij}; \tag{1.4}$$

and the energy $\Phi_\sigma = -K\sigma_{ii}u_{ii} - \mu\sigma_{ij}u_{ij}$ $(i > j)$ of the external potentials. $\Delta\omega = \sum u_{ii}$, $(i, j = x,y,z)$ denotes the change in volume. The dimensions of a seignetoelectric ferromagnetic body depend symmetrically on the electric polarization $\vec{P}$ and on the magnetization $\vec{M}$. The contributions made to the free energies of the ferromagnetic and ferroelectric subsystems, and to the magnetoelectric energy, are obtained by inserting the equilibrium deformations in (1.1). The magnetoelectric energy results from interaction between the magnetoelastic and the electroelastic energy of the lattice.

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The thermodynamic theory of ...

subsystems. Both types of energy occur when the external potentials σ_{ij} are applied. The free energies for the tetragonal, rhombohedral and orthorhombic phase, given by

$$F_A^{(1)} = F_{A0}^{(1)} + \frac{1}{4}\beta a_i^2 \alpha_i^2 + \frac{1}{2}(\gamma_2 + \gamma_3)\alpha_3^2, \qquad (2.4),$$

$$F_A^{(2)} = F_{A0}^{(2)} + \frac{1}{4}\beta a_i^2 \alpha_i^2 + \frac{1}{3}\gamma_3(\alpha_1\alpha_2 + \alpha_2\alpha_3 + \alpha_3\alpha_1), \qquad (2.5) \text{ and}$$

$$F_A^{(3)} = F_{A0}^{(3)} + \frac{1}{4}\beta a_i^2 \alpha_i^2 + \frac{1}{4}(\gamma_2 + \gamma_3)(\alpha_1^2 + \alpha_2^2) + \frac{1}{2}\gamma_3\alpha_1\alpha_2; \qquad (2.6),$$

are derived from the free energy of the crystallographic anisotropy, which is accurate to the fourth power of the direction cosines α_i of the magnetization and β_i of the electric polarization. γ_2 and γ_3 are the

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The thermodynamic theory of ...

parameters of the magnetoelectric energy if (1.1) is not taken into account. The dielectric tensor is $\varepsilon_{ij} \sim 4\pi\chi_{ij}^{(ee)}$, where $\chi_{ij}^{(ee)} = -(\partial^2 \Phi/\partial E_i \partial E_j)$ are the components of the tensor of the dielectric susceptibility and Φ is the thermodynamic potential. $\chi_{ij}^{(mm)} = -(\partial^2 \Phi/\partial H_i \partial H_j)$ is the magnetic susceptibility and $\chi_{ij}^{(em)} = -\chi_{ji}^{(me)} = -(\partial^2 \Phi/\partial E_i \partial H_j)$ is the magnetoelectric susceptibility. The equation $(\partial P_i/\partial H_j) = (\partial M_j/\partial E_i)$ is valid.

The susceptibility tensor of the third rank and of the third order can be written as tensor of the second rank and of the sixth order

$$\left\| \begin{matrix} \| \chi_{ij}^{(ee)} \| & \| \chi_{kl}^{(em)} \| \\ \| \chi_{lk}^{(me)} \| & \| \chi_{mn}^{(mm)} \| \end{matrix} \right\|$$

. The piezomagnetoelectric coefficients $\Pi_{ij,kl} = \partial \vec{u}_{ij}/\partial E_k \partial H_l = \partial d_{ij,k}/\partial H_l = \partial D_{ij,l}/\partial E_k$ express the

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The thermodynamic theory of ...

relation between the tensors of the piezomoduli $d_{ij,k} = (\partial u_{ij}/\partial E_k)_{\vec{E}} \neq 0$ and the coefficients of the paraprocess of magnetostriction. Moreover photoelectromagnetic, thermoelectromagnetic and other new mixed static effects may occur in seignettoelectric ferroelectric materials; they are found to be analogs of the piezoelectromagnetic forces. With increasing deviation from the cubical symmetry, and neglecting other similar effects, the Landau theory of phase transitions of the second kind can be applied in the neighborhood of the magnetic Curie point Θ_{mag} and of the electric Curie point Θ_{el}. If $\Theta_{el} > \Theta_{mag}$ $(\Theta_{el} - \Theta_{mag} \sim \Theta_{el})$, the thermodynamic potential Φ in the vicinity of Θ_{mag} can be expanded in a series

$$\Phi = \Phi_0 + \frac{1}{2}[a + \tilde{\gamma}_1(P^2)]\mathbf{M}^2 + \frac{1}{4}\bar{A}\mathbf{M}^4 + \frac{1}{4}B\sum M_i^4 + \frac{1}{2}\tilde{\gamma}_2''\mathbf{P}^2\mathbf{P}_i^2 M_i^2 + \quad (4.1)$$
$$+ \frac{1}{2}\tilde{\gamma}_3''P^2(\beta\mathbf{M})^2 - (\mathbf{MH}) - (\mathbf{PE}).$$

Card 5/6

KRINCHIK, G. S., TYUTNEVA, G. K., Moscow State University - "Some results of magneto-optical investigations of rare earth iron garnets" [Invited paper] Session L; KRINCHIK, G. S. - "Ferromagnetic hall effect at optical frequencies and inner effective magnetic field of ferromagnetic metals" Session O

SMOLENSKIY, Georgiy Anatol'yevich, Institute of Semiconductors, Academy of Sciences USSR - "On the coexistence of electric and magnetic ordering in crystals" [Invited paper] Session H

Report to be presented at -

ELECTRICAL AND ELECTRONIC ENGINEERS, INSTITUTE OF (AIEE) - Ninth Annual Conference on Magnetism and Magnetic Materials - Atlantic City, New Jersey, 12-15 Nov 63

SMOLENSKIY, G. A.; BOKOV, V. A.

"On the coexistence of magnetic and electric ordering in crystals."

Report presented at the 9th Annual Conference on Magnetism and Magnetic Materials, Atlantic City, New Jersey, 12-15 Nov 63.

Institute of Semiconductors, Academy of Sciences of USSR, Leningrad

SMOLENSKIY, G. A., YUDIN, V. M., and POLYAKOV, V. D.,

"Investigation of New Magnetically Ordered Systems."

report presented at the Symposium on Ferroelectricity and Ferromagnetism, Leningrad, 30 May-5 June 1963.

S/056/62/043/003/023/063
B102/B104

AUTHORS: Smolenskiy, G. A., Yudin, V. M., Sher, Ye. S., Stolypin, Yu. Ye.

TITLE: Antiferromagnetic properties of some perovskites

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 3(9), 1962, 877-880

TEXT: The authors studied the magnetic properties of polycrystalline single-phased $LaCrO_3$ and $BiFeO_3$ samples by measuring the temperature dependences of the magnetic susceptibility χ, of $1/\chi$ and of the spontaneous ferromagnetic moment m_o. The $\chi(T)$ curves of both compounds showed sharp peaks at the Neel point, $BiFeO_3$ had no spontaneous ferromagnetic moment, and that of $LaCrO_3$ was very small but could be increased by thermomagnetic treatment. The weak ferromagnetism of these perovskites is assumed to be caused mainly by an anisotropic indirect exchange interaction. It is suggested that the exchange interaction is responsible also for the

S/056/62/043/003/023/063
B102/B104

Antiferromagnetic properties of...

noncolinearity of the spin moments, which is assumed to be the cause of no ferromagnetic moment being observed in $BiFeO_3$. There are 2 figures and 1 table.

ASSOCIATION: Institut poluprovodnikov Akademii nauk SSSR (Institute of Semiconductors of the Academy of Sciences USSR)

SUBMITTED: April 24, 1962

Card 2/2

S/056/62/042/002/054/055
B108/B138

AUTHORS: Bokov, V. A., Myl'nikova, I. Ye., Smolenskiy, G. A.

TITLE: Ferroelectric antiferromagnetics

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 2, 1962, 643-646

TEXT: The authors proved the assumed existence of perovskite-type ferroelectric antiferromagnetics at the compounds $Pb(Fe_{2/3}W_{1/3})O_3$ and $Pb(Fe_{1/2}Nb_{1/2})O_3$ (the ions in parentheses are located at the octahedral sites). The electric properties were measured at single crystals and the magnetic properties at finely ground crystal powder. Results for the first compound are shown in the Fig. The second compound has similar properties. The temperatures of ferroelectric phase conversion are 178°K for $PbFe_{2/3}W_{1/3}O_3$ and 387°K for $PbFe_{1/2}Nb_{1/2}O_3$ (maximum of ϵ). The phase conversion temperatures from paramagnetic into antiferromagnetic state are 363°K for $PbFe_{2/3}W_{1/3}O_3$ and 143°K for $PbFe_{1/2}Nb_{1/2}O_3$. However, all these

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Ferroelectric antiferromagnetics

phase conversions are rather washed out so that the given temperatures are only approximate. The Néel temperature of these compounds is much lower than in orthoferrites since the former contain a considerable number of unmagnetic ions at the octahedral sites. The experimental and calculated Néel temperatures of $PbFe_{2/3}W_{1/3}O_3$ (363 and 406°K, respectively) are in good agreement. For $PbFe_{1/2}Nb_{1/2}O_3$ these values (143 and 276°K, respectively) differ considerably owing to the segregation of ions of one kind in the sublattice in the case of high "dilution" of the solid solution. The relatively small effective magnetic moment of the Fe^+ ions in $PbFe_{2/3}W_{1/3}O_3$ (μ_{eff} = 4.2 $\mu_B\gamma$, calculated 5.92 μ_B) is due to the inexact extrapolation of the linear part of the $1/\chi(T)$ curve. For $PbFe_{1/2}Nb_{1/2}O_3$, μ_{eff} = 5.4 μ_B. A residual magnetic moment could not be observed owing to the high coercive force. There are 1 figure, 1 table, and 5 references: 2 Soviet and 3 non-Soviet. The two references to English-language publications read as follows: J. Tsubokawa, J. Phys. Soc. Japan, 15, 2243, 1960; M. A. Gillo, J. Phys. Chem. Solids, 13, 33, 1960.

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Poluprovodnikov Akademii nauk SSSR (Institute of Semiconductors of the Academy of Sciences USSR)

L 11156-63 EWT(1)/BDS--AFFTC/ASD--IJP(C)
ACCESSION NR: AP3000601 S/0181/63/005/005/1286/1290

56
54

AUTHOR: Men', A. N.; Polyakov, V. P.; Smolenskiy, G. A.; Chufarov, G. I.

TITLE: Effect of near order on the magnetic properties of ferrimagnetic substances with garnet structure

SOURCE: Fizika tverdogo tela, v. 5, no. 5, 1963, 1286-1290

TOPIC TAGS: ferrimagnetism, garnet, saturation magnetization

ABSTRACT: A study was made of saturation magnetization in solid solutions of garnet containing nonmagnetic ions in tetrahedral and octahedral sites. This study was made with proper calculations for effect of near order and was undertaken to refine the magnetization theory of Gilleo. A comparison was made between theory and experiment for a solid solution of (1-x)Y sub 3 Fe sub 5 O sub 12-xCa sub 3 Fe sub 2 Si sub 3 O sub 12. This comparison is shown graphically in Fig. 1. It was found that calculations involving near order produce a shift in points at the extremes of the curve representing the relation of saturation magnetism to concentration. Comparison of theory with experiment may define two parameters, proposed in theory, that relate the energies of paired interactions. Orig. art. has: 1 figure and 23 formulas.

Metallurgical Institute UFAN; Institute of Semiconductors, Academy of Sciences

Card 1/4

BOBKOV, V.A.; SMOLENSKIY, G.A.; KIZHAYEV, S.A.; MYL'NIKOVA, I.Ye.

Magnetic and electric properties of ferroelectric yttrium and ytterbium manganates. Fiz. tver. tela 5 no.12:3607-3609 D '63. (MIRA 17:2)

1. Institut poluprovodnikov AN SSSR, Leningrad.

ACCESSION NR: AP4043401 S/0181/64/006/008/2556/2557

AUTHORS: Smolenskiy, G. A.; Polyakov, V. P.

TITLE: Neel temperature and magnetization of ferrites with garnet-type structure, containing vanadium ions

SOURCE: Fizika tverdogo tela, v. 6, no. 8, 1964, 2556-2557

TOPIC TAGS: ferrite material, yttrium iron garnet, magnetization, vanadium compound, solid solution, tetrahedral system, valence

ABSTRACT: This is a comment on the results obtained by the authors previously (Izv. AN SSSR, ser. fiz., no. 11, 1396, 1961), and interprets certain recent reports (S. Geller et al., Appl. Phys. Lett., v. 4, 18, 1963) which lead to a lower theoretical Neel temperature. In view of the observed very high Neel temperature in solid solutions of the system $Y_3Fe_5O_{12}$-$YCa_2Fe_5VO_{12}$, it is suggested that the vanadium ion, which occupies a tetrahedral position in the lattice,

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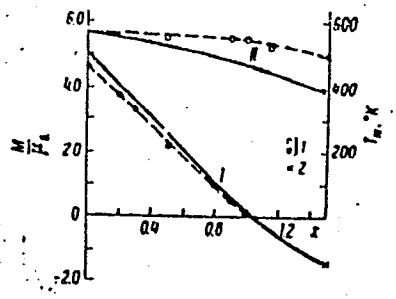
ACCESSION NR: AP4043401 ENCLOSURE: 01



Dependence of magnetization (in Bohr magnetons) (I) and of the Neel temperature (II) of solid solution- in the system $V_{3-2x}Ca_{2x}Fe_{5-x}V_xO_{12}$

1 - present data, 2 - data by others. Continuous curves are calculated

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L 20281-65 SSD/AFWL/ASD(a)-5/AS(mp)-2/ESD(gs)/ESD(t)

ACCESSION NR: AP5000668 S/0181/64/006/012/3668/3675

AUTHOR: Smolenskiy, G. A.; Yudin, V. M.

TITLE: Weak ferromagnetism of some $BiFeO_3$--$Pb(Fe_{0.5}Nb_{0.5})O_3$ perovskites

B

SOURCE: Fizika tverdogo tela, v. 6, no. 12, 1964, 3668-3675

TOPIC TAGS: bismuth inorganic compound, ferromagnetism, magnetic moment, solid solution

ABSTRACT: The study was carried out on polycrystalline samples in fields up to 8 kOe, using the Faraday magnetic balance method. The measurements between the temperature of liquid nitrogen and room temperature were carried out in a nitrogen atmosphere at a pressure of 2--3 mm Hg; at high temperatures (up to 750K), the measurements were carried out in vacuum (10^{-2} mm Hg). The temperatures were measured with thermocouples. The samples were prepared by a solid-state reaction at temperatures 725--1070C, applied for 0.5--5 hours. Although $BiFeO_3$ is an antiferromagnet with distorted rhombohedral perovskite structure and a sharp magnetic susceptibility peak at the Neel point (643K), indicating weak ferromagnetism, no spontaneous magnetic moment was detected in it up to 8 kOe, but it

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was observed in $BiFeO_3$--$Pb(Fe_{0.5}Nb_{0.5})O_3$ solid solutions beginning with 3% of $Pb(Fe_{0.5}Nb_{0.5})O_3$. The moment, which depended strongly on thermomagnetic treatment, rose to a maximum at 90% $BiFeO_3$ and then decreased linearly, reaching zero at 60% $BiFeO_3$, where a complex unit cell was replaced by a simple one and weak ferromagnetism disappeared. The magnetic moment of $BiFeO_3$ and its Dzyaloshinskiy field were estimated by extrapolating to pure $BiFeO_3$ the values of the moments of the solid solutions plotted as a function of the composition: the values for $BiFeO_3$ were found to be 0.036 $G.cm^{-3}.g^{-1}$ and 5.4 kOe, respectively. The Neel temperature of $Pb(Fe_{0.5}Nb_{0.5})O_3$ lay much lower than the temperature calculated on the assumption of a random distribution of the Fe^{3+} and Nb^{5+} ions in the magnetic sublattices. This led to the suggestion of partial ordering in $Pb(Fe_{0.5}Nb_{0.5})O_3$ (each Fe^{3+} ion surrounded by four Nb^{5+} ions). Obviously, this was the short-range order since x-ray diffraction showed no ordering. The space group 160R3m, proposed earlier for $BiFeO_3$, did not satisfy the conditions for the existence of weak ferromagnetism and it should be rejected. The space group of $BiFeO_3$ is one of the following three: 148R3, 155R32, or 166R$\bar{3}$m. Orig. art. has: 3 figures and 6 formulas.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad (Institute of Semiconductors, AN SSSR)

L 20281-65
ACCESSION NR: AP5000668

SUBMITTED: 15Jul64 ENCL: 00

SUB CODE: SS NR REF SOV: 020 OTHER: 004

Card 3/3

ACCESSION NR: AP4030631 S/0048/64/028/004/0614/0619

AUTHOR: Smolenskiy, G.A.; Bokov, V.A.; Mitsek, A.I.

TITLE: Regarding the existence of magnetic and electric ordering in crystals /Report, Symposium on Ferromagnetism and Ferroelectricity held in Leningrad 30 May to 5 June 1963/

SOURCE: AN SSSR. Izv.,Ser.fiz.,v.28, no.4, 1964, 614-619

TOPIC TAGS: ferromagnetic ferroelectric materials, perovskite structure, ferromagnetic ordering, ferroelectric ordering, $BiFeO_3$, $YMnO_3$, $YbMnO_3$

ABSTRACT: The authors point out that there is no basic principle forbidding the simultaneous appearance of ferroelectric and ferromagnetic ordering in the same crystal, and they discuss recent work, both their own and others', indicating the existence of such double ordering in some substances. Two of the authors have given a thermodynamic discussion of simultaneously ferromagnetic and ferroelectric materials (G.A.Smolenskiy, Fizika tverdogo tela,4,No.5,1095,1962; A.I.Mitsek and G.A.Smolenskiy,Ibid.No.12,3581,1962). These substances are characterized by a combined electromagnetic susceptibility tensor relating both the polarization and the magne-

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ACCESSION NR: AP4030631

tization to the electric and the magnetic field. Possible interaction mechanisms between polarization and magnetization are: interaction of both with the elastic deformations of the crystal; the influence of electric charge distribution on the ferromagnetic exchange interaction; the influence of electric charge distribution on the electron orbits, and therefore on the spin-orbit coupling. Particularly favorable for the simultaneous appearance of ferromagnetic and ferroelectric properties are complex crystals with the perovskite structure containing transition metals and ions having an unshared 6s electron pair. $Pb(Fe_{2/3}W_{1/3})O_3$ and $Pb(Fe_{1/2}Nb_{1/2})O_3$ were investigated and found to be ferroelectric as well as antiferromagnetic. Some of the ferric ions do not participate in the antiferromagnetic ordering and so behave paramagnetically, leading to an increase in the susceptibility with decreasing temperature even below the Neel point. Calculations of the Neel point (G.A.Smolenskiy, V.A. Isupov, N.N.Kraynik and A.I.Aranovskaya,Izv.AN SSSR,Ser.fiz.25,1333,1961), on the assumption that a ferric ion participates in the antiferromagnetic ordering only when it has at least two magnetic nearest neighbors, gave results in reasonable agreement with experiment for $Pb(Fe_{2/3}W_{1/3})O_3$. There have been indications, particularly from its behavior in certain solid solutions, that the antiferromagnetic $BiFeO_3$ might be ferroelectric. The low resistivity of this substance, however, can

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ACCESSION NR: AP4030631

give rise to errors. High frequency electrical measurements on $BiFeO_3$-$LaFeO_3$ solid solutions showed that $BiFeO_3$ is not ferroelectric. The ferroelectric materials $YMnO_3$ and $YbMnO_3$ were found to be antiferromagnetic, with Neel points below the temperature of liquid nitrogen. Orig.art.has: 40 formulas, 3 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 00	DATE ACQ: 30Apr64	ENCL: 00
SUB CODE: GP, EM	NR REF SOV: 011	OTHER: 004

Card 3/3

L 58992-65 EWT(l)/EPF(c) Pi-4 IJP(c) WW/GG

ACCESSION NR: AP5017313 UR/0181/65/007/007/2156/2161

38
35
B

AUTHOR: Petrov, M. P.; Smolenskiy, G. A.

TITLE: Nuclear magnetic resonance in paramagnetic $TlMnF_3$

21

SOURCE: Fizika tverdogo tela, v. 7, no. 7, 1965, 2156-2161

TOPIC TAGS: nuclear magnetic resonance, crystallography, paramagnetic resonance

ABSTRACT: Nuclear magnetic resonance is studied in ^{203}Tl, ^{205}Tl and ^{19}F nuclei in paramagnetic $TlMnF_3$ with a cubic structure of the perovskite type at room temperature. A polycrystalline sample of $TlMnF_3$ was prepared by mixing aqueous solutions of TlF and MnF. The $TlMnF_3$ which precipitated was dried and subjected to chemical and X-ray structural analysis. It was established that the lattice constant was $a = 4.25$ Å. The nuclear magnetic resonance was observed by means of an autodyne operating in the range from 7 to 16 Mc. The external magnetic field was measured with the IMI-2 magnetic induction meter based on the nuclear magnetic resonance of protons and lithium. Shifts in the resonant frequencies of ^{203}Tl, ^{205}Tl, and ^{19}F in paramagnetic $TlMnF_3$ were observed which points to the decompensation of electron spins in Tl^+ and F^- shells. Due to the superfine interaction, auxiliary magnetic

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L 58992-65

ACCESSION NR: AP5017313

3

fields are observed in the nuclei. The width of the nuclear magnetic resonance of ^{203}Tl and ^{205}Tl is also due to the superfine interaction of the nucleus with the paramagnetic electron shells. "The authors thank F. Ya. Kul'b and V. Ye. Mironov for synthesizing the $TlMnF_3$ samples and for doing the chemical analysis." Orig. art. has: 4 figures, 8 formulas.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad (Institute of Semiconductors, AN SSSR)

SUBMITTED: 25Dec64 ENCL: 00 SUB CODE: SS, NP

NO REF SOV: 002 OTHER: 023

Card 2/2 dm

PISAREV, R.V.; SMOLENSKIY, G.A.

Estimation of exchange interaction for Mn^{2+} ions in the excited state in MnO. Fiz. tver. tela 7 no.8:2556-2558 Ag '65. (MIRA 18:9)

1. Institut poluprovodnikov AN SSSR, Leningrad.

LEVIN, A.I., prof., [illegible], G.A., kand. [illegible] A.I.

Comparative analysis of the results in treating stenocardia with eriphyl and manitrit. Sov. med. 28 no.1:28-30 Ja '65. (MIRA 18:5)

1. Kafedra propedevtiki vnutrennikh bolezney (zav. - prof. A.I. Levin) Permskogo meditsinskogo instituta.

L 07104-67 EWT(l)/EWT(m)/EWP(t)/ETI/EWP(k) IJP(c) JD/JG

ACC NR: AP6029118 SOURCE CODE: UR/0048/66/030/006/0998/1001

49
B

AUTHOR: Smolenskiy, G.A.; Nasyrov,A.

ORG: none

TITLE: Spin-phonon interaction in yttrium ferrite (excitation of magnetoelastic waves by ultrasound) [Report, All-Union Conference on the Physics of Ferro- and Antiferromagnetism held 2-7 July 1965 in Sverdlovsk]

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 6, 1966, 998-1001

TOPIC TAGS: yttrium compound, ferrite, single crystal, ultrasonic absorption, magnetic effect, magnetic field effect, spin phonon interaction

ABSTRACT: The authors have investigated the effect of the magnitude and direction of an external magnetic field on the absorption at room tempemature of longitudinal ultrasonic waves with frequencies from 50 to 220 MHz propagating parallel to the 110 axis in yttrium ferrite single crystals. The ultrasound was introduced and detected 7.5 mm long cylindrical or parallelepipedonal specimens. Resonance absorption of the ultrasound was observed at a magnetic field strength that varied approximately linearly with the frequency. This absorption is ascribed to production of magnetoelastic vibrations as a result of spin-phonon interaction. The strength of the absorption was investigated as a function of the angle θ in the (100) plane between the external magnetic field and the wave vector of the ultrasound. Maximum absorption was found

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L 26063-66 EWT(1)/EWT(m)/T/EWP(w)/EWP(t) IJP(c) JD/HW/JG

ACC NR: AP6015808 SOURCE CODE: UR/0386/66/003/010/0416/0419

AUTHOR: Smolenskiy, G. A.; Yudin, V. M.; Syrnikov, P. P.; Sherman, A. B.

ORG: Institute of Semiconductors, Academy of Sciences SSSR (Institut poluprovodnikov Akademii nauk SSSR)

TITLE: The transparent hexagonal ferrimagnet $RbNiF_3$

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 10, 1966, 416-419

TOPIC TAGS: antiferromagnetism, magnetic moment, saturation magnetization, magnetic anisotropy, rubidium compound, Curie point

ABSTRACT: Since investigations of the magnetic properties of $RbNiF_3$ have hitherto been confined to the paramagnetic regions and to polycrystals, the authors have investigated the magnetic properties of single-crystal $RbNiF_3$, using a magnetic balance and the Faraday method, in fields from 2 to 14 koe, both above and below the magnetic-transition temperature. The single crystals have been obtained by an exchange decomposition reaction at 960C. They are transparent in visible light, and have the interesting feature that in the temperature interval from 77 to 900K they change their color continuously from bright green to pink. The resistivity at room temperature exceeds 10^{11} ohm-cm, and the dielectric constant is of the order 5--6. Large and perfect crystals (15 x 5 x 5 mm) without cleavage planes can be obtained with relative ease. The dependence of the paramagnetic susceptibility on the temperature has a

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L 26063-66
ACC NR: AP6015808

form characteristic of ferrimagnets. The magnetic ordering sets in at 145K. Plots were obtained of the magnetic moment at 77K against the field intensity and against the temperature in the direction along the hexagonal axis and perpendicular to it. From these plots it is possible to estimate the field of negative uniaxial anisotropy at 77K (~25 koe) and the sum of the magnetic anisotropy constants ($K_1 + K_2 \simeq -0.4 \times 10^6$ erg/cm^3). The results are interpreted from the point of view of the collinear model of ferrimagnetism. The value obtained on this basis for the specific magnetization is 18 G-cm^3/deg. Although the obtained value of the saturation magnetization per formula unit at 0°K is found to be somewhat lower than the theoretical value (~2/3 Bohr magnetons), the difference is attributed to the high temperature of the experiment (more than half the Curie temperature). The results show that on approaching the Curie point the anisotropy constants decrease rapidly, and this gives rise to a spontaneous magnetic moment. It is concluded on the basis of all the data that $RbNiF_3$ is a transparent ferrimagnet of the ferroxplan type. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 25Mar66/ ORIG REF: 001/ OTH REF: 003

Card 2/2

L 28073-66 EWT(m)/T/EWP(t)/ETI IJP(c) JD

ACC NR: AP6014025 SOURCE CODE: UR/0056/66/050/004/0871/0876

89
86
B

AUTHOR: Petrov, M. P.; Smolenskiy, G. A.

ORG: Institute of Semiconductors, AN SSSR (Institut poluprovodnikov AN SSSR)

TITLE: Investigation of local magnetic and electric fields in the $NaNiF_3$ single crystal

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 50, no. 4, 1966, 871-876

TOPIC TAGS: single crystal, nuclear magnetic resonance, magnetic field intensity, electric field, dipole interaction, temperature dependence, nickel, sodium compound, fluorine

ABSTRACT: Shifts of the nuclear magnetic resonance frequency in an $NaNiF_3$ single crystal was investigated as a function of the orientation, external magnetic field intensity, and temperature. For the ^{19}F nucleus, the shifts are due to dipole and hyperfine interaction with the Ni^{2+} ions, resulting in the appearance of local magnetic fields on the ^{19}F nucleus. The spin density in fluorine nuclei was calculated and the nuclear magnetic resistance and the Neel temperature data for $NaNiF_3$ and $KNiF_3$ crystals were compared. The qualitative agreement between the superexchange theory and the experiments

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ACC NR: AP6014025 3

was determined. The shifts in the ^{23}Na nuclear magnetic resonance field are related to the second-order quadrupole effects. It is shown that the electric field near the sodium atoms has a separate axis whose direction is identical for various nuclei in the planes $z = 1/4$ or $z = 3/4$. No local magnetic field has been detected in the sodium nucleus. This indicates the absence of hyperfine interaction between the sodium nucleus and the unpaired electrons on e_g orbits of Ni^{2+}. The authors thank P. P. Syrnikov for growing and A. G. Tutov for orienting $NaNiF_3$ single crystals, and V. M. Yudin for magnetic measurements. Orig. art. has: 3 figures and 7 formulas. [Based on author's abstract] [NT]

SUB CODE: 20 / SUBM DATE: 01Nov65/ ORIG REF: 004/
OTH REF: 011/

Card 2/2 UDC

ACC NR: AP6033557 SOURCE CODE: UR/0181/66/008/010/2965/2969

AUTHOR: Smolenskiy, G. A.; Yudin, V. M.; Syrnikov, P. P.; Sherman, A. B.

ORG: Institute of Semiconductors, AN SSSR, Leningrad (Institut poluprovodnikov AN SSSR)

TITLE: The transparent hexagonal ferrimagnet $RbNiF_3$

SOURCE: Fizika tverdogo tela, v. 8, no. 10, 1966, 2965-2969

TOPIC TAGS: rubidium compound, magnetic property, magnetic susceptibility, magnetic anisotropy, Curie point, magnetic structure

ABSTRACT: The purpose of the investigation was to study the magnetic properties of single-crystal $RbNiF_3$, both above and below the magnetic-transition temperature, in view of the fact that they were hitherto investigated only in the paramagnetic region in single-crystal form. Transparent $RbNiF_3$ crystals with low dielectric losses can be of interest for modulation of light beams in microwave devices at low temperatures. The single crystals were obtained by exchange decomposition at high temperatures. The magnetic properties were investigated with a magnetic balance by the Faraday method in fields from 2 - 14 kOe. The apparatus was described earlier (FTT v. 6, 3668, 1964) and was modified to accommodate anisotropic crystals. The reciprocal magnetic susceptibility was measured as a function of the temperature and the magnetic-moment components were determined as functions of the field intensity at different temperatures. The results confirm that $RbNiF_3$ is a ferrimagnet of the ferroxplan type with a Curie

ACC NR: AP6033557

temperature of 145K. The magnetic structure and the magnetic anisotropy of $RbNiF_3$ exhibit a complicated variation which can be interpreted from the point of view of the assumption that as the temperature is increased the magnetic structure changes from one with an easy-magnetization plan to one having a cone of easy-magentization directions. Orig. art. has: 6 figures and 5 formulas.

SUB CODE: 20/ SUBM DATE: 03Mar66/ ORIG REF: 002/ OTH REF: 005

Card 2/2

ACC NR: AP7001979 SOURCE CODE: GE/0030/66/018/002/0873/0880

AUTHOR: Smolenskiĭ, G. A.; Zhuze, V. P.; Adamyan, V. E.; Loginov, G. M.

ORG: Semiconductor Institute, Academy of Sciences of the USSR, Leningrad

TITLE: Magnetic properties of Ce, Pr, and Nd monochalcogenides at 4.2 to 1300K

SOURCE: Physica status solidi, v. 18, no. 2, 1966, 873-880

TOPIC TAGS: cerium compound, praseodymium compound, neodymium compound, magnetic property, ~~magnetic measurement~~, rare earth ion, ~~rare earth ion valence~~, ~~monochalcogenide~~, chalcogenide

ABSTRACT: An attempt has been made to determine the valency of rare-earth ions in their monochalcogenides and to find the magnetically ordered states at low temperatures. The magnetic properties of Ce, Pr, and Nd monochalcogenides are studied over a wide temperature range. The magnetic measurements at elevated temperatures show that the 4f electrons of metal ions are localized and their number is equal to that of the free tripositive metal ions. At low tempera-

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ACC NR: AP7001979

tures all the compounds investigated exhibit magnetic ordering except for PrSe and PrTe. The possible types of magnetic ordering, and a mechanism for the exchange interaction, are discussed. The authors wish to thank Y. P. Irchin for useful discussions. Orig. art. has: 2 tables and 3 figures. [Based on authors' abstract] [DW]

SUB CODE: 20/SUBM DATE: 01Aug66/ORIG REF: 006/OTH REF: 013/

Card 2/2

ACC NR: AP7007629

sorption bands, the rotation is connected essentially with the ferrimagnetic moment of the crystal and therefore depends little on the wavelength. At 295K, the paramagnetic rotation of the plane of light polarization was 0.06 - 0.08 min/cm-Oe and depended little on the wavelength. The results show that the strong rotation of the plane of polarization can make $RbNiF_3$ useful for the modulation of light at the wavelengths of argon and neodymium lasers, where it is transparent, and also for helium-neon and ruby lasers, where its absorption is slight. It can also be used effectively at infrared wavelengths up to 11 μ, at which it is transparent. The authors thank P. P. Syrnikov for growing the single crystals. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 11Nov66/ ORIG REF: 002/ OTH REF: 005

Card 2/2

SMOLENSKIY, G. A.

"The Characteristics of Thyreocytotoxin." Sub 17 Dec 51, Moscow Medical Stomatological Inst, Ministry of Publich Health RSFSR.

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

SO: Sum. No. 480, 9 May 55.

SMOLENSKIY, G.A.; GOROD, I.S.; ZHOVNER, L.M.; ROSTIK, O.I.

Autoimmune granulocytopeniase. Probl.gemat.i perel.krovi no.6:13-17 '61. (MIRA 14:10)

1. Iz terapevticheskogo otdeleniya (zav. G.A. Smolenskiy) gorodskoy bol'nitsy No.23 i kafedry gospital'noy terapii (zav. - dotsent O.I. Yasakova) pediatricheskogo fakul'teta Sverdlovskogo meditsinskogo instituta.

(AGRANULOCYTOSIS)

SMOLENSKIY, G.A.

Determination of fibrinogen in the blood.
Lab. delo 8 [i.e.9] no.1:21-22 Ja '63. (MIRA 16:5)

1. Kafedra propedevtiki vnutrennikh bolezney (zav.-prof. A.I. Levin) Permskogo meditsinskogo instituta.
(BLOOD-ANALYSIS AND CHEMISTRY) (FIBRINOGEN)

LEVIN, A.I., prof.; SMOLENSKIY, G.A., kand. med. nauk

Clinical and biochemical analysis of a rheumatic fever attack with an acute course. Vop. revm. 3 no.4:46-53 O-D '63. (MIRA 17:2)

1. Iz kafedry propedevtiki vnutrennikh bolezney (zav.-prof. A.I. Levin) Permskogo meditsinskogo instita.

SMOLENSKIY, G.A., kand.med.nauk; MARKOLAVSKAYA, G.S., dotsent

Croupous pneumonia and agranulocytosis. Sov.med. 28 no.4:74-76 Ap '65. (MIRA 18:6)

1. Kafedra propedevtiki vnutrennikh bolezney (zav. - prof. A.I. Lavin) Permskogo gosudarstvennogo meditsinskogo instituta.

SMOLENSKIY, G.A.; YUDIN, V.M.

Weak ferromagnetism of some perovskites $BiFeO_3$-$Pb(Fe_{0.5}Nb_{0.5})O_3$.
Fiz. tver. tela 6 no.12:3669-3675 D '64 (MIRA 18:2)

1. Institut poluprovodnikov AN SSSR, Leningrad.

SMOLENSKIY, K. A.

Electric Currents - Grounding

Selecting a single-phase ground connection with insulated neutral conductor for low-voltage lines.
Rab. energ. 2, No. 7, 1952.

91 Monthly List of Russian Accessions, Library of Congress, October 1952. UNCLASSIFIED.

SMOLENSKIY, K.A., starshiy master.

Protecting electric motors from operating in two phases. Rab.energ. 3 no. 5:16-17 My '53. (MLRA 6:5)
(Electric motors)

SMOLENSKIY, K.A.

AID P - 700

Subject : USSR/Electricity

Card 1/1 Pub. 29 - 11/18

Author : Smolenskiy, K. A., Foreman

Title : Automatic locking for surface grinders

Periodical : Energetik, 8, 21, Ag 1954

Abstract : The author briefly describes his arrangement. One diagram.

Institution : None

Submitted : No date

SMOLENSKIY, K.I.

Book on progressive veneer drying methods and equipment ("Veneer drying in roller and chamber dryers." D.M.Sterlin. Reviewed by K.I.Smolenskii). Der.prom.4 no.9:30 S '55. (MLRA 8:11)

1. Glavnyy tekhnolog Glavfanspichproma
(Lumber--Drying) (Sterlin, D.M.)

LEONT'YEV, I.I.; RAKIN, A.G.; SMOLENSKIY, K.I.

Industrial manufacture of parquet boards. Der.prom. 5 no.7:17-19 Jl '56. (Parquetry) (MIRA 9:9)

SMOLENSKIY, K.I., inzhener.

For further economy of adhesive materials in the plywood industry. Der. prom. 5 no.10:9-10 O '56. (MLRA 9:11)

1. Glavfanspichprom.
(Plywood) (Adhesives)

SMOLENSKIY, K.I.; DMITRIYEV, O.A.

Plywood industry in Finland. Der.prom. 7 no.11:28-30 N '58.
(MIRA 11:11)

(Finland--Plywood industry)

SMOLENSKIY, K.I., inzh.; DMITRIYEV, O.A., inzh.

Hardboards made of wood shavings in Finland. Der.prom. 8 Mr '59. no.3:28-31 (MIRA 12:4)

(Finland--Hardboard)

SMOLENSKIY, K.I., inzh.

Using binding agents with a coupled phenol base. Der. prom. 8 no.11: 11 N '59. (MIRA 13:3)
(Woodwork) (Binding materials)

SMIRNOV, Aleksandr Vasil'yevich, kand. tekhn. nauk; SMOLENSKIY, K.I., nauchnyy red.; ALESHINSKIY, N.A., nauchnyy red.; KRUGLOV, S.A., red.; KOZLOVSKAYA, M.D., tekhn. red.; TOKER, A.M., tekhn. red.

[Operator of the veneer peeling machine in the plywood and veneer industry] Lushchil'shchik v fanernom proizvodstve. Moskva, Proftekhizdat, 1961. 168 p. (MIRA 15:6)
(Woodworking machinery) (Veneer and veneering)

SMOLENSKIY, K.I., red.; KOLOMEYER, V.Z., tekhn. red.; SHENDAREVA, L.V., tekhn. red.; BOGOMOLOV, B.D., red.

[Fiberboard]Drevesno-voloknistye plity; trudy. Pod red. B.D. Bogomolova. Moskva, TSentr. biuro tekhn. informatsii bumazhnoi i derevoobrabatyvaiushchei promyshl., 1961. 121 p. (MIRA 16:4)

1. Vsesoyuznaya nauchno-tekhnicheskaya konferentsiya po proizvodstvu i primeneniyu drevesno-voloknistykh materialov i plastikov. Archangel.

(Hardboard)

SMIRNOV, Aleksandr Vasil'yevich; SMOLENSKIY, K.I., red.; VOLOKHONSKAYA, L.V., red. izd-va; LOBANKOVA, R.Ye., tekhn. red.

[Technology and mechanization of plywood manufacture] Tekhnologiia i mekhanizatsiia fanernogo proizvodstva. Moskva, Goslesbumizdat, 1961. 367 p. (MIRA 14:11)

(Plywood industry)

SMOLENSKIY, K.I.

Develop and improve the production of glued plywood and hardboard. Der. prom. 12 no.1:3-4 Ja '63. (MIRA 16:5)
(Plywood) (Hardboard)

KHUKHRYANSKIY, Pavel Nikolayevich, prof.; SMOLENSKIY, K.I., red.

[Compression of wood] Pressovanie drevesiny. 3. izd., ispr. i dop. Moskva, Lesnaia promyshlennost', 1964. 350 p. (MIRA 17:12)

LEMASOV, Vladimir Stepanovich, prof.; [deceased]; KOZLOV, N.T., dots., kand. tekhn. nauk; BARKOV, V.Yu., dots.; SHEYDIN, I.A., kand. tekhn. nauk, retsenzent; SOLENNIKOV, K.I., red.

[Technology of glued materials and boards] Tekhnologiia kleenykh materialov i plit. Moskva, Lesnaia promyshlennost', 1964. 497 p. (MIRA 18:1)

1. Nachal'nik tekhnologicheskoy laboratorii TSentral'nogo nauchno-issledovatel'skogo instituta fanery i mebeli (for Sheydin).

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[Technology of piezo-thermoplastics] Tekhnologiia p'ezo-termoplastikov. Moskva, Lesnaia promyshlennost', 1965. 295 p. (MIRA 18:2)

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SMOLENSKIY, K.I., inzh.

"Plywood; market of capitalist countries." Der. prom. 13 no.8:30 Ag '64. (MIRA 17:11)

SMOLENSKIY, L.A., aspirant; ZHIVOTOVSKIY, L.S., kand. tekhn. nauk; KARLIN, B.I., kand. tekhn. nauk

Study and calculation of hydraulic cyclone sand classifiers. Trudy MIIT no.176:108-125 '63. (MIRA 17:6)

[illegible], L.A., aspirant

Study of the operation of a hydraulic cyclone in a saturated regime. Trudy MIIT no.176.[illegible]129 '63. (MIRA 17:6)

KHOLODOVSKAYA, R.S.; ZABYRINA, K.I.; SMOLENSKIY, L.S.

Electrical insulation properties of lacquers based on condensed fatty acids. Lakokras.mat.i ikh prim. no.1:37-39 '62.
(MIRA 15:4)

(Lacquer and lacquering)
(Electric insulators and insulation)
(Acids, Fatty)

TSEYTLIN, B.S., kand.tekhn.nauk; SMOLENSKIY, M.F., inzh.; GOTLIB, Ya.L., inzh.

Initial filling system and the water balance of the Bratsk Reservoir. Gidr. stroi. 32 no.6:1-4 Je '62. (MIRA 15:6)
(Bratsk Reservoir)

SOV/177-58-11-14/50

.17(1)

AUTHORS: Smolenskiy, M.L., Lieutenant-Colonel of the Medical Corps, and Matveyeva, V.N.

TITLE: The Sugar Level in the Blood and in the Spinal Fluid in a Closed Injury of the Cerebrum

PERIODICAL: Voyenno-meditsinskiy zhurnal, 1958, Nr 11, pp 48 - 50 (USSR)

ABSTRACT: The author reports on changes of the sugar level in the blood and in spinal fluid which may occur in closed injuries of the cerebrum and on its sequela. According to investigations of various authors, including D.A. Shamburov and V.S. Asatiani, the quantity of sugar in the normal spinal fluid is subjected to considerable fluctuations from 40 to 60 mg%. The authors base this article on their own investigations and on the observation of 50 persons who sustained a closed cerebral trauma. The results are summed up in two conclusions. 1) The low values of the sugar level in the liquor (55.58 mg%) and its low relation

Card 1/2

SMOLENSKIY, M.L.; BOGDANOVICH, Ye. I.

Diagnosis of affections of the lumbosacral segment of the peripheral nervous system. Sov. med. 24 no. 5:124-125 My '60. (MIRA 13:10)

(NERVES, PERIPHERAL--DISEASES)

SMOLENSKIY, M.L., podpolkovnik meditsinskoy sluzhby

Novocaine diathermy electrophoresis in the compound treatment of lumbosacral radiculitis. Voen.-med. zhur. no.5:84 My '61. (MIRA 14:8)

(NERVES, SPINAL--DISEASES) (NOVOCAINE)
(ELECTROTHERAPEUTICS)

SMOLENSKIY, M.L., podpolkovnik meditsinskoy sluzhby

Change in sugar metabolism in closed brain injury. Voen.-med. zhur. no.9:80 S '61. (MIRA 15:10)
(SUGAR IN THE BODY) (BRAIN--WOUNDS AND INJURIES)

SMOLENSKIY, M.L.; MATVEYEVA, V.N.

Sequelae of closed trauma of the brain (oxidative processes). (MIRA 14:9)
Zhur. nevr. i psikh. 61 no.9:1346-1349 '61.
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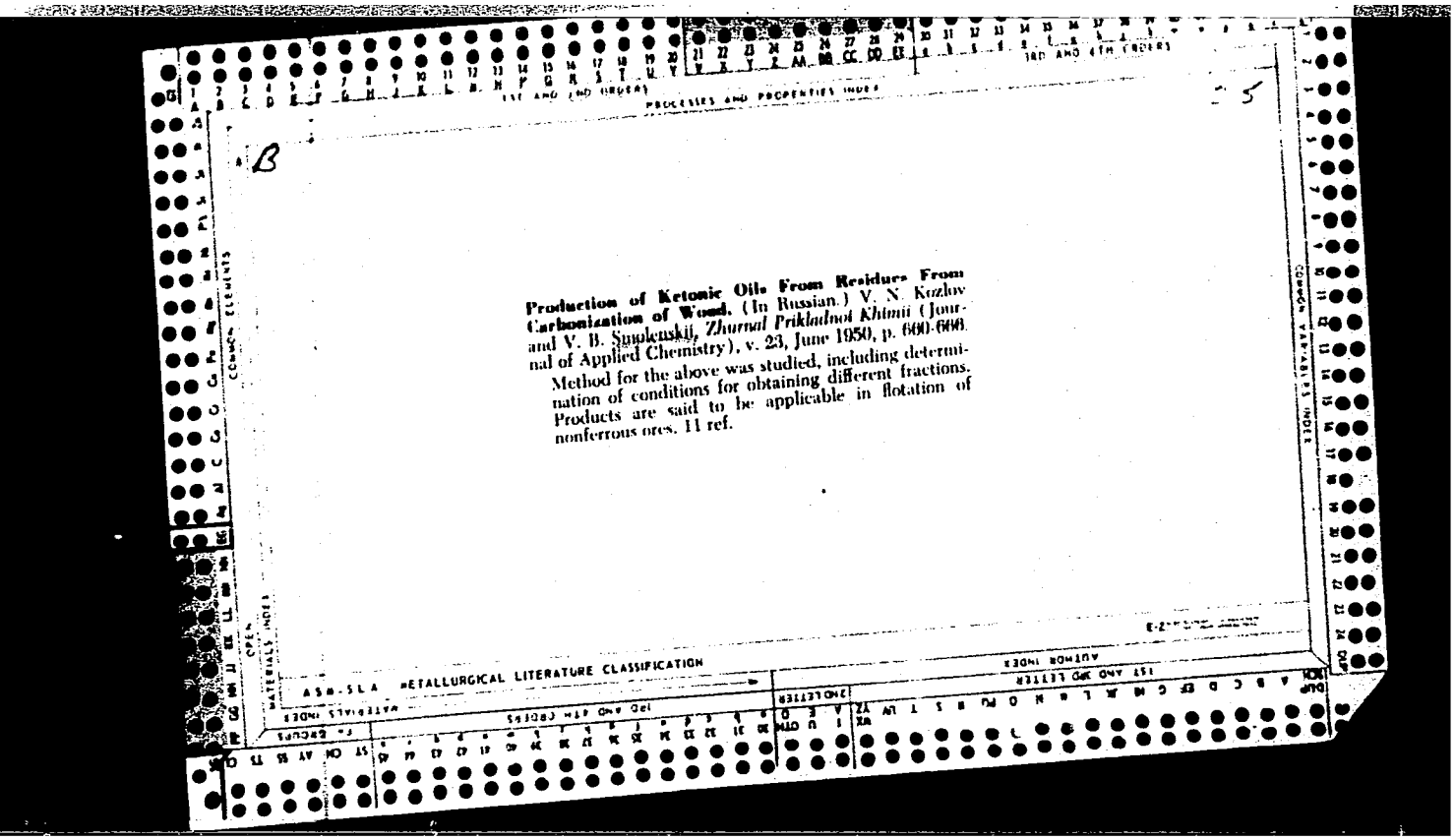

Production of Ketonic Oils From Residues From Carbonization of Wood. (In Russian.) V. N. Kozlov and V. B. Spopleuskii, *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 23, June 1950, p. 600-606.

Method for the above was studied, including determination of conditions for obtaining different fractions. Products are said to be applicable in flotation of nonferrous ores. 11 ref.

Chemical Abst.
Vol. 48 No. 4
Feb. 25, 1954
Fuels and Carbonization Products

Frac 2

Esters and flotation agents from wood acid tars. V. N. Kozlov and V. B. Smolenskii. *Deretsopererabatyvayushchaya i Lesokhim. Prom.* 2, No. 10, 17–18(1953).—Acid tars (I), obtained from the dealcoholized pyroligneous acid freed of settled and residue tars, were extd. with a solvent, and solvent and AcOH were distd. from the ext. which was studied as a source of esters and flotation agents. I, d_4^{20} 1.1046, acid no. 349.2, and sapon. no. 441.1, contained 22.6% volatile acids (calcd. as AcOH), 20.4% phenols, 9.0% H_2O, and 17.6% neutral compds. Distn. of I gave 2 fractions: *A*, 45.1%, b. 105–80°, d_4^{20} 1.0437, acid no. 399.0, and sapon. no. 507.5, contained 23.1% H_2O, 43.2% volatile acids, 7.73% phenols, 5.96% neutral compds., and 20% complex compds.; *B*, 53.8%, b. >180°, d_4^{20} 1.1690, acid no. 158.9, and sapon. no. 219.7, contained 3.3% volatile acids, 23.5% phenols, 21.0% neutral compds. and 52% complex compds. Fraction *A* (194.6 g.), of which the volatile acids contained 73.1% AcOH, 17.5% $EtCO_2H$, and 9.9% $PrCO_2H$, was esterified at 140–70° with 123.8 g. BuOH contg. 9.94 g. 96% H_2SO_4, the esters were distd. off, neutralized with 10% soln. Na_2CO_3, and washed with H_2O, giving 40–9% esters (based on I), made up of 0.05% acids, 85.7% esters, 1.12% H_2O, and 13.0% alcs. The mixt. was fractionated to give 5 fractions: (*C* to *G*), 3.1% (all based on I) b. 100–16°; 26.6%, b. 116–30°, 3.6%, b. 130–47°, 1.85%, b. 147–67°; and 2.6%, b. above 167°. Fraction *C* contained 52.8% BuOAc and 47.1% BuOH; *D* 92.7% BuOAc; *E* 97.4% $EtCO_2Bu$; and *F* 95.1% $PrCO_2Bu$. Fraction *G*, d_4^{20} 0.9636, acid no. 25.2, sapon. no. 262.1, contained 24.2% phenols and 56.9% neutral substances. Redistn. of *G* gave 3 fractions: *H* 62.9%, b. 167–200°, *J* 29.7%, b. 200–30°, and a residue 4.4% b. >230°. The d., acid no., sapon. no., % phenols, % neutral substances, and color of *H* were 0.9324, 15.2, 207.8, 15.0, 61.8, and light green, resp., and of *J* 0.9780, 20.6, 252.4, 41.0, 53.7, and dark yellow, resp. Fraction *B* was neutralized with $Ca(OH)_2$ and pyrolyzed to give 17.7% oil (based on I), d_4^{20} 1.0617, acid no. 9.9, sapon. no. 36.2, and contg. 2.5% H_2O, 46.9% neutral oil, and 40.7% phenols; this oil was satisfactory as a flotation

6-4-54

KOZLOV, V.N.; SMOLENSKIY, V.B.; ARASHKEVICH, V.M.

Preparation of foaming agents and organic solvents from acidic wood resins. Zhur.prikl.khim. 26 no.9:995-999 S '53. (MLRA 6:10)

1. Laboratoriya lesokhimii Instituta khimii i metallurgii Ural'skogo filiala Akademii nauk SSSR. (Gums and resins) (Foam) (Solvents)

SMOLENSKIY, V.B.

Foaming agents from acid wood tar. V. N. Kozlov, V. M. Arashkevich, and V. B. Smolenskii. *Derevoperera-batyvayushchaya i Lesokhim. Prom.* 3, No. 7, 14–16(1954); cf. *C.A.* 47, 12701a.—Acid wood tars (I) from the dry distn. of wood were processed with CaO and the Ca salts of acids and phenols present subjected to dry distn. I, d_4^{20} 1.1046, acid no. 340.2, and sapon. no. 441.1, contained 23.45% volatile acids, 19.6% neutral substances, 20.4% phenols, and 8.05% H_2O. The yield on dry distn. was 49.5–51%, which was distd. to give Me_2CO 5.05, MeEtCO 2.3, MePrCO 0.95, and flotation oil (II) 40.80%, d_4^{20} 1.0949, 1.19% b. 103–50°, 15.07% b. 150–200°, 48.79% b. 200–50°, 32.05% residue b. >250°, and 2.3% gas loss, acid no. 30.7, sapon. no. 95.5, contained 3.5% H_2O, 1.03% volatile acids, 41.34% phenols, 42.48% neutral substances, a surface tension of 38.0 ergs/sq. cm. at 20°, and a viscosity of 70.2 millipoise at 20°. II was found equal to pine oil (surface tension 72.5 ergs/sq. cm. at 20° and d_4^{20} 0.9009) in the flotation of sulfide ore contg. pyrite, chalcopyrite, and sphalerite. John Lake Keays

KOZLOV, V.N.; SMOLENSKIY, V.B.

Investigation of efficient means of distilling acid wood tar. Trudy Inst.khimi met. no.2:150-157 '55. (MLRA 9:5)
(Wood tar)

SMOLENSKIY, V. B.

Recovery of flotation oils from the acidic residue left in the rectification of acetic acid. V. N. Kozlov, V. B. Smolenskii, and V. M. Arashkevich. *Gidrolis. i Lesokhim. Prom.* 9, No. 1, 10–11(1956).—The acidic residue (I) left over in the rectification of AcOH from wood powder was neutralized with $Ca(OH)_2$ and distd. destructively in an iron vessel. It gave 33.5% of oils and 1.01% of acetone. The former were divided into two fractions, one distg. below 105° (II), and the other above 105° (III). Based on I the fractionated yield of II was 3.10, and of III 30.10% of oils. The latter represented the flotation-oil fraction. Further distn. of II gave 23.35 of acetone-sylvan b. 50–60°, 23.82 of MeCOEt b. 60–93°, 22.14 of $MeCO(CH_2)_2CH_3$ b. 83–105°, and 24.10% of III. Fractionation of III gave a substance (IV) with d_4^{20} 0.9338, acid no. 11.17, sapon. no. 102.70, 86.46 of neutral substances, and 9.72% of phenols. The ether soln. of IV was treated with $NaHCO_3$ and 10% KOH. A neutral oil with acid no. 2.31 and sapon. no. 39.55 was recovered. The oil was tried as the froth former in flotation of Cu-Fe sulfide ores imbedded in chlorite sericite and quartz chlorite shales. The froth formation properties of the oil were comparable to the standard froth formers.

T. Jurecic

SMOLENSKIY, Vl.

A closed cycle. Izobr.i rats. no.12:2 D '59.
(MIRA 13:8)
(Combines (Agricultural machinery))

KOZLOV, V.N.; SMOLENSKIY, V.B.

Frothing agents from wood tar for use in flotation. Sbor.rab. Lab.lesokhim. no.2:52-56 '58. (MIRA 12:8)
(Wood tar) (Flotation--Equipment and supplies)

KOZLOV, V.N.; SHOLEMSKIY, V.B.

Production of flotation oils and complex esters from wastes of the manufacture of acetic acid from wood powder. Shor. rab.Lab.lesokhim. no.2:57-61 '58. (MIRA 12:8)
(Wood tar) (Flotation--Equipment and supplies)

Smolenskiy, V.; Kozlov, V.

Flotation-frothing agents from wood resin. p. 119.

BIOLOGICHESKAIA NAUKA: SELSKOMU I LESNOMU AKOZIAISTVU. (Latvijas PSR Zinatnu akademija. Biologijas Zinatnu nodala) Riga, Latvia, no. 16, 1958
In Russian.

Monthly List of East European Accessions (EEAI) LC, Vol. 8, No. 8, August 1959.
Uncl.

KOZLOV, V.N., SMOLENSKIY, V.B.

Wood tar its properties and uses. Trudy Inst.khim. UFAN SSSR no.5:25-35 '59. (MIRA 13:6)
(Wood tar)

KOZLOV, V.N.; SMOLENSKIY, V.B.; TOKAREVA, G.A.; POPOVA, G.I.

Yield and composition of the settled tar in the pyrolysis of various portions of coniferous and deciduous trees. Trudy Inst. khim.UFAN SSSR no.6:23-27 '61. (MIRA 16:2)
(Wood tar)

SMOLENSKIY, V.B.; KOZLOV, V.N.

Extraction of phenols from peat tar by a water solution of methanol. Trudy Inst.khim.UFAN SSSR no.6:79-86 '61. (MIRA 16:2)

(Phenols) (Peat tar) (Extraction (Chemistry))

SMOLENSKIY, V.P.

Device for automatically connecting dials to incoming units of different rural automatic telephone exchange systems. Vest. sviazi 23 no.2:19-20 F '63. (MIRA 16:2)

(Telephone)

SMOLENSKIY, V. S.

SMOLENSKIY, V. S. -- "Effect of Hypertension on the Development of Experimental Arteriosclerosis." Sub 12 Nov 52, Acad Med Sci USSR. (Dissertation for the Degree of Candidate in Medical Sciences.)

SO: Vechernaya Moskva January-December 1952

SMOLENSKIY, V.S.

SMOLENSKIY, V.S.(Moskva)

Critique of the so-called general adaptation syndrome. Klin.med. 33 no.8:5-10 '55 (MLRA 8:11)

1. Iz Instituta terapii AMN SSSR (dir.--deystvitel'nyy chlen AMN SSSR prof. A.L. Myasnikov)
(GENERAL ADAPTATION SYNDROME, critique)

EXCERPTA MEDICA Sec 20 Vol 2/7 Gerontology July 59

SMOLENSKIY, V.S.

1938. **The development of atherosclerosis of the major arteries in patients with normal and raised arterial pressures. (Autopsy data) (Russian text)**
SMOLENSKY V. S. Med. Clinic and Dept. of Pathol. Anat., 1st Moscow Med. Inst.
Terap. Arkh. 1958, 30/8 (47-55)

The following 120 autopsy cases were studied: 31 cases of hypertension, 15 of atherosclerosis, 25 of malignant tumours, 13 of heart defects, 8 of chronic nephritis and 28 of other diseases. Only 20 had died before 45 yr. of age; the average age of death in the cases of atherosclerosis was 67 yr., that in the cases of hypertension 60 yr. The arterial vascular system (aorta, carotids, cerebral arteries, coronary arteries, mesenteric arteries, coeliac artery, renal arteries, and iliac artery) was dissected and the changes observed presented in a table. Seven types of localization for arteriosclerosis were found in patients with normal blood pressures: (1) coronary-aortic, (2) cerebral-aortic-coronary, (3) aortic, (4) coronary, (5) cerebral-aortic, (6) cerebral, and (7) cerebral-coronary. These numerous variations make it impossible to draw valid conclusions from changes in one arterial territory bearing on those in another territory. Comparison with the clinical picture shows that hypertension is associated with a rapid development of atherosclerosis in all the arteries investigated, reducing the patient's life by about 5 to 7 yr.

Brandt – Berlin (V, 18, 20)