"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEIN, M. V.

VOL'KENSHTEIN, M. V.
J. Exptl. Theoret. Phys. (USSR) 11, 642-62 (1941)
Intensities in vibration spectra of polyatomic molecules.

CA: 37-1654/6

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEIN, M. V.

PRILEZHAYEVA, E. N., SYRKIN, Ya. K. and VOL'KENSHTEIN, M. V. CA: 35-4285/4
(Karpov Inst. Physical Chemistry, Moscow; State Univ., Minsk)
Acta Physiocochim. URSS 14, 119-53 (1941) - in English
The Raman spectra of the halogen derivatives of ethylene and the electronic resonance.

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

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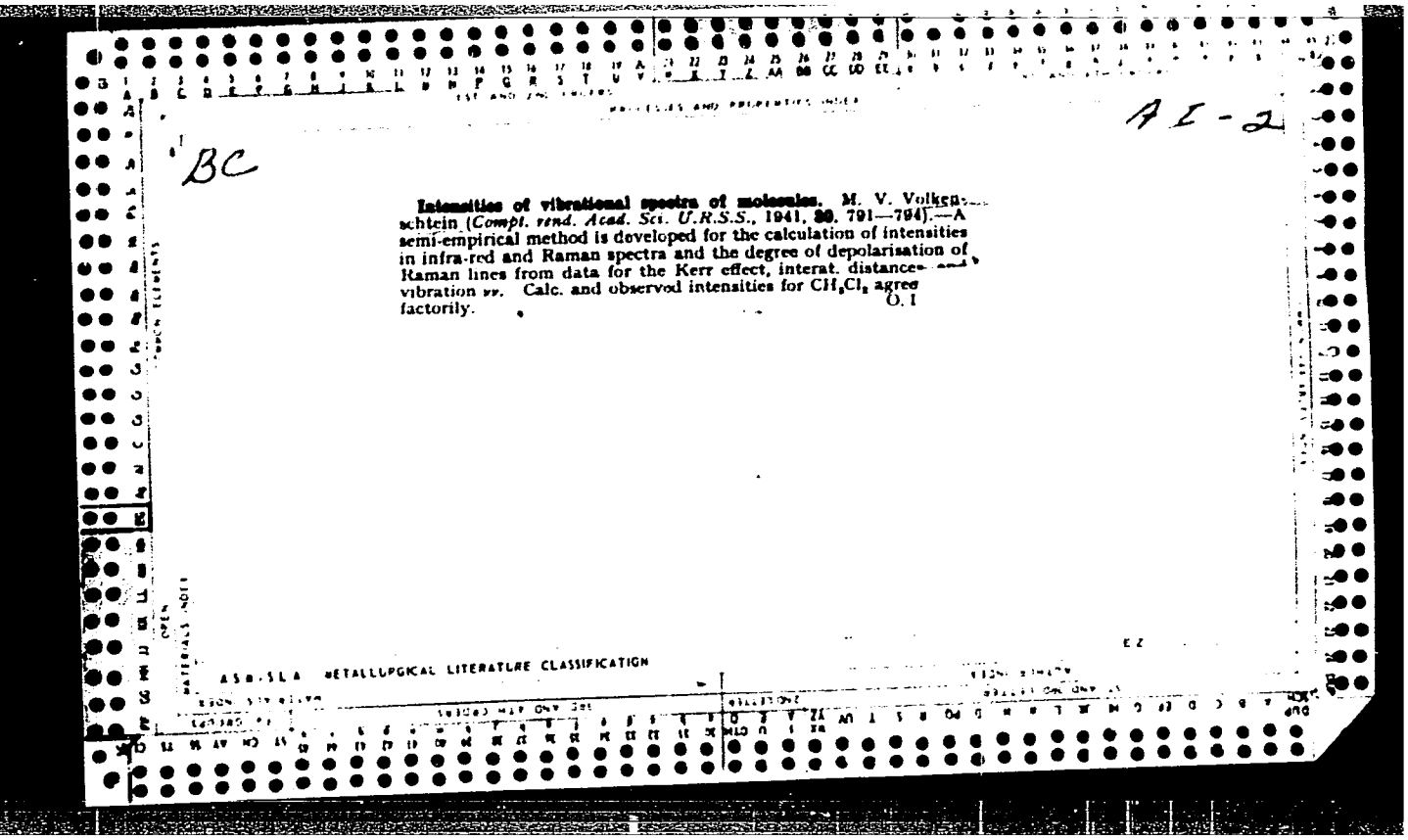

BC

AI-2

Intensities of vibrational spectra of molecules. M. V. Volkenschtein (*Compt. rend. Acad. Sci. U.R.S.S.*, 1941, **30**, 791—794).—A semi-empirical method is developed for the calculation of intensities in infra-red and Raman spectra and the degree of depolarisation of Raman lines from data for the Kerr effect, interat. distances and vibration ww. Calc. and observed intensities for CH_2Cl_2 agree factorily. O. I

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

Polarisability of molecules and intermolecular forces. M. V. Volkenschtein (*Compt. rend. Acad. Sci. U.R.S.S.*, 1941, **32**, 185—188).—Mathematical. Consideration of the effect of anharmonicity and anisotropy in electronic oscillators predicts changes in mol. consts. associated with the anisotropy of the polarisability tensor, without change in refraction, as found experimentally for the Kerr effect and depolarisation of Rayleigh scattering. The theory is applied to Raman intensities. L. J. J

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"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEIN, M. V.

VOL'KENSHTEIN, M. V. CA: 37-3267/9
(Karpov Inst. of Physical Chemistry, Moscow)
Acta Physicochim. URSS 16, 120-2 (1942) - in English
Intensity of Raman lines and the nature of the chemical bond.

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEIN, M. V.

SLOVIKHOTOVA, N. A., SYRKIN, YA. K. and VOL'KENSHTEIN, M. V. CA: 37-1655/7
(Karpov Inst. Physical Chemistry, Moscow)
Compt. rend. acad. sci. URSS 35, No. 5, 146-8 (1942) in English
Raman spectra of betaine.

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

Physico-Chemical Institute imeni L. Ya. Karpov, Moscow (-1941-)

"Preliminary Reports - Intensity of the Raman Lines and the Nature of the Chemical Bond." Zhur. Fiz. Khim., Vol. 17, No. 1, 1943

[redacted]-52059019

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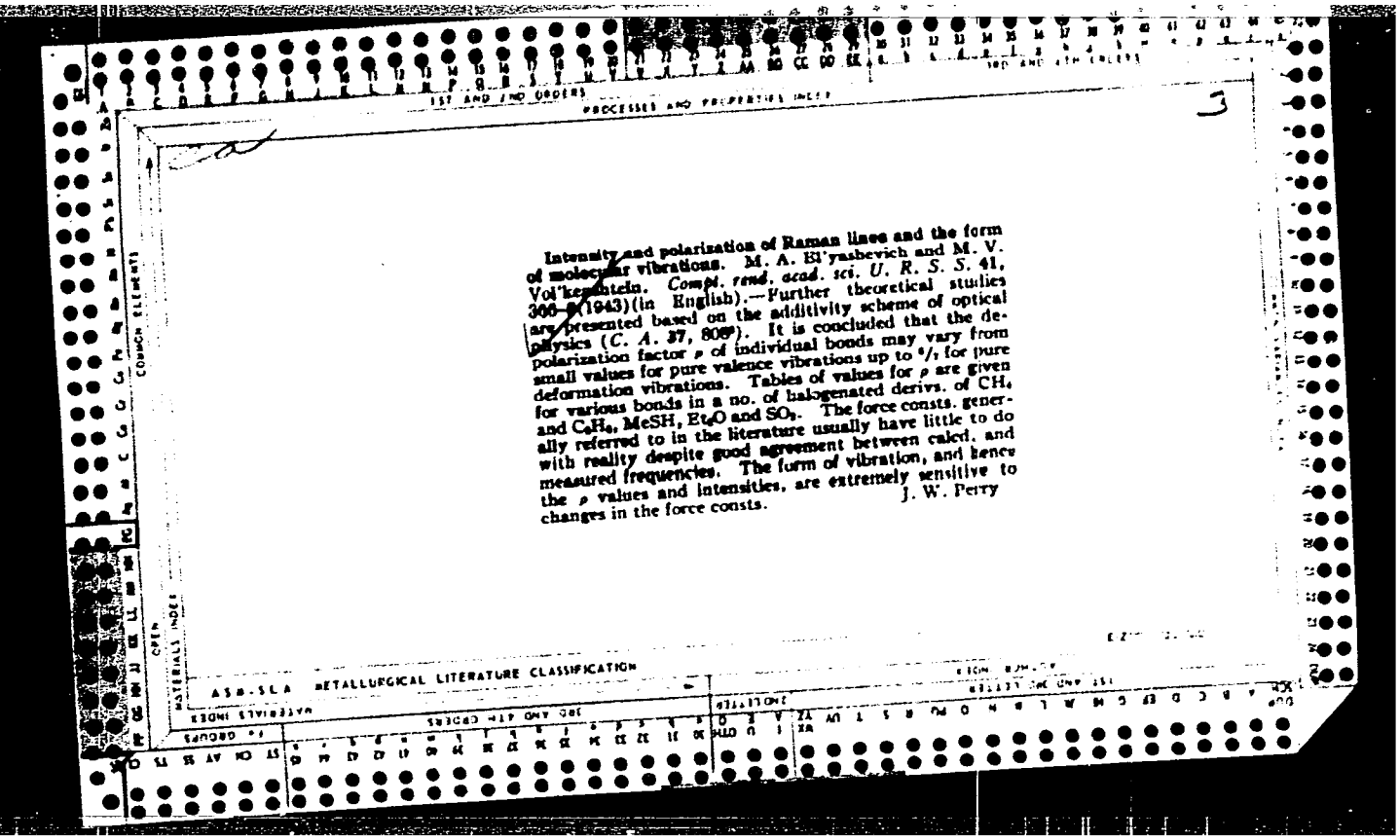

Intensity and polarization of Raman lines and the form of molecular vibrations. M. A. El'yashevich and M. V. Vol'kenshtein. *Compt. rend. acad. sci. U. R. S. S.* 41, 300–3(1943)(in English).—Further theoretical studies are presented based on the additivity scheme of optical polysics (*C. A.* 37, 809⁹). It is concluded that the depolarization factor ρ of individual bonds may vary from small values for pure valence vibrations up to $^6/_7$ for pure deformation vibrations. Tables of values for ρ are given for various bonds in a no. of halogenated derivs. of CH_4 and C_6H_6, MeSH, Et_2O and SO_2. The force consts. generally referred to in the literature usually have little to do with reality despite good agreement between calcd. and measured frequencies. The form of vibration, and hence the ρ values and intensities, are extremely sensitive to changes in the force consts.

J. W. Perry

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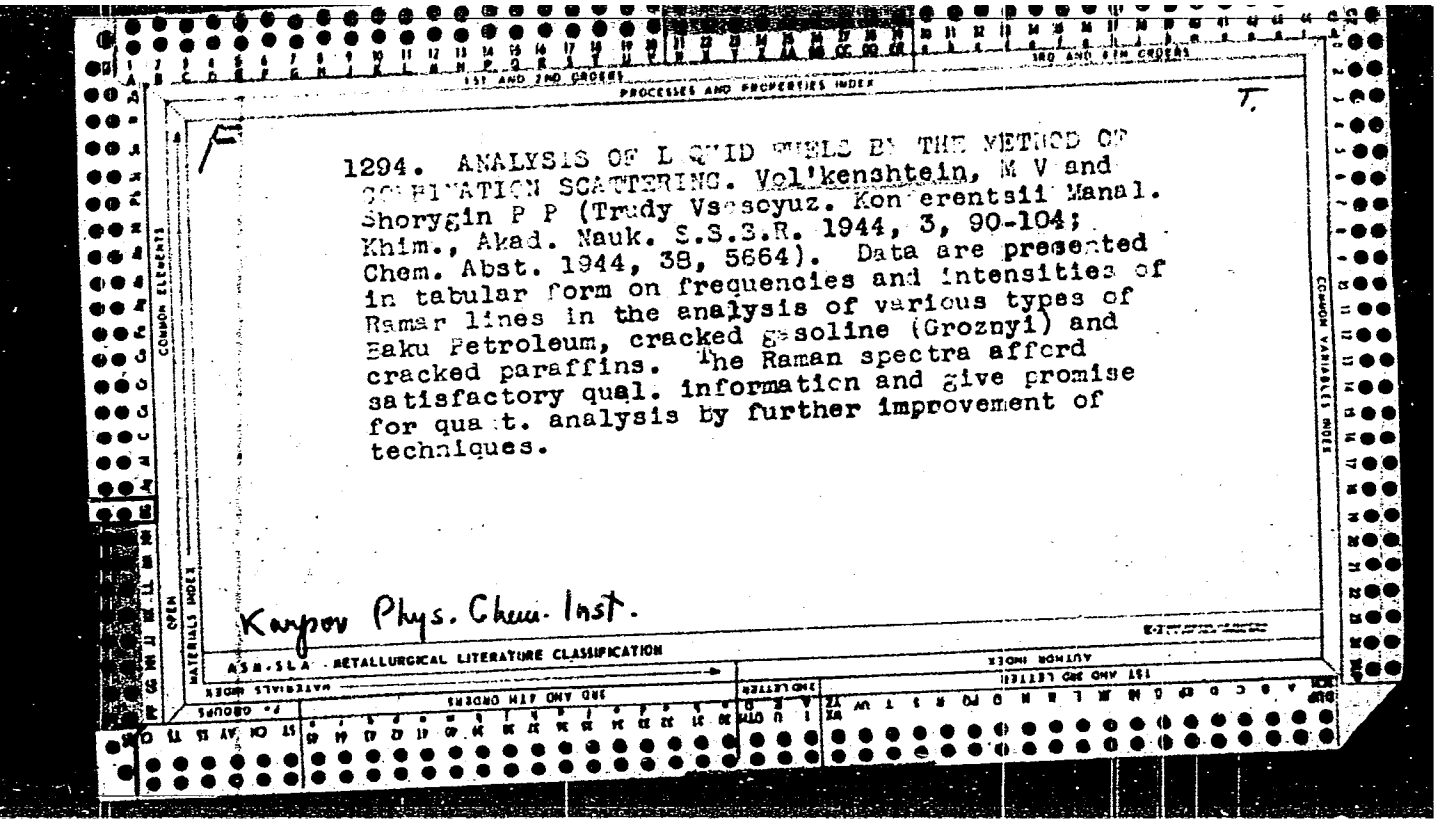

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

F

T.

1294. ANALYSIS OF LIQUID FUELS BY THE METHOD OF COMBINATION SCATTERING. Vol'kenshtein, M V and Shorygin P P (Trudy Vsesoyuz. Konferentsii Manal. Khim., Akad. Nauk. S.S.S.R. 1944, 3, 90-104; Chem. Abst. 1944, 38, 5664). Data are presented in tabular form on frequencies and intensities of Ramar lines in the analysis of various types of Baku Petroleum, cracked gasoline (Groznyi) and cracked paraffins. The Raman spectra afford satisfactory qual. information and give promise for quant. analysis by further improvement of techniques.

Karpov Phys. Chem. Inst.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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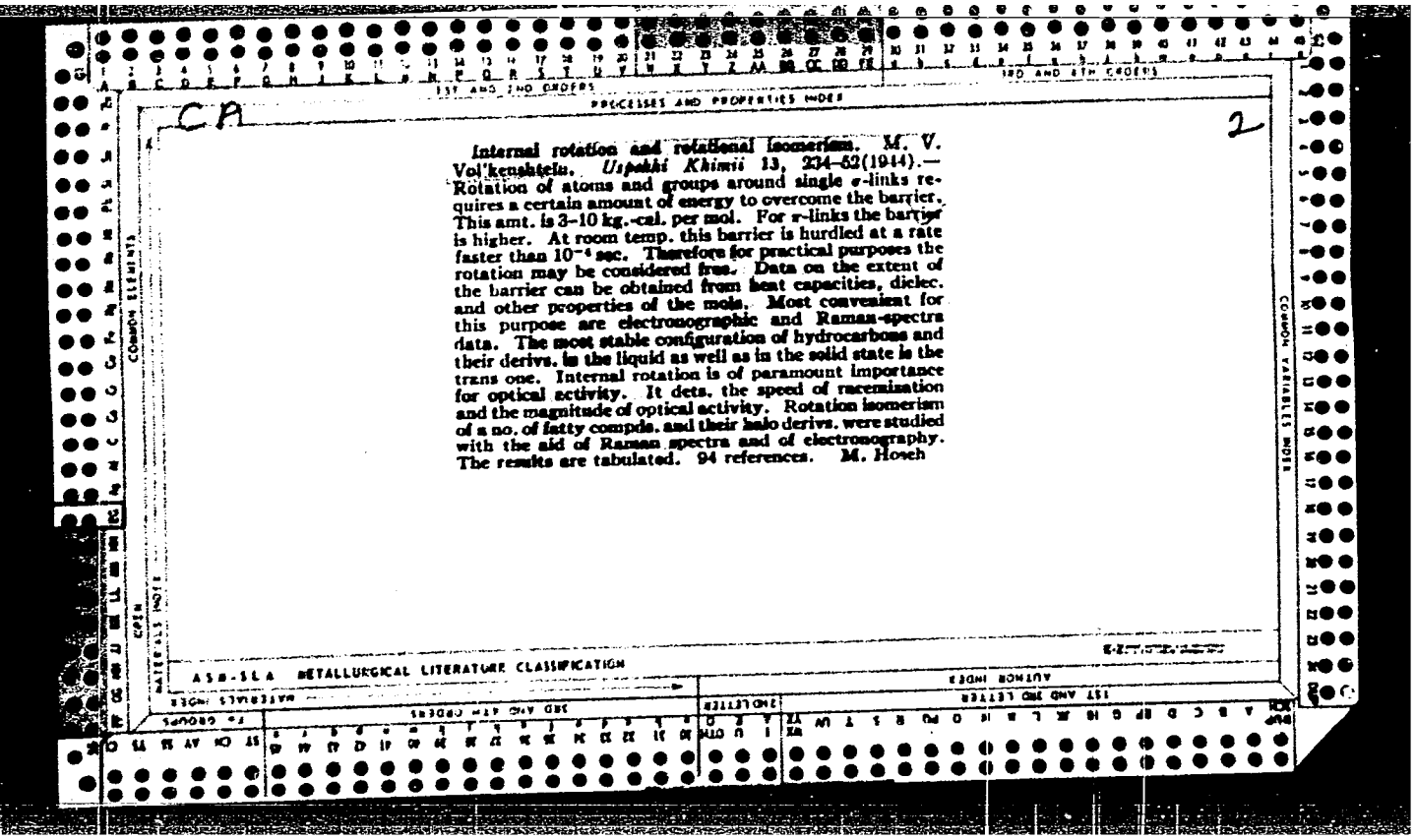

CA

2

Internal rotation and rotational isomerism. M. V. Vol'kenshtein. *Uspekhi Khimii* 13, 234–52(1944).—Rotation of atoms and groups around single σ-links requires a certain amount of energy to overcome the barrier. This amt. is 3–10 kg.-cal. per mol. For π-links the barrier is higher. At room temp. this barrier is hurdled at a rate faster than 10^{-4} sec. Therefore for practical purposes the rotation may be considered free. Data on the extent of the barrier can be obtained from heat capacities, dielec. and other properties of the mols. Most convenient for this purpose are electronographic and Raman-spectra data. The most stable configuration of hydrocarbons and their derivs. in the liquid as well as in the solid state is the trans one. Internal rotation is of paramount importance for optical activity. It dets. the speed of racemisation and the magnitude of optical activity. Rotation isomerism of a no. of fatty compds. and their halo derivs. were studied with the aid of Raman spectra and of electronography. The results are tabulated. 94 references. M. Hoseh

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AI 2 Molecular structure

[illegible]

Theory of intensities and polarisation in Raman spectra of halogen-substituted methanes. M. V. Volkenschtein and M. A. Eliaschevitsch (*Compt. rend. Acad. Sci. U.R.S.S.*, 1944, **48**, 51—53).—The theory previously developed (A., 1943, 1, 116) is applied to CCl_4, $CHCl_3$, CH_2Cl_2, MeCl, MeBr, CH_2Br_2, $CHBr_3$, and CBr_4. The original theory depends on the additivity of effects due to valency bonds, but this approximation is not always valid. The polarisability of a bond is not only a function of its length, but it also varies with the length of neighbouring bonds and with valency angle. However, the theory gives satisfactory agreement between observed and calc. vals. of intensity and polarisation, the agreement being better in the case of intensity. The calc. degree of depolarisation of deformational vibrations is > observed vals. The polarisability (α) of the C–H bond is small, but the variation of α with bond-length (r) is considerable. $d\alpha/dr$ is the smaller the more ionic is the nature of the bond.

A. I. M.

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"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

Electro-optical properties of valency oscillations. M. V. Volkenschtein. (*Compt. rend. Acad. Sci. U.R.S.S.*, 1944, **43**, 332—333.) Mathematical. N. M. B.

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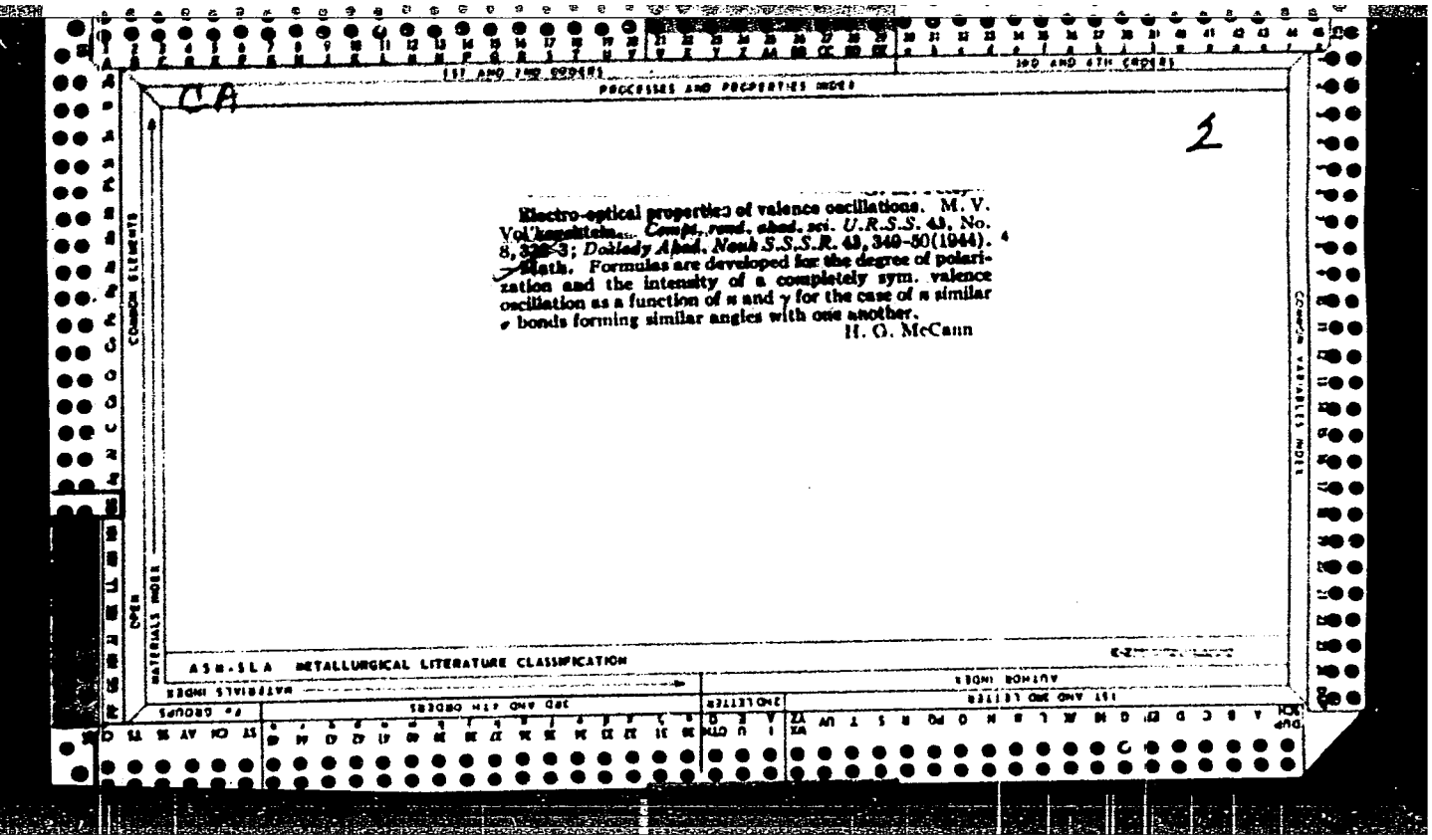

CA

1

Electro-optical properties of valence oscillations. M. V. Vol'kenshtein. *Compt. rend. acad. sci. U.R.S.S.* 43, No. 8, 339–43; *Doklady Akad. Nauk S.S.S.R.* 43, 349–50(1944). In Russian. Formulas are developed for the degree of polarization and the intensity of a completely sym. valence oscillation as a function of α and γ for the case of n similar σ bonds forming similar angles with one another.

H. G. McCann

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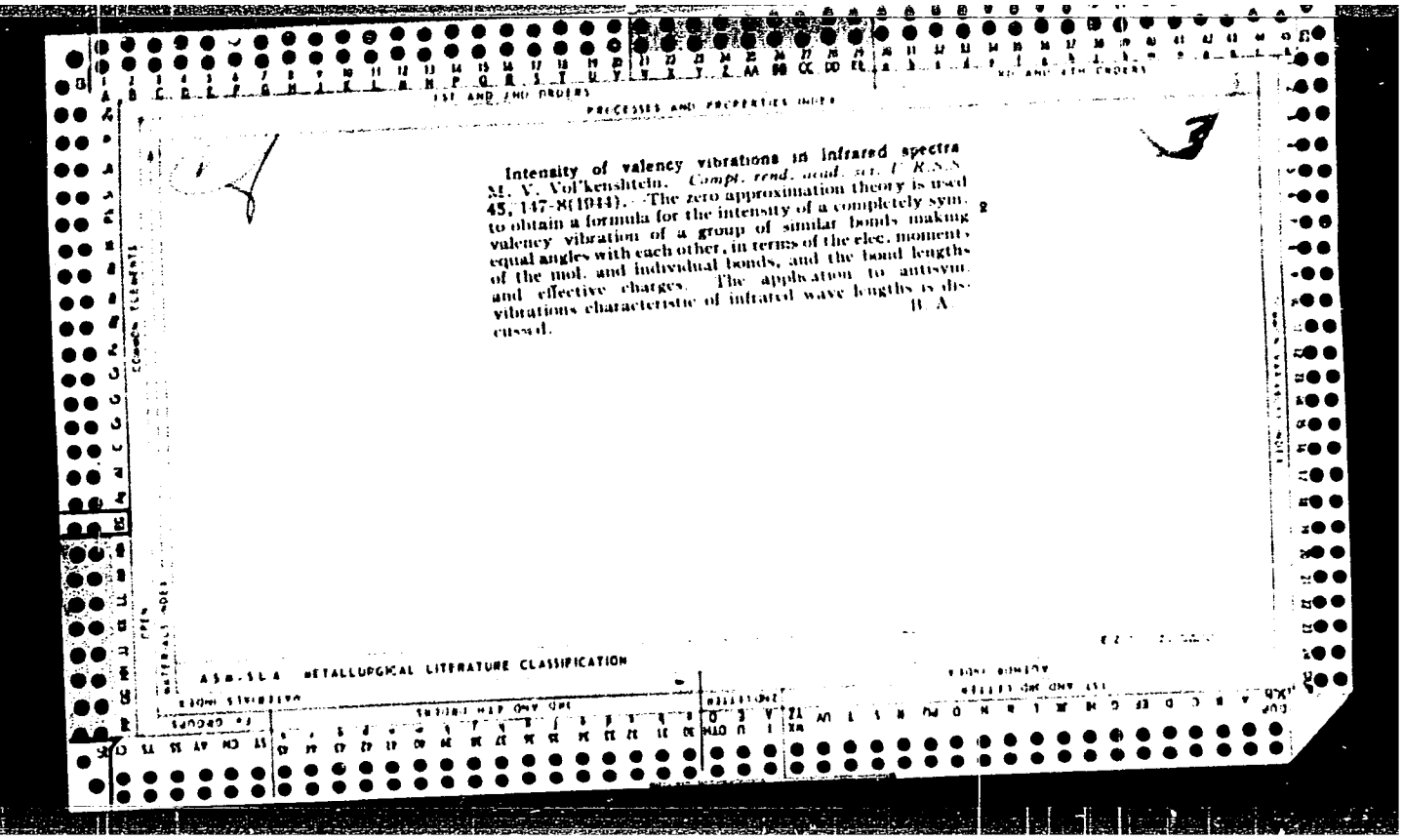

Intensity of valency vibrations in infrared spectra
M. V. Vol'kenshtein. *Compt. rend. acad. sci. U.R.S.S.* 45, 147-8(1944). The zero approximation theory is used to obtain a formula for the intensity of a completely sym. valency vibration of a group of similar bonds making equal angles with each other, in terms of the elec. moments of the mol. and individual bonds, and the bond lengths and effective charges. The application to antisym. vibrations characteristic of infrared wave lengths is discussed. H. A.

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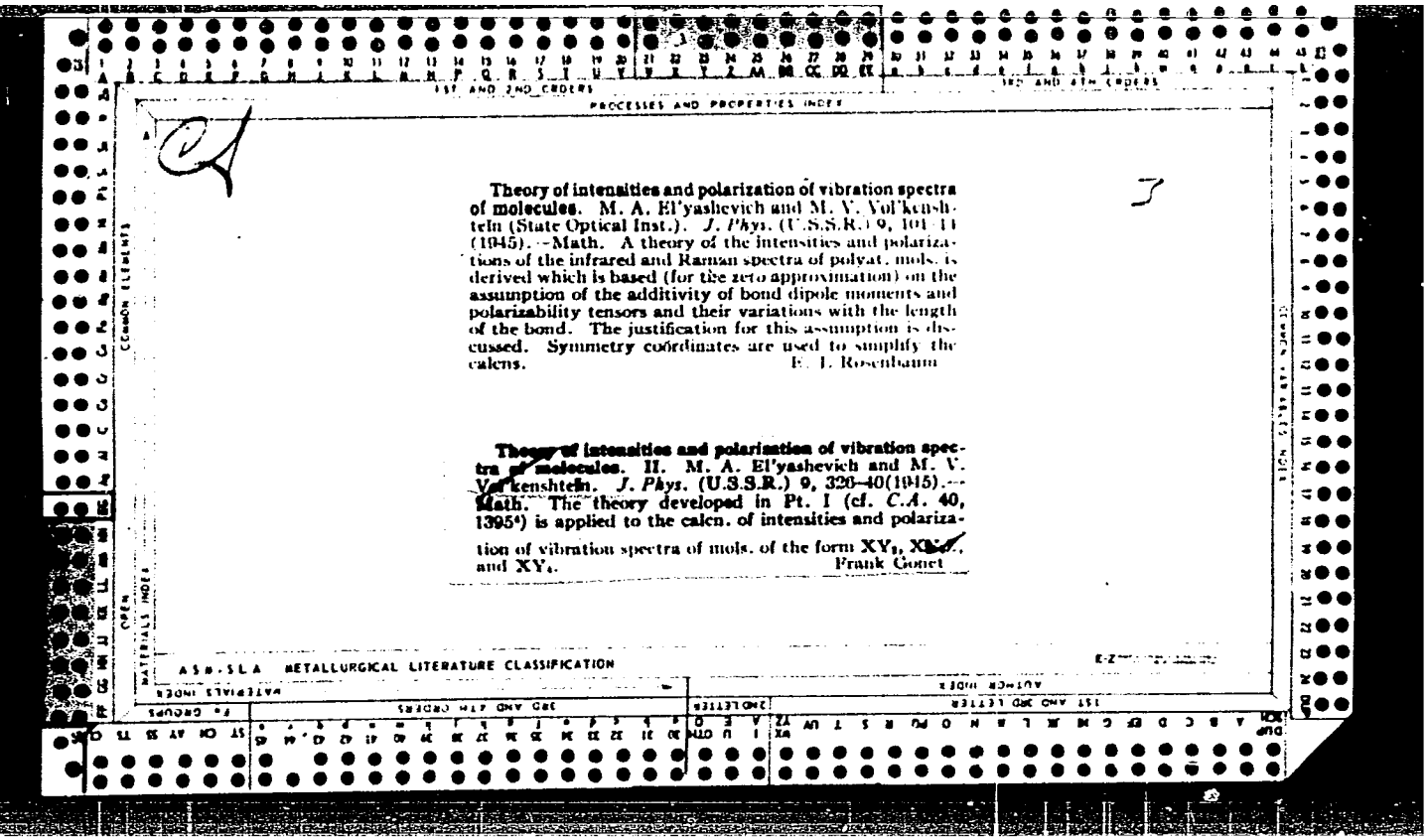

PROCESSES AND PROPERTIES INDEX

Theory of intensities and polarization of vibration spectra of molecules. M. A. El'yashevich and M. V. Vol'kenshtein (State Optical Inst.). *J. Phys.* (U.S.S.R.) 9, 101–11 (1945).—Math. A theory of the intensities and polarizations of the infrared and Raman spectra of polyat. mols. is derived which is based (for the zero approximation) on the assumption of the additivity of bond dipole moments and polarizability tensors and their variations with the length of the bond. The justification for this assumption is discussed. Symmetry coördinates are used to simplify the calcns. E. J. Rosenbaum

Theory of intensities and polarization of vibration spectra of molecules. II. M. A. El'yashevich and M. V. Vol'kenshtein. *J. Phys.* (U.S.S.R.) 9, 320–40(1945).—Math. The theory developed in Pt. I (cf. *C.A.* 40, 1395[4]) is applied to the calcn. of intensities and polarization of vibration spectra of mols. of the form XY_3, XY_2, and XY_4. Frank Conet

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PROCESSES AND PROPERTIES INDEX

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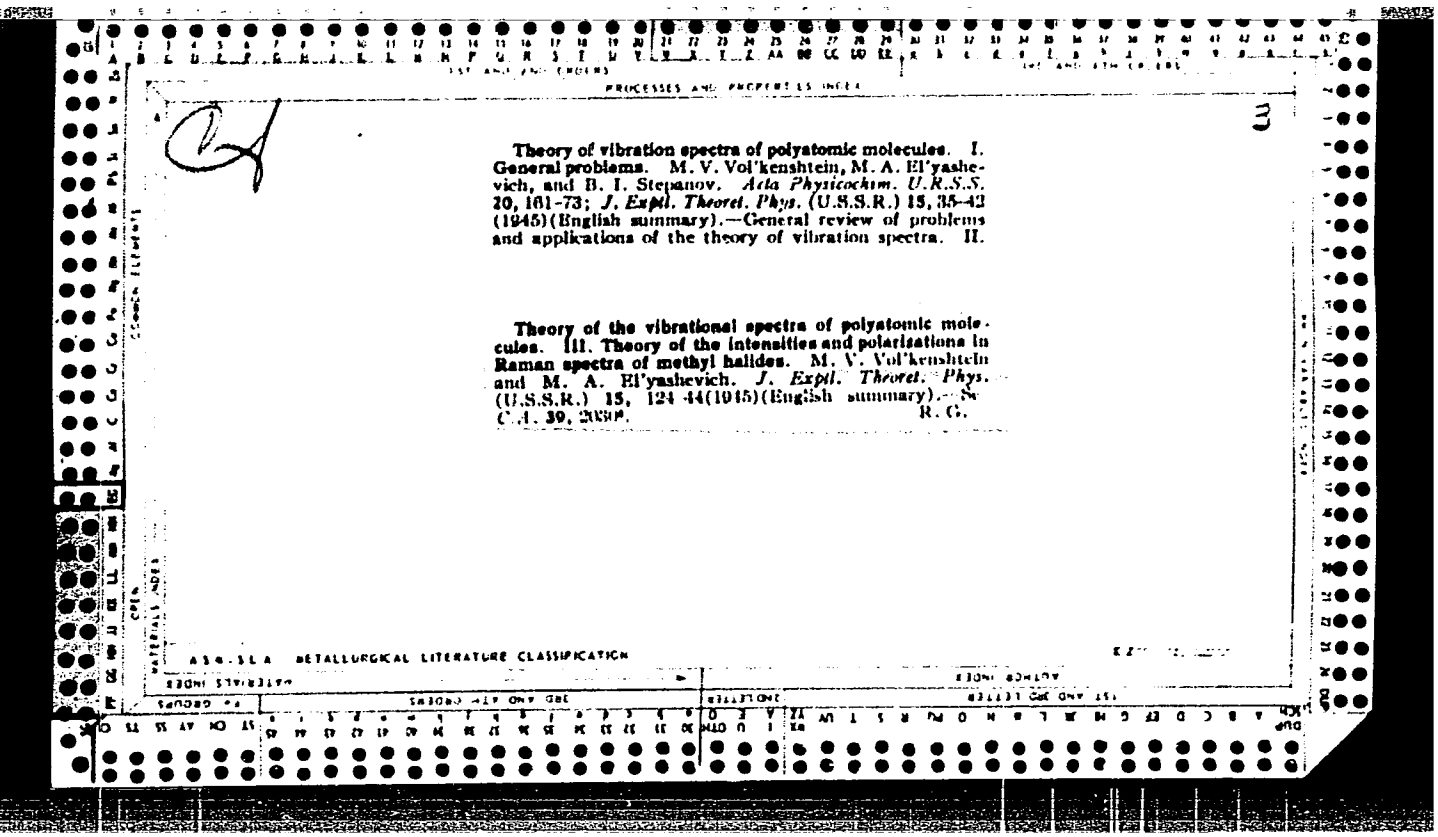

Theory of vibration spectra of polyatomic molecules. I. General problems. M. V. Vol'kenshtein, M. A. El'yashevich, and B. I. Stepanov. *Acta Physicochim. U.R.S.S.* 20, 161-73; *J. Exptl. Theoret. Phys.* (U.S.S.R.) 15, 35-42 (1945)(English summary).—General review of problems and applications of the theory of vibration spectra. II.

Theory of the vibrational spectra of polyatomic molecules. III. Theory of the intensities and polarizations in Raman spectra of methyl halides. M. V. Vol'kenshtein and M. A. El'yashevich. *J. Exptl. Theoret. Phys.* (U.S.S.R.) 15, 124-44(1945)(English summary).—See C.A. 39, 2030[8]. R. G.

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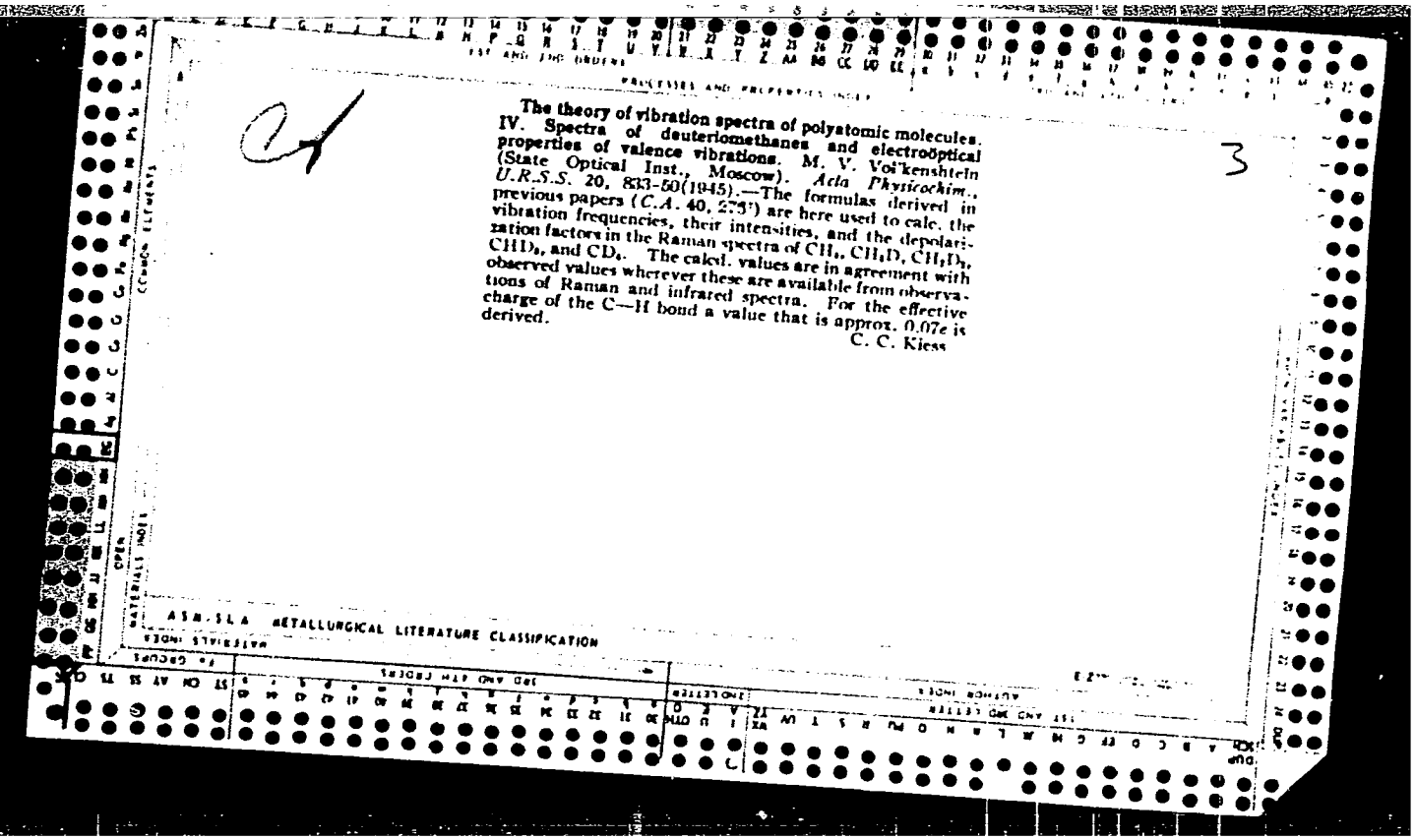

The theory of vibration spectra of polyatomic molecules. IV. Spectra of deuteriomethanes and electrooptical properties of valence vibrations. M. V. Vol'kenshtein (State Optical Inst., Moscow). *Acta Physicochim., U.R.S.S.* 20, 833-50(1945).—The formulas derived in previous papers (*C.A.* 40, 2751) are here used to calc. the vibration frequencies, their intensities, and the depolarization factors in the Raman spectra of CH_4, CH_3D, CH_2D_2, CHD_3, and CD_4. The calcd. values are in agreement with observed values wherever these are available from observations of Raman and infrared spectra. For the effective charge of the C—H bond a value that is approx. 0.07*e* is derived.

C. C. Kiess

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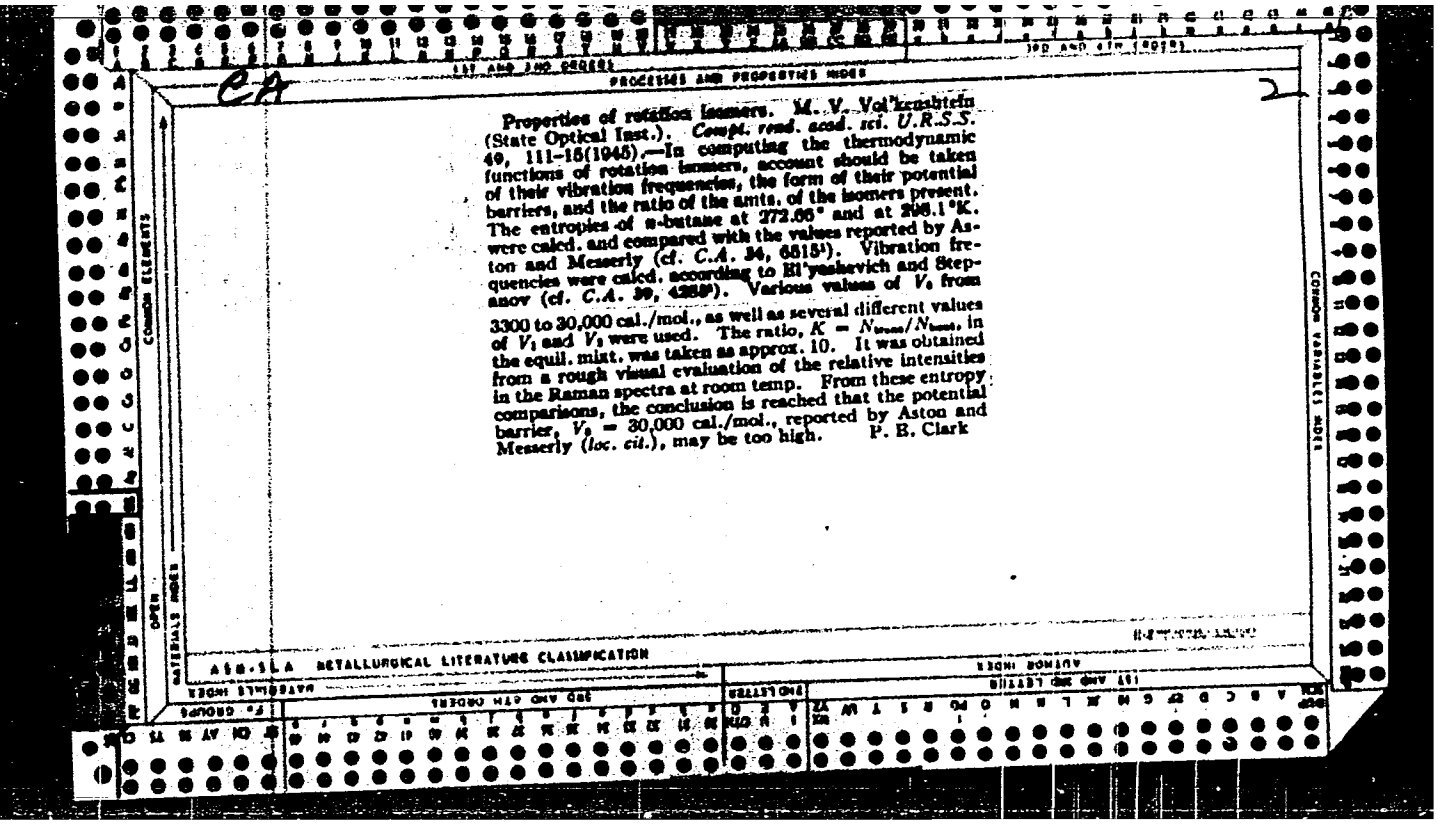

CA

2

Properties of rotation isomers. M. V. Vol'kenshtein (State Optical Inst.). *Compt. rend. acad. sci. U.R.S.S.* 49, 111–15(1945).—In computing the thermodynamic functions of rotation isomers, account should be taken of their vibration frequencies, the form of their potential barriers, and the ratio of the amts. of the isomers present. The entropies of *n*-butane at 272.66° and at 298.1°K. were calcd. and compared with the values reported by Aston and Messerly (*cf. C.A.* 34, 6515[1]). Vibration frequencies were calcd. according to El'yashevich and Stepanov (*cf. C.A.* 39, 4388[8]). Various values of V_0 from 3300 to 30,000 cal./mol., as well as several different values of V_1 and V_2 were used. The ratio, $K = N_{trans}/N_{cis}$, in the equil. mixt. was taken as approx. 10. It was obtained from a rough visual evaluation of the relative intensities in the Raman spectra at room temp. From these entropy comparisons, the conclusion is reached that the potential barrier, V_0 = 30,000 cal./mol., reported by Aston and Messerly (*loc. cit.*), may be too high. P. E. Clark

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VOLKENSTEIN, M. V.

M. V. Volkenstein, "V. V. Kondratiev: Structure of Atoms and Molecules" (L. A.) P. 261. **Volkenstein, reviewer of Kondratiev's book**

We are in possession of Kondratiev's book. It has 318 pages and has the following chapters:

1. Structure of atomic nucleus: composition of nucleus its dynamics.
2. Theory of the electrone cover of the atom.
3. Atomic spectroscopy.
4. Levels of energy in molecules; the nature of chemical forces and the valence theory.
5. Spectroscopy of molecules.
6. Electrical properties of atoms and molecules.
7. The geometry and energetics of molecules.

SO: Bulletin of the U.S.S.R. Academy of Sciences (Chemistry Series) Izvestia Akad. Nauk, S.S.S.R., No. 2, 1948.

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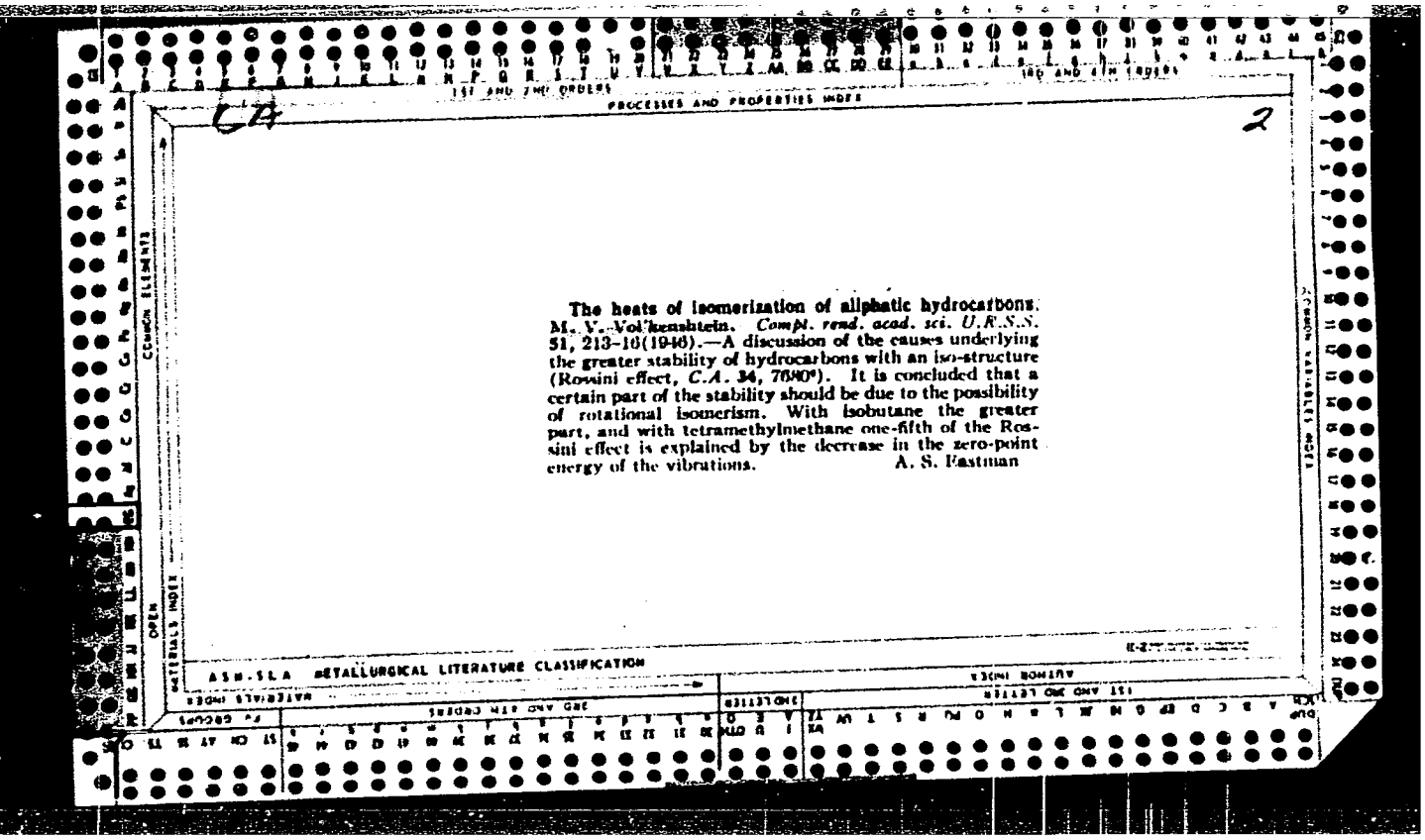

CA

2

The heats of isomerization of aliphatic hydrocarbons. M. V. Vol'kenshtein. *Compt. rend. acad. sci. U.R.S.S.* 51, 213–16(1946).—A discussion of the causes underlying the greater stability of hydrocarbons with an iso-structure (Rossini effect, *C.A.* **34**, 7680⁹). It is concluded that a certain part of the stability should be due to the possibility of rotational isomerism. With isobutane the greater part, and with tetramethylmethane one-fifth of the Rossini effect is explained by the decrease in the zero-point energy of the vibrations. A. S. Eastman

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"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOLKENSHTEYN, M. V.

Author: Volkenshtein, M. V.

Title: The structure of molecules. (Stroenie molekul). 273p.

City: Moscow

Publisher: Publishing House of the Academy of Sciences of the USSR

Date: 1947

Available: Harvard University
Library of Congress

Source: Monthly List of Russian Accessions
Vol. 4, No. 6, p. 386

Call No: QD466.V65

Subject: 1. Molecules. 2. Chemistry, Physical and Theoretical.

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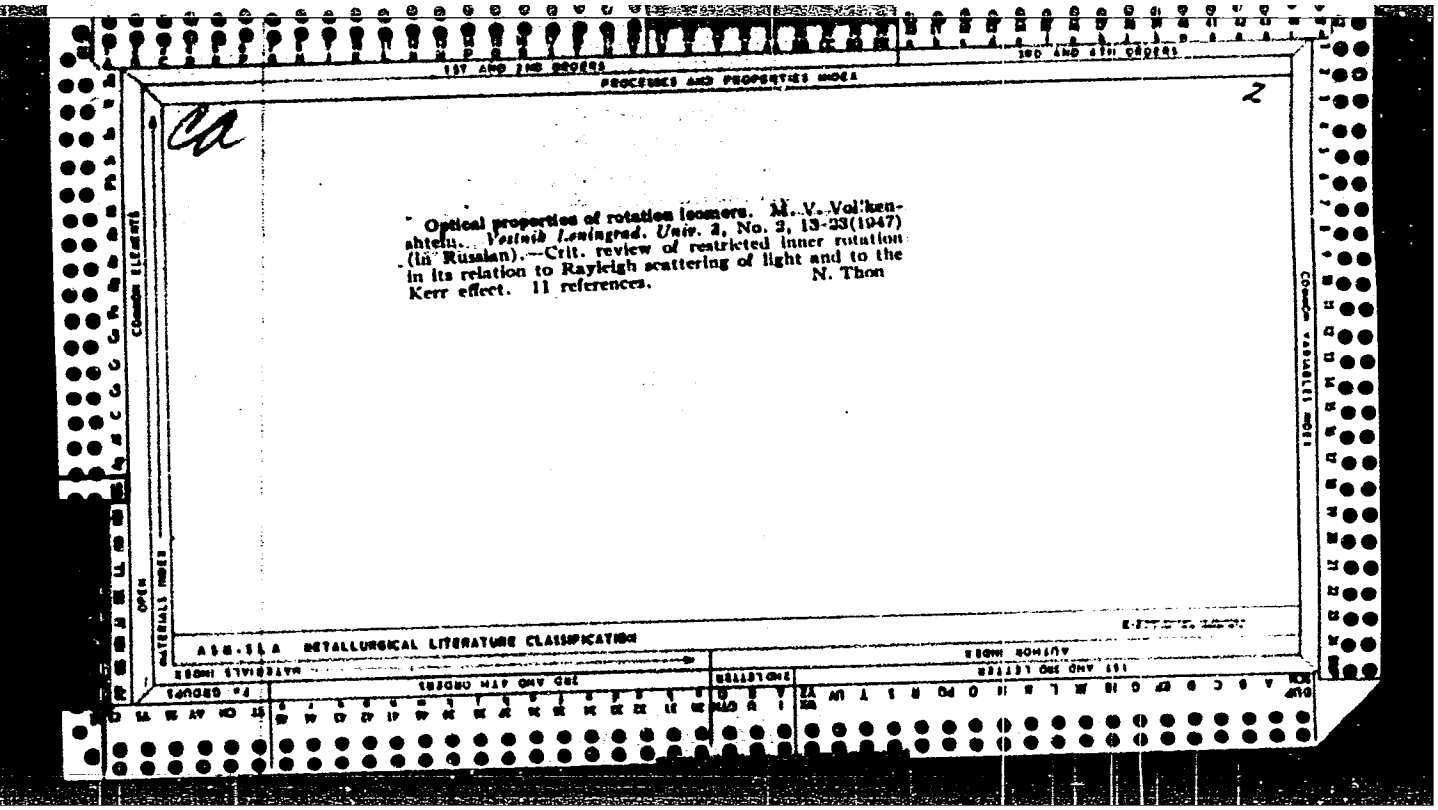

Optical properties of rotation isomers. M. V. Vol'kenshteĭn. *Vestnik Leningrad. Univ.* 2, No. 2, 13-23(1947) (in Russian).—Crit. review of restricted inner rotation in its relation to Rayleigh scattering of light and to the Kerr effect. 11 references. N. Thon

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VOL'KENSHTEYN, M. V. Prof

PA 9/49T104

USSR/Physics
Light - Dispersion
Light - Polarization

Oct 48

"Dispersion of Light," Prof M. V. Vol'kenshteyn, 12½ pp

"Priroda" No 10

Describes molecular dispersion of light in gases and fluctuation of density; dispersion in liquid and solid bodies; fluctuation of orientation and polarization of dispersed light; dispersion of light in solid bodies and theory of thermal capacity of solid bodies.

9/49T104

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M.V. Prof.

Nov 48

USSR/Physics
Light, Dispersion
Polarization

"The Combined Dispersion of Light," Prof M. V. Vol'kenshteyn, 16 pp

"Priroda" No 11

Treats subject under following (mentioning scientists concerned): nature of phenomenon, combined dispersion of light and chemical combination in polyatomic molecules, analytical propositions, intermolecular reaction, theory of molecular oscillations, and theory of intensities and polarizations in combination dispersion spectra.

23/49T102

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

Sep/Oct 48

USSR/Physics
Polarization
Spectra - Analysis

"Polarization of the Spectral Lines of Combined Dispersion, II," Ya. S. Bobovich, M. V. Vol'kenshteyn, State Opt Inst, 7 pp

"Iz Ak Nauk SSSR, Ser Fiz" Vol XII, No 5

PA 19/49T91

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

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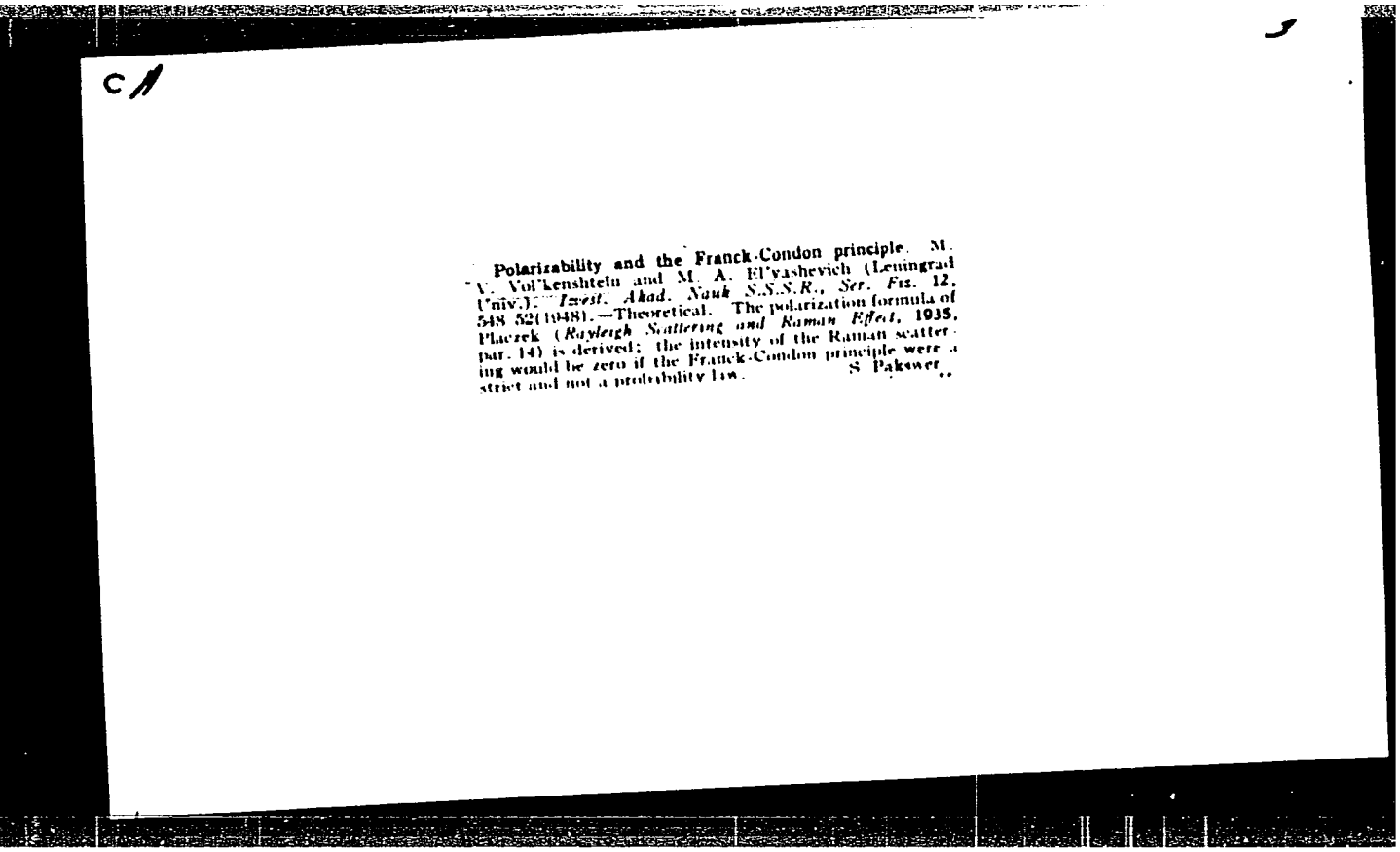

Polarizability and the Franck-Condon principle. M. V. Vol'kenshtein and M. A. El'yashevich (Leningrad Univ.). *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 12, 548-52(1948).—Theoretical. The polarization formula of Placzek (*Rayleigh Scattering and Raman Effect*, 1935, par. 14) is derived; the intensity of the Raman scattering would be zero if the Franck-Condon principle were a strict and not a probability law. S. Pakswer

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CA

2

Polarization of spectral lines of Raman scattering 11

Va. S. Bobovich and M. V. Volkenshtein. *Inst. Akad.*

Nauk S.S.S.R., Ser. Fiz. 12, 553-9(1948). An exptl. set up is described consisting of a spectrograph with a doubly refractive polarizer in front of the slit. Since the polarizing prism separates both components of the scattered radiation but turns them through 45°, the illuminator (Hg lamps) was mounted at a 45° angle with respect to the axis of the vessel contg. the liquid. This method permits exposures of 3-12 hours. The depolarization of Raman lines of CCl_4, C_6H_6, and PhMe was measured and compared to data available in literature. Data on naphthalene in CCl_4 and benzene soln. are in disagreement with data taken by Nedungadi. The depolarization of solns. in benzene, pyridine, or CCl_4 of the following nitro compds. has been measured: Nitromethane, nitrobenzene, nitrotoluene, *p*-nitrochlorobenzene; *o*-, *m*-, *p*-nitrophenol; *p*-nitroaniline; *m*-dinitrobenzene; toluene, nitronaphthalene, and dinitronaphthalene. It is shown that groups in para position increase the axial component in the mol.

Serge Pakswer

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"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYU, M. V.

USSR/Physics Jan 1948
Spectrum Analysis
Spectra, Electronic

"Electron Spectra and Intensity of Combination Dispersion in Spectra," M. V. Vol'kenshteyu, 12 pp

"Zhur Eksper i Teoret Fiz" Vol XVIII, No 1

Analyzes formulas based on the association of the intensities and polarizations of lines of combination dispersion with aspects of the basic and excited electron conditions of a molecule.

41T104

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

State Optical Inst.

Electronic spectra and intensities in Raman spectra
M. V. Vol'kenshtein. *Zhur. Eksptl. Teoret. Fiz* 18, 71-81(1948).—Placzek's criterion of intensity and polarization of Raman lines, the deriv. of the mol. electronic polarizability with respect to the normal coordinate, can be represented as a function of the polarizabilities α of the individual valence bonds and the derivs. $\partial\alpha/\partial q$ with respect to the bond coördinate q. On the basis of the Kramers-Heisenberg formula, $\partial\alpha/\partial q$ can be linked with the properties of the ground and excited electronic states of the mol. In the case of diat. mols. and of individual bonds treated as diat. mols., the theory accounts for the low intensity of Raman lines of ionic bonds and their increase with decreasing polarity, e.g. in the series C—Cl, C—Br, C—I. The criterion of bond polarity derived from Raman spectra coincides with the spectroscopic criteron of Franck. The theory also accounts for the high Raman-line intensities of conjugate-bond and aromatic org. mols., i.e. mols. characterized by nonadditivity of bond energies. N. Thon

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

CA

Polarization of Raman lines. M. V. Vol'kenshtein. *Zhur. Eksptl. Teoret. Fiz.* 18, 138-48(1948). The following rules, derived on the basis of the valence optical scheme, and supplementing Placzek's rules, claim only approx. validity but are nonetheless practically valuable and borne out by comparison with ample exptl. data. (1) For any fully symmetrical pure deformation vibration of a mol. of any symmetry group, the degree of depolarization $\rho = 6/7$. (2) For a vibration of a diatomic mol. or a characteristic vibration of an individual bond, ρ is comprised between $3/4$ and 0. (3) For fully symmetrical vibrations of any plane mols. of the symmetry D_{nh}, built up of identical bonds, ρ is equal and independent of the no. of bonds. (4) As a generalization of rule 2, for any fully symmetrical pure valence vibration of a bond or a group of identical bonds, the upper limit of ρ is $3/4$. N. Thon

State Optical Inst.

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KINSHTEYN, M. V.

USSR/Chemistry - Oils, Spectrography of
Chemistry - Asphalt

Aug 48

"Porphyrin Spectra in Oils and Asphalts," Ye. A. Glebovskaya, M. V. Vol'kinshteyn, All-Union Sci Res Petroleum Geol Survey Inst and State Opt Inst, 12 pp

"Zhur Obshch Khimii" Vol XVIII (LXXX), No 8

Total of 24 samples, of bituminous substances, oils, shale constituents, etc., from various locations were dissolved in dioxane, alcohol, benzene, chloroform, petroleum ether, or pyridine and subjected to spectrum analysis with a Beckmann apparatus. Measurements were made every 2-5 mμ in visible part of spectrum. Presence of a porphyrin complex with vanadium, and possible with nickel was established. Complexes may belong to material from which oil originated. Submitted 17 Aug 47.

PA 19/49T26

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V., TELYASHEVICH, M. A. and STEPANOV, B. I.

"Molecular Vibrations: Vol. I.
"The Geometry and Mechanics of Molecular Vibrations"

State Publishing House of Technical and Theoretical Literature: Moscow-Leningrad, 1949.

Translation F-TS-7334-RE

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

1. VOLKENSHTEYN, M. V., YEL'YASHEVICH, M. A., STEPANOV, B. I.

2. USSR (600)

4. Physics and Mathematics

7. Oscillations of Molecules, M. V. Volkenshteyn, M. A. Yel'yashevich, B. I. Stepanov. (Moscow-Leningrad State Technical Press, 1949). Reviewed by V. M. Chulanovskiy, Sov. Kniga, No 10, 1950.

9. [redacted] Report U-3081, 16 Jan. 1953, Unclassified.

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

Intensity and polarization of vibrational spectra and molecular spectral analysis. M. V. Vol'kenshtein. *Vestnik Leningrad. Univ.* 5, No. 8, 26-32(1950).—A general review. O. M.

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

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CA

Investigation of rotational isomerism by optical methods. M. V. Vol'kenshtein. *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 14, 466–70(1950).—The isomers whose structure is detd. by the rotation of mol. groups around a double bond have very small differences in energy and activation energy and therefore a fast conversion so that they cannot be detected chemically. V. reviews the detection methods based on Raman spectra, electronic transition spectra, and mol. optics. S. Paksweer

H5

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

CIS

3

Rotational symmetry of dienes. M. V. Volkenstein, V. N. Nikitin, and T. V. Yakovleva. *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 14, 471-7(1950).—The intensities of Raman lines of butadiene and isoprene were investigated at −60 to +75° (butadiene) and −60 to +50° (isoprene). The comparison of the tabulated Raman lines with infrared absorption lines, measured by other investigators, shows that in liquid butadiene the trans form (D_{16}) is present, whereas the presence of the cis form is doubtful. The results do not allow conclusions on the presence of both isomers in equil. in the case of isoprene. S. Pakswer

1951

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

CA

The work of L. A. Chugaev in the field of optically active compounds. M. V. Vol'kenshtein and A. M. Efros. *Uspekhi Khim.* 19, 802-18(1950).—Review; 49 references. Portrait of Chugaev. N. Thon

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

PA 159T91

USSR/Physics - Optics
Polarization

Apr 50

"The Theory of Natural Optical Activity," M. V. Vol'kenshteyn, Leningrad State U, 5 pp

"Zhur Eksper i Teoret Fiz" Vol XX, No 4

Classical theory of optical activity of anisotropic media is made more precise. Shows Born's theory is not applicable to case of anisotropic medium, and that in this case it is necessary to consider electrical quadrupole polarization besides electrical and magnetic dipole polarizations. Submitted 15 Dec 49.

159T91

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

CA

Theories of the spectroscopic manifestations of the hydrogen bond. M. V. Vol'kenshtein, M. A. El'yashevich, and B. I. Stepanov (Leningrad State Univ., Leningrad). *Zhur. Fiz. Khim.* 24, 1158–64(1950).—A crit. discussion.
Paul W. Howerton

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

PA 165T90

USSR/Physics - Polarizability 21 Mar 50
Optical Activity

"Theory of Polarizability, and Optical Activity," M. V. Vol'kenshteyn, Leningrad State U imeni A. A. Zhdanov

"Dok Ak Nauk SSSR" Vol LXXI, No 3, pp 447-450

Mathematically attempts to construct a molecular theory of essential optical activity that permits one to calculate rotating capacity of molecules purely on basis of other information on their structure. Valence-optical scheme of optical activity. Submitted 26 Jan 50 by Acad A. N. Kolmogorov.

[redacted]

165T90

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

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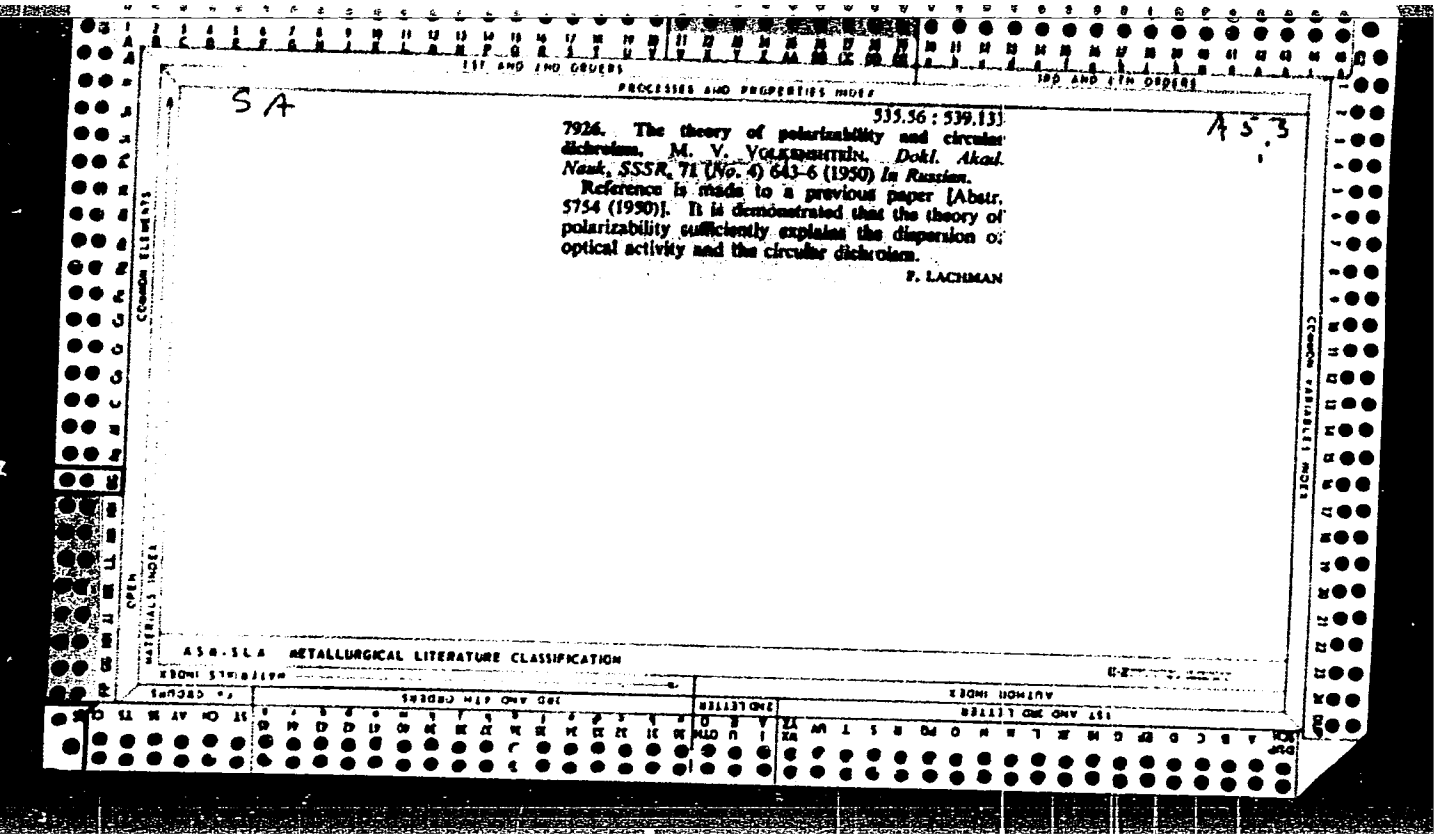

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535.56 : 539.13

7926. The theory of polarizability and circular dichroism. M. V. VOLKENSHTEIN. *Dokl. Akad. Nauk, SSSR*, 71 (No. 4) 643-6 (1950) *In Russian.*

Reference is made to a previous paper [Abstr. 5754 (1950)]. It is demonstrated that the theory of polarizability sufficiently explains the dispersion of optical activity and the circular dichroism.

P. LACHMAN

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

PA 175T80

USSR/Physics - Polariza[redacted] 21 Apr 50
Combination Spectra

"Polarization in the Spectra of Combination Scattering of Aromatic Nitro-Compounds," Ya. S. Bobovich, M. V. Vol'kenshteyn

"Dok Ak Nauk SSSR" Vol LXXI, No 6, pp 1045-1049

Reports on some results of polarization measurements on spectra of combination scattering of aromatic compd (e.g., $NO_2 \cdot \phi$; $NO_2 \cdot \phi \cdot NH_2$; : $NO_2 \cdot \phi \cdot Cl$; $NO_2 \cdot \phi \cdot Br$; $NO_2 \cdot \phi \cdot OH$; $NO_2 \cdot \phi \cdot CH_3$; etc.). Addn radicals are placed variously around benzene radical. Submitted 20 Feb 50 by Acad A. N. Terenin.

[redacted]

175T80

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

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Molekulyarnaya optika (molecular optics) Moskva, Gos., izd-vo tekhnikoteoreticheskoy Literatury, 1951.
744 p. diagrs.
Cataloged from abstract.
FB 508050.

Monograph gives systematic account of molecular optics, related to the field of physics. Special attention is paid to the leading role of Soviet researchers in the development of physics.

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

PA 197T96

USSR/Nuclear Physics - Optics, Molecular Oct 51

"Optically Active Molecules in External Field," M. V. Volkenshteyn, E. K. Byutner, Leningrad State U

"Zhur Eksper i Teoret Fiz" Vol XXI, No 10, pp 1132-1138

Discusses behavior of optically active gas or soln in external field taking into account elec dipole and quadripole and magnetic dipole of polarizing medium (cf. M. V. Volkenshteyn, ibid. 20, 342, 1950, and "Molecular Optics" 1951). Authors acknowledge A. T. Timorev's advice. Submitted 22 Nov 50.
LC

197T96

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOLKENSHTEYN M. V.

181T82

USSR/Physics. - Molecular Spectra Apr 51

"Internal Molecular Interaction and Optics," M. V. Volkenshteyn

"Uspekhi Fiz Nauk" Vol XLIII, No 4, pp 485-511

Discusses opt phenomena disclosing internol action. Delocalization of electrons in case of strong electron action may be noticed in electronic spectra of mols, in anisotropic diamagnetic susceptibility of aromatic comps and particularly in anomalous intensities of combined dispersion.

181T82

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

USSR/Physics - Crystallography 1 Feb 51

"Optically Active Crystals," M. V. Volkenshteyn, E. K. Byutner, Leningrad State U imeni A. A. Zhdanov.

"Dok Ak Nauk SSSR" Vol LXXVI, No 4, pp 515-517

Only accurate theory of rotating crystals is that of Born. Exptl data on relation between crystallic spectrum and rotating capacity were found by Samoylov, studying uranyl acetate at temp of liquid helium. Submitted 20 Nov 50 by Acad S. I. Vavilov.

178T107

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

154T102

USSR/Physics - Polymers, Linear 1 Jun 51

"Geometry of Linear Polymers," M. V. Vol'kenshteyn, O. B. Ptitsyn

"Dok Ak Nauk SSSR" Vol LXXVIII, No 4, pp 657-660

Present-day phys of linear polymers proceeds from representation of familiar freedom of rotation of members of the polymer chain. Up to now no method has been described for solving problems of the geom of such chains. The most important formulas in the lit are given without derivation. Here method is expounded which is convenient for any potentials that brake int

184T102

USSR/Physics - Polymers, Linear (Contd) 1 Jun 51

rotation. Also gives anal of existing computational formulas. Submitted 6 Apr 51 by Acad A. F. Ioffe.

184T102

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOLKENSHTEYN, M. V.

184T106

USSR/Physics - Molecular 11 Jun 51

"Linear Polymer as a Mixture of Rotational Isomers," M. V. Volkenshteyn, Inst High-Mol Compds, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXVIII, No 5, pp 879-882

Considers polymeric chain as equil state of rotational isomers. Different equil states have different energy levels. Rotational isomerism of polymer may be studied by oscillatory spectra at various temps. Submitted by Acad A. F. Ioffe 6 Apr 51.

184T106

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOLKENSHTEYN, M. V.

"Molecular Optics," Sovetskaya Kniga (Soviet Books), 128 p., Pravda Publ. House, 1952.

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

Chemical Abst.
Vol. 48 No. 9
May 10, 1954
General and Physical Chemistry

Optical activity of triacetylcellulose. N. M. Bazhenov and M. V. Vol'kenshtein. *Bull. Acad. Sci. U.S.S.R., Div. Chem. Sci.* 1952, 333-8(Engl. translation).—See *C.A.* 46, 9381i.

H. L. H.

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M.V.; KOLODINA, N.S.

Electronic absorption spectra of polystyrene and its derivatives. Izvest. Akad. Nauk S.S.S.R., Otdel Khim. Nauk '52, p.1033-6. (CA 47 no.13:6253 '53) (MLRA 6:1)

1. High Polymer Inst., Acad. Sci. U.S.S.R., Moscow.

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

USSR/Physics - Dichroism Nov 52

"Circular Dichroism in Crystals," M. V. Vol'kenshteyn and E. K. Byutner, Leningrad State Univ

"Zhur Eksper i Teoret Fiz" Vol 23, No 5, pp 584-587

It is shown by means of a classicial model of a system of coupled oscillators with helical symmetry that crystals in the plane of polarization may possess a strong circular dichroism. Received 13 May 52.

(PA 56 no.668:5429 '53)

236T85

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M.V.

6

Geometry of linear polymers. I. Calculation of the length of the chains. M. V. Vol'kenshtein and O. B. Ptitsyn (Inst. High-Mol. Compds., Acad. Sci. U.S.S.R., Leningrad). *Zhur. Fiz. Khim.* 26, 1061–71 (1952); cf. *C.A.* 46, 1856a.—Theoretical and math. A general method is developed for calcg. the av. quadratic length of polymeric chains on the basis of a kinetic theory in which is assumed a somewhat hindered rotation about each of the individual C—C bonds. Like the Kuhn equation, the derived equation fails to take into account correlation between more distant rotations. II. Rotation-isomerism theory. M. V. Vol'kenshtein. *Ibid.* 1072–83.—Theoretical and math. A rotation-isomerism theory is proposed for linear polymers. According to this theory the polymer chain is an equil. mixt. of rotational isomers. Exptl. values are compared for ethane, propane, isobutane, isobutene, and 2-methylbutane.
F. H. Rathmann

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"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

Aug. 52

USSR/Chemistry - Polymers

"The Geometry of Linear Polymers, II. The Rotation Isomer Theory", M. V. Vol'kenshteyn, Inst of High Mol compds, Acad Sci USSR, Leningrad

Zhur Fiz Khim, Vol 26, No. 8, pp 1072-1083

The rotation isomer theory of linear polymers was proposed, according to which the polymeric chain represents an equil mixt of rotation isomers.

263 T 3

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"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

USSR/Physics - Oscillatory Spectra 1 Feb 52

"Distribution of Intensity in the Oscillatory Spectra of Linear Chains," L. I. Vidro, B. I. Stepanov

"Dok Ak Nauk SSSR" Vol LXXXII, No 4, pp 557-560

Calculates the intensities of infrared and combinational lines for 2 simplest models - linear chains, using the valent-optical scheme of M. V. Vol'kenshteyn and M. A. Yel'yashevich. Considers a simple linear chain consisting of 2n+1 identical bonds: o-o-...-o-o. Acknowledges the helpful assistance of Prof M. V. Vol'kenshteyn. Submitted by Acad A. N. Terenin 4 Dec 51.

PA 213T112

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

USSR/Physics - Electron Spectra, Aromatic Compounds 1 Aug 52

"Electron Spectra of Aromatic Compounds," M.V. Vol'kenshteyn, L.A. Borovinskiy, Leningrad State U imeni Zhdanov, and Novgorod Teachers' Inst of City of Borovichi

"Dok Ak Nauk SSSR" Vol 85, No 4, pp 737-740

States that aromatic compds represent systems with especially considerable interaction of pi-electrons Notes that the properties of these systems can be understood only by proceeding from the profound ideas of "averaged" mutual influence of atoms, which were expressed for the 1st time by Butlerov and Markovnikov in 1870's. Proposes that a semi-quant theory of electron spectra of aromatic compds can be constructed on the basis of a model of potential well just as in quantum mech. Submitted by Acad A.N. Terenin 10 Jun 52.

227T73

(PA 56 no. 6728617 '53)

227T73

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

239T94

USSR/Physics - Susceptibility 11 Aug 52

"Anisotropy of Diamagnetic Susceptibility of Benzol, Naphthalene, and Anthracene," M. V. Vol'kenshteyn and L. A. Borovinskiy; Leningrad State U and Novgorod Teachers Inst, Borovichi

"DAN SSSR" Vol 85, No 5, pp 977-980

Derive new calcns based on the application of an elementary phys model of an electron in a potential well, which is a graphic visual method. State that in future computations it will be necessary to take into consideration the nonequivalence of all the bonds in condensation aromatic compds. Submitted by Acad A. N. Terenin 13 May 52.

239T94

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M.V.

5 Mat

USSR.

539.132

3711. Vibration spectra of linear polymers. L. I. VIDRO AND M. V. VOL'KENSHTEIN. *Dokl. Akad. Nauk SSSR*, 85, *No.* 6, 1243-6 (1952) *In Russian.*

See also Abstr. 5627 (1953). Derives expressions for intensities of the C–C bond vibrations in the Raman spectra of linear polymers; for some C_nH_{2n+2} hydrocarbons the expression is in qualitative agreement with experimental results obtained for their Raman spectra.

F. LACHMAN

M.A. YOUTZ
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VOL'KENSHTEYN, M.V.

USSR.

539.133

3738. Dimensions of the real chains of linear polymers in solutions. M. V. VOL'KENSHTEIN AND O. B. PTITSYN. *Dokl. Akad. Nauk SSSR*, 86, No. 3, 493–6 (1952) *In Russian.*

A simple method is proposed for an approximate evaluation of the influence of the volume effects on the dimensions of the polymer molecules. The final formula shows that, when volume effects are taken into account, the value $\sqrt{h^2}$ (h being the probable chain length) varies as $N^{0.6}$ (not as $N^{0.5}$) and that its temperature dependence is less pronounced than was assumed previously. F. LACHMAN

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M. A. YOUTZ.
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"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V. and PTITSYN, O. B.

"Rotational-Isomeric Theory of Fusion of Crystalline Polymers," DAN SSSR Vol 86, No 4, pp 677-80, 1952. Inst. of High-Molecular Compds.

Attempts to prove on basis of rotational isomeric theory that the temp of cryst fusion and the elasticity modulus should rise with increasing stretching of the molecular chain of the polymer. This theory permits direct connection between phys properties of polymers and their chem structure. Presented by Acad A.F.Ioffe 28 Jul 52

252T91

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M.V.

Raman spectra of two silanes. M. V. Vol'kenshtein and B. I. Pokrovskii. *Bull. Acad. Sci. U.S.S.R., Div. Chem. Sci.* 1953, 159 (Engl. translation).—See *C.A.* 47, 6254*h*.
H. L. H.

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M.V.; POKROVSKIY, Ye.I.

Raman spectra of two silanes. Izvest. Akad. Nauk S.S.S.R., Otdel Khim. Nauk '53, p. 177. (MLRA 6:3)
(CA 47 no.13:6254 '53)

1. High Polymer Inst., Acad. Sci. U.S.S.R., Moscow.

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOLKENSHTEYN, M. V.

USSR/Physics - Molecular Spectra Sep/Oct 53

"Computations of Oscillatory Spectra of Molecules Containing the Carbonyl Group and Their Comparative Characteristics," L. M. Sverdlov, Saratov State Univ im Chernyshevskiy

Iz Ak Nauk, Ser Fiz, Vol 17, No 5, pp 567-573

The oscillatory spectra are calculated by method of M. V. Volkenshteyn, M. A. Yel'yashevich, B. I. Stepanov (Kolebaniya Molekul (Oscillations of Molecules) 1949) and L. S. Mayants (Dissertation, Trudy FIAN, v. V (1950) for compds contg carbonyl group: formaldehyde, acetaldehyde, acetone, acetyl chloride, monomers of formic and acetic acids and dimers of formic acid. Results are tabulated. Indebted to M. A. Kovner

274T86

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VOL'KENSHTEYN, M.V.

USSR

535.566.2 : 541.653

10106. Optical activity and molecular structure. M. V. VOL'KENSHTEIN. *Izv. Akad. Nauk SSSR, Ser. Fiz.*, 17, No. 5, 574-80 (1953) (In Russian.

A discussion of the optical properties of secondary butyl alcohol, methyl- and ethyl-vinyl carbinols, in the light of the author's theory (1950). In contradiction of Kirkwood [*J. chem. Phys.*, 5, 479-91 (June, 1937)], it is found that a second approximation for the gyration, or molecular constant of optical activity, must be taken into consideration to get reasonable agreement between theory and experiment. Theory also predicts a number of other known experimental facts, e.g. that unsaturated carbinols rotate the plane of polarized light more than the corresponding saturated substances.

K. C. MURRAY

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M.V.

USSR

Theory of the relaxation spectrum of a polymeric chain. Yu. Ya. Gotlib and M. V. Vol'kenshtein. *Zhur. Tekh. Fiz.* 23, 1036-48(1953).—On the basis of the model of Kargin (*C.A.* 43, 7295*e*) the dynamic behavior of a high polymer in soln. was calcd. Polydispersion causes an expansion and change in form of the distribution function of relaxation time, whereas the Gaussian distribution of mol. wts. has practically no effect. 19 references. A. P. K.

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

1. VOL'KENSHTEYN
2. USSR (600)
4. Adsorption
7. Theory of activated adsorption, Part 1, Zhur.fiz.khim. 27 no. 2, 1953.

9. Monthly List of Russian Accessions, Library of Congress, APRIL 1953. Unclassified

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M.V.

Geometry of linear polymers. III. The degree of convolution and bending of polymer chains. M. V. Vol'kenshtein and O. B. Ptitsyn (Inst. High-Molecular Weight Compds., Acad. Sci. U.S.S.R., Leningrad). *Zhur. Fiz. Khim.* 27, 76-86(1953); cf. *C.A.* 46, 21*f*; 48, 13349*d*; 49, 2152*e*.—The polymer chain is considered as an equil. mixt. of rotational isomers. The chain is characterized by the degree of convolution, or the thermodynamic flexibility, and the kinetic flexibility. The degree of convolution is the ratio of the max. length of the chain to the length of the convoluted chain. A method is given for the calcn. of this ratio and it is applied to a series of polymers. A study of the properties of these mols. shows the relation between the flexibility of the mols. and their chem. structure.

J. Rovtar Leach

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V. Apr 53

USSR/Physics - Polymers

"Statistical Physics of a Linear Polymeric Chain," M. V. Vol'kenshteyn and O. B. Ptitsin Usp Fiz Nauk, Vol 49, No 4, pp 501-568

First part of a review that will be continued. Analysis of statistical theory of an isolated chain mol. Discusses possibility of predicting the phys properties of polymers from their chem structure. Assumes the polymer to possess considerable number of degrees of freedom, which is responsible for its great elasticity. Also Discusses the rotating isomeric theory of linear polymers and statistics of real polymeric mols. Lists 125 references, 35 Soviet.

267T90

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V. 259T87

USSR/Physics - Ultrasonic Absorption 11 Apr 53

"Absorption of Ultrasound in Solutions of Polymers," Yu. Ya. Gotlib and M. V. Vol'kenshteyn

DAN SSSR, Vol 89, No 5, pp 821-824

Derivation and soln of the eqs describing the Kargin-Slonimskiy model (V. A. Kargin and G. L. Slonimskiy, DAN SSSR, Vol 62, No 2, 239 (1948); Zhur Fiz Khimii, 23, 5, 563 (142)) of a net-like high polymer immersed in a soln as a sequence of sphere-segments connected by quasi-elastic forces of a statistical character. Presented by Acad A. N. Terenin 13 Feb 53.

259T87

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

259T97

USSR/Physics - Molecular Lengths 21 Apr 53

"Length of the Molecular Chain in Cis- and Trans-Polydienes," A. A. Chistorazum, Inst of High-Molecular Compds, Acad Sci USSR

DAN SSSR, Vol 89, No 6, pp 999-1002

Calculations of mean square distances in chains with alternating double bonds and different valence angles in the case of the polymers polybutadiene, polyisoprene, and polydimethylbutadiene are given. Acknowledges the interest and assistance of M. V. Vol'kenshteyn and O. B. Ptitsyn, who developed the

259T97

formulas for the mean square distance between ends of a chain having N identical bonds taking into account extent of hindrance of rotation around each bond (DAN SSSR, 78, 879 (1951)). Presented by Acad A. F. Ioffe 21 Feb 53.

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

USSR/Physics - Polymer Chains 21 Aug 53

"Stretching of Polymer Chains," M. V. Vol'kenshteyn and O. B. Ptitsyn, Inst of High Molecular Compds, Acad Sci USSR

DAN SSSR, Vol 91, No 6, pp 1313-1316

Conclude that for small extensions (disregarding terms of the order x^3) the "energetic" elastic force f_1 and the "entropic" elastic force f_2 connected with the transition of convoluted isomers into trans-isomers compensate each other; consequently, for small extensions this transition does not change the free

275T95

energy of the chain and the recovering force bears a purely entropic character. For large extensions the above-indicated compensation will not hold. Propose that a one-dimensional model in the main correctly gives the dependence of stretching of polymer chains upon their flexibility and external force. Presented by Acad A. F. Ioffe 22 Jun 53.

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

KITAYGORODSKIY, A.I.; VOL'KENSHTEYN, M.V., redaktor; BELOVA, V.I., redaktor; ASTAF'YEVA, G.A., tekhnicheskiy redaktor.

[Order and confusion in the world of atoms] Poriadok i besporiadok v mire atomov. Moskva, Izd-vo Akad. nauk SSSR, 1954. 69 p. (MLRA 7:12)
(Atoms) (Crystallography)

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL' KENSHTEYN, M.V.

GRINBERG, A.A. (Leningrad); BABAYEVA, A.V.(Moscow); YATSIMIRSKIY, K.B. (Ivanovo); GOREMYKIN, V.I. (Moscow); BOLIY, G.B. (Moscow); FIALKOV, Ya.A. (Kiyev); YAKSHIN, M.M. (Moscow); KEDROV, B.M. (Moscow); GEL'MAN, A.D. (Moscow); FEDOROV, I.A. (Moscow); MAKSIMYUK, Ye.A. (Leningrad); VOL'KENSHTEYN, M.V. (Leningrad); ZHDANOV, G.S. (Moscow); PTITSYN, B.V. (Leningrad); ABLOV, A.V. (Kishinev); VOLSHTEYN, L.M. (Dnepropetrovsk); TROITSKAYA, A.D. (Kazan'); KLOCHKO, M.A. (Moscow); BABAYEVA, A.V.; TRONEV, V.G. (Moscow); RUBINSHTEYN, A.M.(Moscow) CHERNYAYEV, I.I.; GRINBERG, A.A.; TANANAYEV, I.V.

Explanation of the transeffect. Izv.Sekt.plat.i blag.met. no.28: 56-126 '54. (MLRA 7:9)

(Compounds, Complex) (Platinum)

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

USSR/ Chemistry Physical chemistry

Card : 1/1 Pub. 147 - 18/25

Authors : Bazhenov, N. M., and Vol'kenshteyn, M. V.

Title : Optical activity and reversible isomerization

Periodical : Zhur. fiz. khim. 28/7, 1299 - 1309, July 1954

Abstract : The quantitative connection between the magnitude of optical activity and the nature and orientation of atoms and bonds in the molecule, is explained theoretically. The differences in energies (also entropy) of reversible isomers, were determined on the basis of the thermal process of the optical activity of many substances. A new ultraviolet polarometric method for the study of the thermal rotation process and the dispersion of the optical activity of tested isomers, is described. Twenty-one references: 8 USA; 1 German; 11 USSR and 1 English (1902 - 1953). Tables; graph; illustrations; drawing.

Institution : Acad. of Sc. USSR, Institute of Highmolecular Compounds, Leningrad

Submitted : November 30, 1953

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

USSR/Chemistry Physical chemistry

Card : 1/1 Pub. 147 - 19/25

Authors : Bazhenov, N. M., Vol'kenshteyn, M. V., and Bybrevich, T. V.

Title : Optical activity of gaseous methylvinylcarbinol

Periodical : Zhur. fiz. khim. 28/7, 1310 - 1312, July 1954

Abstract : A method of measuring the thermal process of optical activity in gaseous phase, in the ultraviolet zone of the spectrum, was developed. The optical activity of gaseous methylvinylcarbinol and the molecular constants of reversible isomers of this compound, were investigated and the results are given in tables. Two references: 1 USA and 1 USSR (1925 and 1954). Drawing.

Institution : Acad. of Sc. USSR, Institute of High Molecular Compounds, Leningrad

Submitted : November 30, 1953

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V.

USSR/ Chemistry Physical chemistry

Card : 1/1 Pub. 147 - 20/25

Authors : Vol'kenshteyn, M. V., and Brebdo, V. I.

Title : Effect of intermolecular reactions on reversible isomerization

Periodical : Zhur. fiz. khim. 28/7, 1313 - 1318, July 1954

Abstract : The differences in energies of intermolecular reactions of convolute and trans-isomers of 1,2-dichloroethane and 1,2-dibromoethane, were estimated quantitatively. It was found that an orientational reaction, between molecules, balances the energies of reversible isomers in liquids. The effect of intermolecular reactions, on the relative stability of reversible isomers, is explained. Eleven references: 4 Japanese; 3 USSR and 4 USA (1939 - 1953). Tables.

Institution : Acad. of Sc. USSR, Institute of High Molecular Compounds, Leningrad

Submitted : November 30, 1953

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEIN, M.V.

62 Quantitative polyisoprene analysis by infrared spectrography. E. I. Pokrovskii and M. V. Vol'kenshtein. *Doklady Akad. Nauk S.S.S.R.* 95, 301-3(1954).—*A.* no. of polyisoprene samples were prepd. by different methods and analyzed by infrared spectrography; the proportion of *cis*-1,4-, *trans*-1,4-, *trans*-1,2-, and *trans*-3,4- was detd. by a simplified method similar to that used by Richardson and Sacher (*C.A.* 47, 6691e). W. M. Sternberg

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"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

Vol'KENSHTEYN, M.B.

USSR/ Physics

Card 1/1 Pub. 22 - 14/63

Authors : Gotlib, Yu. Ya.; Vol'kenshteyn, M.B.; and Byutner, E.K.

Title : Anisotropy of the Polarizability of chain molecules

Periodical : Dok. AN SSSR 99/6, 935-938, Dec 21, 1954

Abstract : An analytical derivation of the polarizability of a chain molecule containing a number of equal links characterized by a symmetrical voltage of the inner rotation ($V(\varphi)=V(-\varphi)$), is presented. The matrix and tensor method was used for the computations. Five references; 3-USSR (1942-1953). Table.

Institutions: The Leningrad State Pedagogical Institue im. A.I. Gertsen; The Institute of the High Molecular Compounds of the Acad. of Scs. of the USSR

Presented by: Academician A.F. Ioffe, September 18, 1954

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

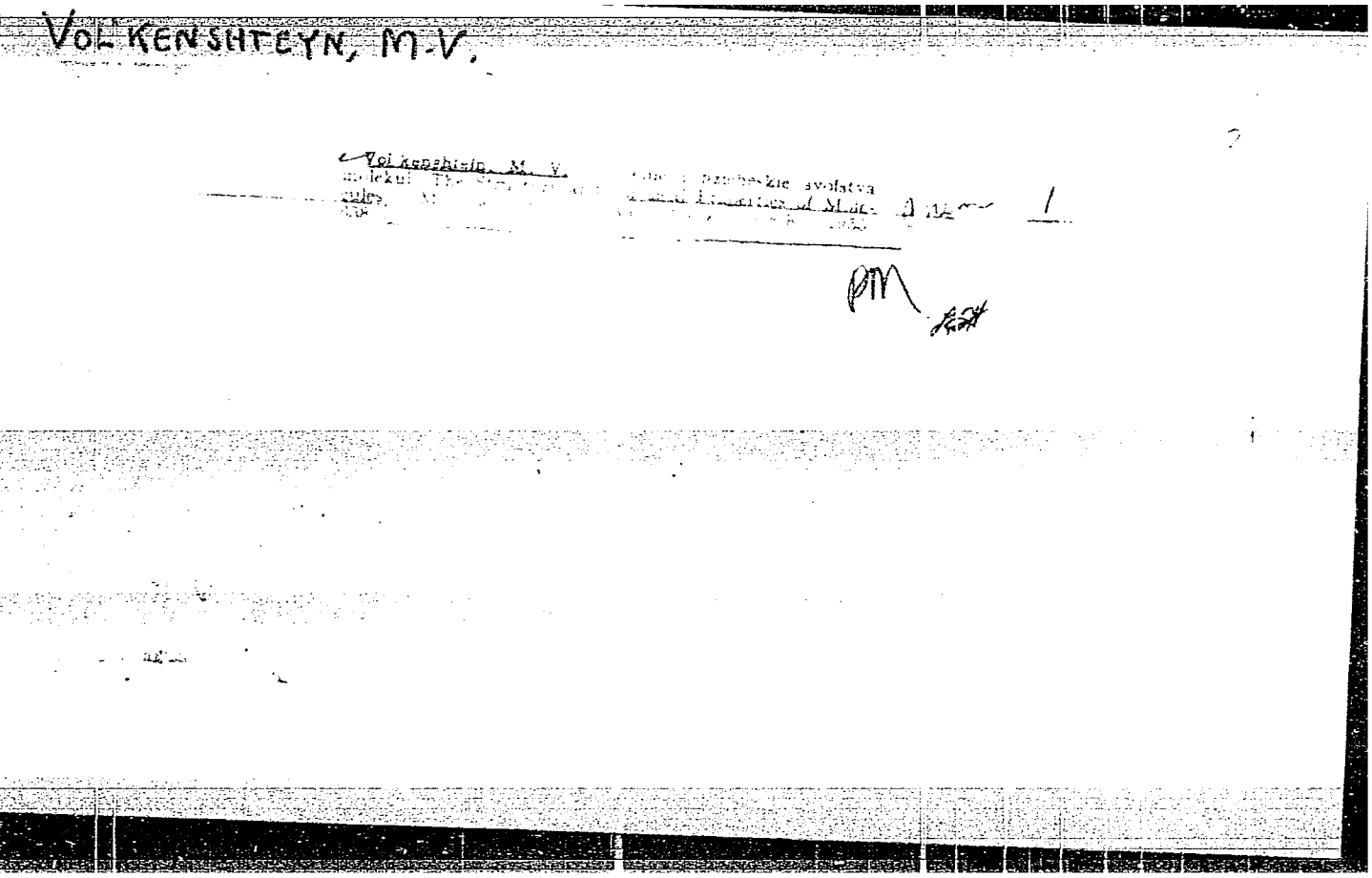
VOL'KENSHTEYN, M.V.; SOKOLOV, N.D., professor, redaktor; ESHMAN, Yu.A., redaktor; SMIRNOVA, A.V., tekhnicheskiy redaktor.

[Molecules and their structure] Molekuly i ikh stroenie. Moskva, Izd-vo Akademii nauk SSSR, 1955. 229 p. (MLRA 8:12)
(Molecules)

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOLKENSHTEYN, M.V.



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"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M.V.

Internal rotation in polymer chains and the physical properties thereof. II. The elongation of polymer chains. M. V. Vol'kenshtein and O. B. Ptitsyn. *Zhur. Tekh. Fiz.* 25, 649-61(1955); cf. *C.A.* 49, 21022.—Math. The av. and averages of the squares of the distances between and among the chain ends of polymer chains are calcd. when they are under the action of an external force f, and these averages in their most general expression are presented as a series of fl/kT, where l is the length of one link of the chain. The equations are solved for one-dimensional and two-dimensional models on the basis of the theory of rotation isomery, and the various mechanisms of chain elongation are discussed. The findings on these models can be applied freely to linked chains with long statistical elements; this is detd. from the congruence of the max. length and av. square of the length of such model with the corresponding dimension of the true chain. The diffusion analogy cannot be applied to such a chain, which is under the influence of an external force. III. The change of the internal energy of polymer chains upon elongation. *Ibid.* 662-70.—Math. On elongation of the polymer chain with impeded internal rotation, there is generated in such chain not only an entropy, but also an energy force. At small elongations this force is compensated by an addnl. entropy energy that is not taken into account in the ordinary theory. The elongation of the polymer in a block is discussed, and thus an expression for the modulus of elasticity of rubber is obtained that is based upon the grid theory. The energy effects that occur on elongation of the polymer in a block are discussed also; the sp. heat of the polymer chain changes upon elongation.

Werner Jacobson

A MIT

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"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN M.V.

Category : USSR/Optics - Physical Optics

K-5

Abs Jour : Ref Zhur - Fizika, No 2, 1957, No 4990

Author : Bazhenov, N.M., Vol'kenshteyn, M.V., Volotina, I.A.
Title : Optical Activity and Vitrification.

Orig Pub : Zh. tekhn. fiziki, 1955, 25, No 11, 1861-1863

Abstract : Investigation of the temperature variation of the rotation of the plane of polarization in rosin. The curve $\varphi(T)$ displays a break at the rosin vitrification temperature $T_g = 24^\circ$. The break at the same temperature is observed on the curves $n(T)$ and $\rho(T)$ (n is the index of refraction and ρ the density), since $\varphi = K \frac{n^2+2}{n} g\rho$ where K is a constant, and g is the molecular rotation constant (gyration). Using the Lorentz-Lorenz equation the authors derive an expression

$$\frac{1}{\varphi}\frac{d\varphi}{dT} = \left[1 + \frac{(n^2-1)(n^2-2)}{6n^2}\right]\frac{1}{\rho}\frac{d\rho}{dT} + \frac{1}{g}\frac{dg}{dT}.$$

Estimating the individual terms of this equation from obtained experimental data, the authors obtain $\frac{(n^2-1)(n^2-2)}{6n^2} \sim 0.04$ and show that the temperature variation $\varphi(T)$ and the break in the derivative $d\varphi/dT$ at

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"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

Category : USSR/Optics - Physical Optics

K-2

Abs Jour : Ref Zhur - Fizika, No 2, 1957, No 4990

T_g are determined not only by the change in $d\rho/dT$ but also by the direct change in g, i.e., in dg/dT. The quantity $(1/g)(dg/dT)$ changes in the case of T_g approximately three times more rapidly than the quantity $(1/\rho)(d\rho/dT)$. The authors indicate that an investigation of the temperature behavior of the optical activity gives a new sensitive method for studying the vitrification, making it possible to investigate separately the effects connected with the changes in the molecule packing (variation of $d\rho/dt$) and with the changes of the intermolecular interaction (variation of dg/dT).

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"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

Category : USSR/Atomic and Molecular Physics - Physics of high-molecular substance D-9

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1019

Author : Nikitin, V.N., Vol'kenskteyn, M.V., Volchek, B.Z.
Title : Investigation of the Stretching of Polymers in Polarized Infrared Light

Orig Pub : Zh. tekhn. fiziki, 1955, 25, No 14, 2486-2491

Abstract : The authors derived an equation for the ratio of the coefficient of absorption of two bands at various degrees of tension $(K'_1/K'_2):(K''_1/K''_2)$, where the indices 1 and 2 pertain to bands ν_1 and ν_2 and the indices ' and '' pertain to the first and second stretchings. This ratio is unity if the content of the rotation isomers does not change with stretching. The stretching of polyethylene and polyvinyl acetate was investigated. It is shown that at elongations of 1,000% and more, the content of the rotation isomers changes. The stopping of the growth of dichroism at 100% elongation indicates the absence of further orientation.

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"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M.V.; PTITSYN, O.B.

Relaxation theory of vitrification. Dokl.AN SSSR 103 no.5:795-798 Ag '55. (MLRA 9:1)

1.Institut vysokomolekulyarnykh soyedineniy Akademii nauk SSSR. Predstavleno akademikom A.F.Ioffe.
(Vitreous state)

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M.V., YAZYKOVA, S.M.

Intensities in vibration spectra and the "metallic" model of the molecule. Dokl. AN SSSR 104 no.6:834-836 O '55. (MLRA 9:3)

1. Institut vysokomolekulyarnykh soyedineniy Akademii nauk SSSR i Fizicheskiy institut imeni P.N. Lebedeva Akademii nauk SSSR. Predstavleno akademikom G.S. Landsbergom.
(Raman effect) (Spectrum, Molecular)

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOL'KENSHTEYN, M. V., and PTITSYN, O. B.

Introduction by M. V. Vol'kenshteyn and O. B. Ptitsyn, Problemy Sovremennoy Fiziki, Vol 8, No 12, Dec 56, pp 3-5

This issue of the periodical Problemy Sovremennoy Fiziki, which publishes translated articles illustrating progress in various fields of physics outside the USSR, represents a collection of non-USSR articles on the physics of polymers. The translations contained in this issue have been edited by M. V. Vol'kenshteyn. Vol'kenshteyn and Ptitsyn comment as follows on five articles published as a separate section (pp 173-222) under the heading "The Action of Nuclear Radiation on Polymers":

"The last, sixth section of the collection of articles consists of papers that deal with the action of nuclear radiation on polymers. This field is of great interest from both the physical and the chemical standpoint, because the processes which take place in polymers under the action of radiation (cross-linking, etc.) lead to the formation of substances which have new and valuable properties. Investigation of the processes and characteristics involved is also of importance for nuclear technology, in which some high-polymer materials are applied."

Sum 1258

APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1"

"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

USSR / Optics Vol'kenshteyn, M.V. K

Abs Jour: Referat Zhur-Fizika, 1957, No 4, 10353

Author : Bazhenov, N.M., Vol'kenshteyn, M.V., Gotlib, Yu.Ya., Rosenshteyn, L.D.
Inst : Not Given
Title : Photoeleastic Effect in Polystyrol and Its Halogen Derivatives

Orig Pub: Zh. tekhn. fiziki, 1956, 26, No 8, 1730-1737

Abstract: The photoelastic effect (PE) was measured in polystyrol (I) (130000), polyparachlorostyrol (II) poly- 2.5 dichlorostyrol (III) (60000), polyorthochlorostyrol (IV) (80200), poly-3.4 dichlorostyrol (V) (30000), polyorthoiodostyrol (VI) (20000) and polyparaiodostyrol (VII) (32000). The numbers in the parentheses represent the molecular weights. The PE was studied in tension of thin films by constant load and at temperatures above the vitrification temperature. With the aid of a setup with a polarization microscope, simultaneous measurements were made of the elongation $\Delta l/l$, the birefringence, Δn, and the true load σ. The PE in vitrified films was measured in a photoelectric

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"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

USSR / Optics

K

Abs Jour: Referat Zhur-Fizika, 1957, No 4, 10353

setup. The time dependences of $\Delta l/l$, Δ n, and the photoelastic coefficient $\mathcal{E} = \Delta n/\sigma$ were obtained. The tension curves have a characteristic S-shape form with a relative saturation, this being due to the presence of a labile lattice in the block linear polymer. The step-like character of the tension of I discloses the damage to the lattice structure and formation of new labile nodes. $\mathcal{E}$ rapidly reaches its maximum value and diminishes only slightly upon further tension. $\mathcal{E}_{max}$ is practically independent of σ_{init} over a wide range of σ_{init} (for II: 2 -- 18 x 10^6 dyne/cm^2). The average values of $\mathcal{E}_{max}$ were used to find the effective anisotropic polarizabilities of the chain $\Delta\alpha$ (Treloire, L. Physics of Elasticity of Rubber , IL, 1953): I -- 140, II -- 210, III -- 170, IV -- 130, V -- 340 x 10^{-25} cm^3. In accordance with the theory (Gotlib Yu. Ya., Volkenshteyn, M.V., Byutnor, E.K., Dokl AN SSSR, 1954, 99, No 6, 935), the known value of η (the average cosine of the angle of internal rotation about the bond C-C in I) and the value of $\Delta\alpha$ were used to determine $\mu = \overline{\cos^2 \psi'}$ (ψ' is the angle of

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USSR / Optics

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Abs Jour: Referat Zhur-Fizika, 1957, No 4, 10353

rotation of the phenyl ring), after which these values of μ and γ were used to calculate $\Delta\alpha$ for II -- VII. Satisfactory agreement with experiment was obtained for II and V, which indicates a similarity in the conditions of internal rotation in I, II, and V. For II and IV, which contain chlorine in the ortho position, the calculated values of $\Delta\alpha$ are greater than those observed, this being due to the greater resistance to rotation of the suspended weight.

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"APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001860510018-1

VOLKENSHTEYN, M.V.

CARD 1 / 2 PA - 1561

SUBJECT USSR / PHYSICS
AUTHOR WOL'KENŠTEJN, M.V., PTICYN, O.B.
TITLE The Relaxation Theory of the Formation of Glass. I. Solution of the Basic Equation and its Examination.
PERIODICAL Žurn. techn. fis, 26, fasc. 10, 2204-2222 (1956)
Issued: 11 / 1956

Proceeding from the most general molecular-kinetic ideas the basic laws of glass formation and of softening are here derived. The theory found must then be suited for all objects from which glass is formed. Relaxation processes are here dealt with by an equation which describes the transition of kinetic units from one energy state to another. The spectrum of relaxation times is on this occasion neglected. Reaction may be of the first or second order ("isomerization" or "dimerization" respectively). The influence exercised by reactions of a higher order may be neglected. In the case of a reaction of the first order the elementary acts of transition from the nonexcited state (state 1) to the excited state (state 2) take place with the participation of only one kinetic unit. The reaction of the second order consists in the production and dissociation of the bindings among the kinetic units. On the occasion of the investigation of such relaxation processes which are connected with only little deviations from equilibrium the equation of the first order may always be used. Here only reactions of the first order are investigated. Reactions of the second order are studied later.
At first an expression for the solution of the basic equation is given. On this

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occasion the dependence of the transition probability on the structure of the liquid is neglected. At first the most simple process is investigated in which the exterior parameters of the system do not depend on time. Next the case is investigated in which the temperature of the system changes with constant or variable velocity. The solutions found for the share ν of the kinetic units which are in an excited state are written down. There follows the mathematical discussion of the solution obtained.

Forming of glass and softening: Every system satisfying the above conditions is suited for the formation of glass in connection with cooling and for softening during heating. Furthermore, equations are obtained which connect the temperature of glass formation T'_g and of the softening T_g with the parameters of the system and with the modification velocity $|q|$. With increasing $|q|$ also T_g and T'_g increase. Next, the solutions of the basic equation for the vitrification interval and for the domains above and below the vitrification interval are discussed. Among others, ν does not depend on temperature within the range below the vitrification interval, i.e. the structure of the liquid is frozen.

INSTITUTION: Institute for Highly Molecular Compounds of the Academy of Science in the USSR.

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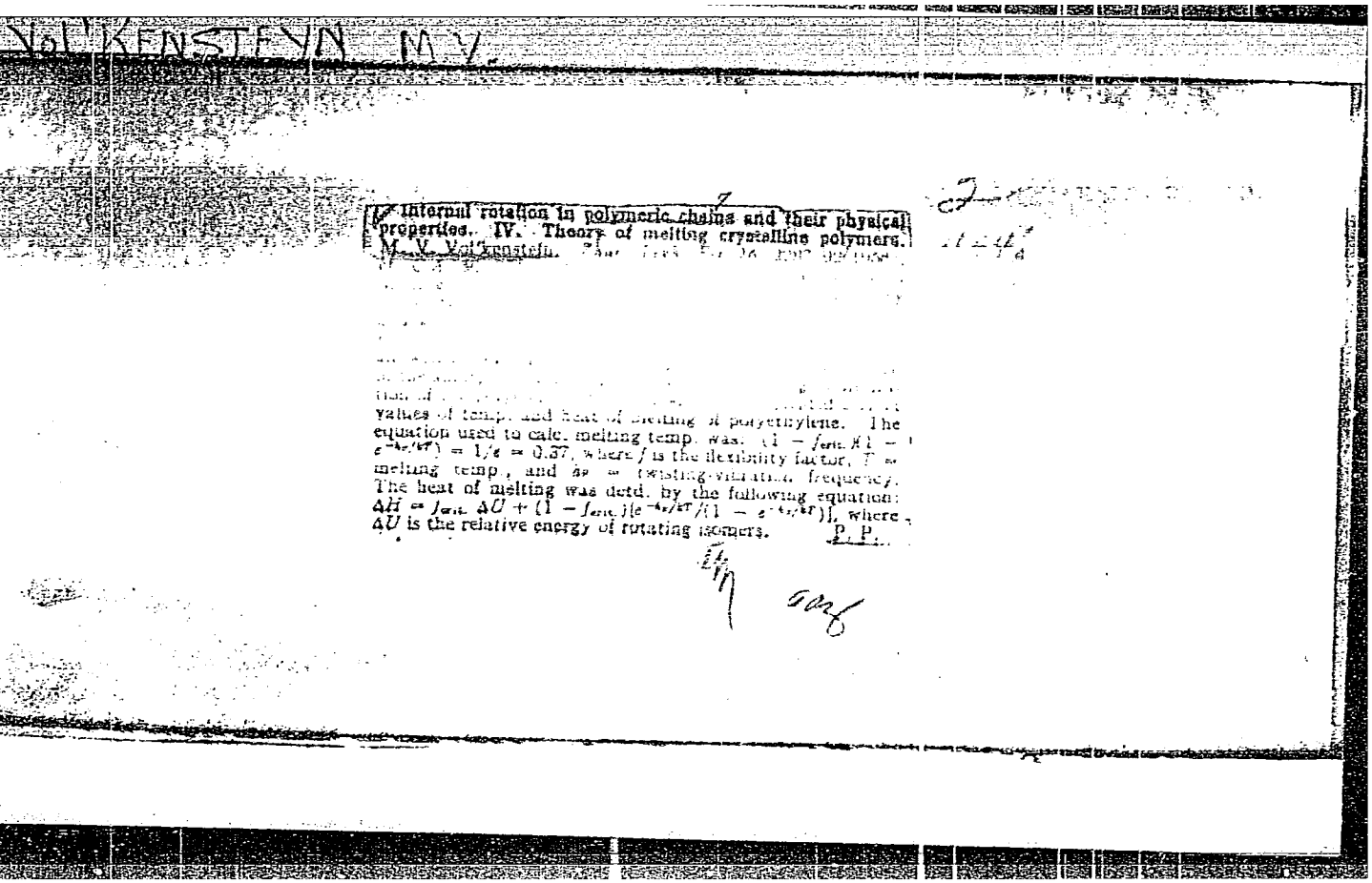

VOL'KENSTEYN M.V.

Internal rotation in polymeric chains and their physical properties. IV. Theory of melting crystalline polymers.
M. V. Vol'kenstein.

values of temp. and heat of melting of polyethylene. The equation used to calc. melting temp. was: $(1 - f_{anis})(1 - e^{-\Delta\epsilon/kT}) = 1/e = 0.37$, where f is the flexibility factor, T = melting temp., and $\Delta\epsilon$ = twisting-vibration frequency. The heat of melting was detd. by the following equation: $\Delta H = f_{anis}\,\Delta U + (1 - f_{anis})[e^{-\Delta\epsilon/kT}/(1 - e^{-\Delta\epsilon/kT})]$, where ΔU is the relative energy of rotating isomers.

P. P.

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