"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

TOMASSKIY, I.S., kand.tekhn.nauk; SYRKIN, V.G.

Production of powder carbonyl iron abroad. Biul.tekh.-ekon. inform.Gos.nauch.-issl.inst.nauch. i tekh.inform. 16 no.11: 89-90 '63. (MIRA 16:11)

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TOLMASSKIY, I.S.; SYRKIN, V.G.; FRIDENBERG, A.E. [deceased]

New type of a magnetodielectric for distance-type communication apparatus. Elektrosviaz' 17 no.11:59-60 N '63. (MIRA 17:1)

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4"

"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

ACCESSION NR: AP4040472 S/0226/64/000/003/0075/0084

AUTHOR: Syrkin, V. G. (Moscow)

TITLE: Obtaining iron powder by thermal decomposition of atomized iron pentacarbonyl

SOURCE: Poroshkovaya metallurgiya, no. 3 (21), 1964, 75-84

TOPIC TAGS: iron powder, powder metal, iron pentacarbonyl, centrifugal atomizer/ R 50 iron powder, R 100 iron powder

ABSTRACT: A new method for the production of radiotechnical iron powder is proposed. It is based on thermal decomposition of liquid iron pentacarbonyl and yields iron powder of 0.5-1.0 micron particle size with a maximum carbon content of 0.62-0.63%. The process consists of atomizing iron pentacarbonyl by means of a centrifugal spray nozzle into the top of a 4-m high tank, 0.5 m in diameter. The upper zone of the tank is heated to 240C, the central section to 295C, and the lower part to 280C. The decomposition reaction of iron pentacarbonyl is conducted in the presence of ammonia vapors to prevent the liberation of carbon from its monoxide. The iron powder collected from the bottom of the tank constituted 80% of the yield and was coarser than the product collected from a filter column attachment (20%). Electron microscopic investigation revealed an onion-like layer structure of the iron

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particles. It was found that the carbonyl iron powders possessed electromagnetic parameters which rendered them suitable for the radiotechnical industry. In quality this iron lies between the two best domestic brands (R-50 and R-100). Orig. art. has: 8 figures and 2 tables.

ASSOCIATION: none

SUBMITTED: 27Jan63

SUB CODE: MM

NO REF SOV: 007

ENCL: 00

OTHER: 002

Card 2/2

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4"

"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

L 56090-65 EWP(e)/EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)
Pf-4 IJP(c) JD
ACCESSION NR: AR5015156 UR/0137/65/000/005/G031/G031

SOURCE: Ref. zh. Metallurgiya, Abs. 5G186

33
32
B

AUTHOR: Syrkin, V. G.; Tolmasskiy, I. S.

TITLE: Production of metal powders by the carbonyl method

CITED SOURCE: Tr. 7 Vses. nauchno-tekhn. konferentsii po poroshk. metallurgii. Yerevan, 1964, 91-94

TOPIC TAGS: powder metallurgy, powder metal production, carbonyl iron, iron base alloy, nickel containing alloy, molybdenum containing alloy, dissociation, electromagnetic property, powder metal

TRANSLATION: Processes for the production of carbonyl iron powder and iron-nickel, iron-molybdenum, and iron-molybdenum-nickel powders with a given ratio of components were investigated. Carbonyl iron was produced by the dissociation of iron pentacarbonyl vapors or liquid pentacarbonyl introduced into the dissociation apparatus through a spray nozzle. Finer powders were produced by appropriate regulation of temperature conditions, by decreasing the concentration of carbonyl vapors at the inlet of the apparatus, or by increasing the feed rate.

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L 56090-65

ACCESSION NR: AR5015156

The particles of powder have an "onion shaped" structure; particle size is 0.2 - 4 - 5 microns. Separation of the powders into fractions was done in a multicyclone installation in a stream of air. The electromagnetic properties of the powders are given. V. Kvin.

SUB CODE: MM ENCL: 00

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SYRKIN, Vitaliy Grigor'yevich, kand. tekhn. nauk; MEL'NIKOVA, Zh.M., red.

[New carbonyl materials] Novye karbonil'nye materialy. Moskva, Izd-vo "Znanie," 1965. 46 p. (Novoe v zhizni, nauke, tekhnike. XI Seriia: Khimiia, no.8) (MIRA 18:8)

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4"

"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

SYRKIN, V.G. [illegible] MOSKIN, I.C. (Moskva); Pri uchastii FRIDENBERG, [illegible]

Effect of the duration of grinding of iron carbonyl powders on their electromagnetic parameters. Porosh. met. 5 no.7: 13-18 Jl '65. (MIRA 18:8)

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4"

"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

L 54003-65 EWT(m)/EPF(c)/EWP(j) Pc-4/Pr-4 RM

ACCESSION NR: AP5013998 UR/0064/65/000/005/0352/0356
621.762.214:669.12

AUTHORS: Volkov, V. L.; Syrkin, V. G.

20
B

TITLE: Thermodynamic analysis and chemical scheme of the dissociation of iron pentacarbonyl

SOURCE: Khimicheskaya promyshlennost', no. 5, 1965, 352-356

TOPIC TAGS: carbonyl iron, iron compound, chemical reaction kinetics

ABSTRACT: It has been ascertained that powdered iron carbonyl is composed of pure iron and its combinations with carbon, oxygen, and nitrogen, the last three elements accounting for 1-3 % of weight. The basic reaction $Fe(CO)_5 = Fe + 5 \cdot CO$ is accompanied by complex side reactions occurring between the solid phase and the gaseous surroundings. The authors studied these side reactions and conducted thermodynamic analyses during the decomposition of the iron pentacarbonyl. A description of the known reaction products and some details of the usual process are given. Nineteen reactions which may occur in the gaseous phase are listed, and energy relations are discussed. All reactions discussed are presented graph-

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L 54003-65

ACCESSION NR: AP5013998

ically. In each case the free energy is shown as a linear function of temperature. All reactions are described in detail, with particular attention being given to the temperature interval between 500 and 600K. Orig. art. has: 22 equations and 12 figures.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: GC, TD

NO REF SOV: 010 OTHER: 005

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"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

L 46133-66 EWP(e)/EWT(m)/EWP(t)/ETI/EWP(k) LIP(c) JD

ACC NR: AP6025936 SOURCE CODE: UR/0226/66/000/007/0038/0044

AUTHOR: Syrkin, V. G. (Moscow); Tolmasskiy, I. S. (Moscow); Petrova, A. A. (Moscow)

ORG: None

TITLE: Correlation between electromagnetic and physicochemical properties of powdered carbonyl iron

SOURCE: Poroshkovaya metallurgiya, no. 7, 1966, 38-44

TOPIC TAGS: electromagnetic property, carbonyl iron, iron powder, magnetic permeability, phase diagram, phase transition, physical chemistry property

ABSTRACT: The authors study the electromagnetic parameters of powdered carbonyl iron as a function of physicochemical properties. These electromagnetic characteristics are: initial permeability, hysteresis loss, frequency loss, additional losses and the temperature coefficient of initial permeability at frequencies up to 0.5 Mc, or relative Q-factor, effective permeability and permeability temperature coefficient at radio frequencies. The authors correlate the electromagnetic parameters of carbonyl iron with the following factors: the effect of "bulb" structure of the powder particles; the effect of powder particle size; the effect of chemical composition of the powder. Electron microscopic analysis of the internal structure of carbonyl iron powder particles shows that the number of concentric layers in the particle plays an

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L 46133-66

ACC NR: AP6025936

important role in determining the electromagnetic properties of carbonyl iron powder, these properties improving with the number of layers in the powder particles at the same dispersion. The internal structure of carbonyl iron powder particles contains carbon, oxygen and nitrogen compounds. The form of the powder particles plays a major role in determining its electromagnetic properties. By changing the internal structure of the powder particles by appropriate technological means, its electromagnetic parameters can be considerably varied. Particle dimensions also affect the electromagnetic properties of the powder. Particle size primarily affects magnetic losses. If the dispersion of the powder is changed by technological means it is possible to produce a powder with given properties. The chemical composition of powdered carbonyl iron indicates a specific phase structure. The electromagnetic parameters of the powder in turn are a function of its state and phase transition. The technological factors which control the formation of carbonyl iron particles with given properties are considered. Orig. art. has: 6 figures, 5 tables.

SUB CODE: 11/ SUBM DATE: 02Aug65/ ORIG REF: 006/ OTH REF: 004

Card 2/2 mjs

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4"

"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

ACC NR: AP6033449 SOURCE CODE: UR/041/66/000/018/0032/0032

INVENTOR: Syrkin, V. G.; Tolmasskiy, I. S.; Volkov, V. L.; Fridenberg, A. E. (Deceased)

ORG: None

TITLE: A method for producing highly dispersed carbonyl iron powder. Class 12, No. 185864

SOURCE: Izobret prom obraz tov zn, no. 18, 1966, 32

TOPIC TAGS: carbonyl iron, iron powder, powder metal production

ABSTRACT: This Author's Certificate introduces a method for producing highly dispersed carbonyl iron powder by thermal dissociation of iron pentacarbonyl. The yield is increased and a product with a low degree of carburization is obtained by sectional inlet and outlet of the heating gas along the height of the equipment from top to bottom to produce "falling" temperature conditions.

SUB CODE: 11/13/ SUBM DATE: 09Sep61

Card 1/1 UDC: 546.725.07

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"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

BLOKH, V.A., inzh.; SYRKIN, V.S., inzh.

Automatic rotation of the rotor of a turbine unit. Energomashinostroenie 10 no.11:36-38 N '64 (MIRA 18:2)

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4"

"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

BLOKH, V.A., inzh.; SYRKIN, V.S., inzh.; FRIDMAN, A.N., inzh.

The IMZ instruments for operational control and protection of steam and gas turbines. [Trudy] LMZ no.6:399-407 '60. (MIRA 13:12)
(Electric instruments)

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"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

Molecular quadrupoles. Ya. K. Syrkin. *J. Russ. Phys.-Chem. Soc.* 61, 325-43 (1929).—The mol. quadruple moment (m) can be calcd. from the equation: $m = 10.07 \times 10^{-26} T_c^{5/6}/P_c^{1/6}$ (T_c = crit. temp., P_c = crit. pressure). Values calcd. from this equation for 97 substances are smaller than those of Debye (*C. A.* 15, 2220, 3776), but close to those of Keesom (*C. A.* 8, 1046; 10, 980; 15, 3215; 16, 525, 1160; 17, 231). The CH_2 group increases m by about 4×10^{-26} for hydrocarbons and by about 3.7×10^{-26} for amines. Isomers with side chains have a smaller m than normal compds. ($0.5 \times 10^{-26} - 1.9 \times 10^{-26}$ units difference). For certain compds. m is additive. Similar compds. formed from the elements of the same periodic group increase in m as the mol. wt. of the element increases. Eötvös' const. calcd. by means of the above equation is 2.48, which is close to the av. exptl. value of 2.1°; Debye arrives at a value of 0.82.

V. Kalichevsky

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES

Ca

Electrostatics of colloids. Ya. K. Syrkin. *J. Phys. Chem.* (U. S. S. R.) 1, 455-67(1930). A lecture. G. Faerman

COMMON ELEMENTS

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ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

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1ST AND 3RD LETTER

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3

Infra-red characteristic vibrations. YA. K. SUIRKIN. — *Bull. inst. polytech. Ivanovo-Voznesensk* **15**, 17-23(1930)(in German 24). — Lindemann's formula $\nu = 2.8 \times 10^{-12} T^{1/2} M^{-1/2} d^{1/2}$ giving the relationship between the frequency, temp. and density and the Madlung and Einstein formula $\nu = A M^{-1/2} d^{-1/2} k^{-1/2}$ are not accurate. From considerations of quantum statistics of Dirac (*C. A.* **21**, 2599) and Fermi (*C. A.* **20**, 2265) S derives the equation $\nu_{red} = 198.8 \times 10^{-3} d^{1/2} M^{1/2}$, where d is density and M is at. wt. The values for ν for several metals obtained from this formula are in better agreement than those by Lindemann's formula. S's formula can be applied to chem. compds. if for M is taken $(M_1 + M_2)/2$ for compds. of univalent metals and $M/3$ for compds. of bivalent metals.

G. S. SLAMATOFF

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

Periodic system. The centennial anniversary of Mendeleev's birth. Ya. K. Syrkin. *Uspekhi Khim.* 3, 354–415(1934).—The periodic system is discussed in the light of modern physics such as the Bohr atom, vector models, wave mechanics, Fermi-Thomas statistics and atomic properties such as ionization potentials, valence forces and bond energies.

F. H. Rathmann

COMMON ELEMENTS

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3RD AND 4TH ORDERS

2

Dependence of the rate of reaction on the amount of catalyst. Ya. K. Sutkin and V. G. Vasil'ev. *Compt. rend. acad. sci.* (U. R. S. S.) 1, 513-15(in German 516-17) (1935).—The catalytic decompn. of H_2O_2 was studied over various amts. of catalysts I, II, III and IV formed by evapg. 10, 20, 80 and 100 cc. of Pt sol onto 2-g. samples of SiO_2 gel. The reaction velocity consts. per unit weight of Pt were 1.37, 2.2, 2.66 and 2.70, resp., on 1-g. samples of I, II, III and IV; 1.22 and 2.60, resp., on 0.5-g. samples of I and IV; and 1.37 and 1.08, resp., on 0.25-g. samples of II and III. It is suggested that the increase in the reaction rate per unit weight of Pt with the amt. of Pt per g. of SiO_2 gel may be indicative of the propagation of reaction chains from the Pt catalyst into the H_2O_2 solns.

P. H. Emmett

ASM SLA METALLURGICAL LITERATURE CLASSIFICATION

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BC

d-1

Kinetics of bimolecular reactions in solution. J. K. SYRKIN (Acta Physicochim. U.R.S.S., 1935, 1, 853—870).—The no. of mol. collisions and the probability of a collision being followed by a reaction are discussed mathematically. (Cf. A., 1936, 165.)

C. R. H.

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CA

3

Raman spectrum of tetraethylammonium iodide. Ya. K. Syrkin and M. V. Volkenstein. *Acta Physicochim. U. R. S. S.* **2**, 203-7 (1935) (in German). A comparison of the data of S. and W. on Et_4NI with previous data on EtI and Et_4N indicates that in Et_4NI the characteristic intense frequencies of EtI, as 497 cm.$^{-1}$ assigned to the C-I bond, are absent, and that the I is bound to neither C nor N but is held ionically outside the coördination sphere. New frequencies, especially 667 and 1231 cm.$^{-1}$ lead to interpreting the Et_4N ion as a regular tetrahedron with the N atom in the center. F. H. Rathmann

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1ST AND 2ND ORDERS

3RD AND 4TH ORDERS

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CA

2

Kinetics of bimolecular reactions in solutions. II. Formation of sulfonium salts. Ya. K. Suirkin and I. T. Gladishev. *Acta Physicochim. U. R. S. S.* 2, 291-303 (1935).—The reaction MeI + Et_2S → Et_2MeSI was studied over the temp. interval 17°, 27° and 37°. All the reagents were carefully purified and dried. The concn. range was 0.4 to 0.6 *M*. The bimol. consts. show good constancy during the course of the reaction. The activation energies and the values of *A* in the equation $K = Ae^{-E/RT}$ are 16,740, 5.54 × 10^7 for MeOH; 17,240, 5.17 × 10^7 for EtOH; 17,770, 8.69 × 10^7 for PrOH and 12,150, 3.61 × 10^6 for acetone. On correcting the collision frequency for viscosity differences, these values become 19,150, 20,760, 21,270 and 13,300 cal., resp. From this the steric hindrance factors are $^1/_{190}$, $^1/_{60}$ and $^1/_{127}$ for the alcs., resp., and 4.1 × 10^{-7} for acetone. It is assumed that the thio ether forms an addn. complex with acetone. The reverse reaction is much more rapid in acetone than in the alcs. It is shown that the equation $K = B\eta e^{-E/RT}$, where η = viscosity, is much more satisfactory than the ordinary Arrhenius equation.

F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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1ST AND 2ND ORDERS

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3RD AND 4TH ORDERS

SA

A53
1

5060. Raman Spectrum of Tetraethyl-Ammonium Iodide. J. K. Syrkin and M. W. Wolkenstein. *Acta Physicochimica*, 2, 3, pp. 302–307, 1935. *In German.*—The Raman spectrum is observed for $(C_2H_5)_4NI$, and it is compared with those of C_2H_5I and $(C_2H_5)_3N$, and conclusions are drawn as to the structure of the molecule of $(C_2H_5)_4NI$. A. C. M.,

COMMON ELEMENTS

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CA

3

Raman effect of fluosilicic acid. Ya. K. Syrkin and M. V. Volkenstein. *Acta Physicochim. U. R. S. S.* 2, 308–12(1935)(in German).—Fluosilicic acid (27%) from a paraffin bottle was freed of colloidal paraffin (indicated by Tyndall effect), by ultrafiltration through a collodion membrane on a compressed Jena-glass filter. Only one Raman line, $\nu = 649 \pm 5$ cm.$^{-1}$, was observed. The SiF_6 ion is interpreted as being octahedral with the Si atom in the center and the Si-F distance 1.92 A. The calcd. value for the Raman line is then 680 cm.$^{-1}$. F. H. R.

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PROCESSES AND PROPERTIES INDEX

3

Abnormally small steric factors in chemical kinetics. H. Hellmann and Ya. K. Syrkin. *Acta Physicochim. U. R. S. S.* 2, 433 (1935) (In German). — Theoretical. The wave-mechanics theory of collision processes is worked out for the two extreme cases of completely adiabatic and completely diabatic collisions. A strong transformation of the electron field in the process of reaction leads to diabatic collisions and an abnormally small steric factor. In discrete initial conditions the tunnel effect may lead to small steric factors. P. H. Rathmann

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"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

PROCESSES AND PROPERTIES INDEX

Kinetics of the bromination of benzaldehyde. Ya. K. Syrkin and A. T. Gladishev. *Acta Physicochim. U. R. S. S.* 2, 467-72(1935)(in German).—Br was carefully freed of Cl and dried. Benzaldehyde was freshly distd. before each expt. The solvent, CCl_4, was dried over $CuSO_4$ and distd. All were kept in the dark. The reaction was effected at 30°, 35° and 40° in a thermostat in a dark room and in a blackened vessel, at initial concns. of 0.05 *M* Br, and 1.08 *M* C_6H_5CHO. The velocity consts. were, resp., 3.12×10^{-7}, 7.07×10^{-7} and 1.50×10^{-6}. The values of about 3×10^{-6} obtained by Herz and Dick (*C. A.* 2, 3083) are due to traces of light and perhaps impurities. After correction for the 8% viscosity change from 30° to 40°, the bimol. velocity const. is given by the equation $K = 1.67 \times 10^{11} e^{-22,900/RT}$ and the unimol. by $K = 2.3 \times 10^{14} e^{-27,400/RT}$. The factor 1.67×10^{11} can be explained by 10 squared terms. Both hydroquinone and iodine are practically without catalytic effect.

F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

PROCESSES AND PROPERTIES INDEX

The kinetics of the addition of bromine to ether. A. S. Selivanova and Ya. K. Syrkin. *J. Phys. Chem.* (U. S. S. R.) 8, 48-50(1936).—The addn. reaction of Br_2 to Et_2O was studied in CCl_4 soln. at 15°, 20° and 25°. The reaction rate is a const. when calcd. as a second-order reaction. The reaction velocity consts. for g. moles per l. per sec. are 1.08, 1.93 and 3.31 × 10^{-4}, resp., and are given by the equation $v = 3.5 \times 10^{9} e^{-18,100/RT}$, giving a steric factor of 10^{-5}. Addn. of 2% I_2 increases the rate by about 25%.

F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

10

The application of physical methods in organic chemistry. Ya. K. Syrkin. *Org. Chem. Ind.* (U. S. S. R.) 3, 122-31(1937). A discussion. Chas. Blanc

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

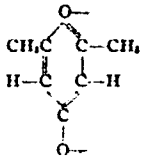
APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4"

"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

PROCESSES AND PROPERTIES INDEX

2

Dipole moments of pyrone compounds. V. G. Vasil'ev and Ya. K. Syrkin. *Acta Physicochim. U. R. S. S.* 6, 639-60(1937).—The dipole moments ($\mu \times 10^{18}$) for γ-dimethylpyrone (462), xanthone (294) and cumarine (454), in C_6H_6 soln. are const. over the range from 15° to 65°. These values are larger than those calcd. from simple vectorial additivity of the values for the sep. polar groups, but they can be accounted for on the basis of the quant.-mech. resonance theory assuming a mixt. of which one of the states is a dipole of a trivalent ethereal-monovalent carbonyl oxygen combination in nonassocd. mols. of the type



This ionized state is also indicated by the formation of various addn. compds. with acids and alkyl halides, by reactions with $(NH_4)_2CO_3$ and Grignard reagents, as well as by light-absorption data. Cf. Gowinda Rao, *Mem. Indian Inst. Sci.*, IV, No. 6, A, 087(1937). F. H. R.

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2

Dielectric polarization of iodine solutions. S. Kaftanov, V. Vasil'ev and Ya. Syrkin. *Acta Physicochim. U. R. S. S.* 7, 75-84 (1937) (in English); cf. preceding abstr.—The polarization of I solns. in C_6H_6 was measured at 15°, 25°, 40°, 55° and 60° for the concns. (mol. fractions) 0.004222, 0.006085, 0.007860, 0.014917 and 0.025328. For the temps. measured the calcd. value of the molar polarization is 41.12 ± 0.12 cc. The independence of polarization from the temp. leads to the conclusion that I has no dipole moment in C_6H_6 or CS_2. The difference between the electronic polarizations in vapor (32.2) and in soln. is discussed.

W. George Parks

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1252. Vapour Pressure of Liquids and Solids. J. K. Syrkin. *Acta Physicochimica*, 7. 6. *pp.* 867–874, 1937. *In English.*—The binomial equation $\log p = A - b/T$, in which T is the temperature, and A and b are constants characteristic of a given liquid, is discussed from the standpoint of a relation between A and b. $\log p = \log \Pi\ (1-T_s/T)/(1-T_s/\theta)$. (where Π is the critical pressure, θ is the critical temperature and T_s is the boiling point), is found to afford pressures from the boiling point to the critical temperature accurately to within 2–3%. For most organic substances $T_s/\theta = 0{\cdot}64$, whilst for a number of inorganic compounds it is approximately $0{\cdot}6$; $\log \Pi$ is in most cases within the limits $1{\cdot}7$ to $1{\cdot}9$. The usual equation for the vapour pressure of liquids, *viz.*, $p = CT^{\gamma}e^{-\lambda/RT}$, with coefficients C and γ independent of the nature of the liquid, is discussed, but it is found that in the neighbourhood of the boiling-point, no general formula can express the vapour pressure in a satisfactory way and it is expedient to adapt formulæ with uniform coefficients for groups of similar substances. Extending the work to solids, it is found that the calculation of vapour pressure by the formula, $\log p_s = 4{\cdot}75(1-T_s/T_m) + \sigma/4{\cdot}57\ T_m - \sigma/4{\cdot}57\ T$, where T_m is the melting point, is a good approximation.

H. H. Ho.

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The kinetics of unimolecular decomposition in solutions

Ya. K. Syrkin and M. A. Gubareva. *Acta Physicochim. U. R. S. S.* 8, 236-50(in English); *J. Phys. Chem.* (U. S. S. R.) 11, 285-96(1938).—The reaction $(C_6H_5)(C_6H_5CH_2)(CH_3)_2NI = C_6H_5N(CH_3)_2 + C_6H_5CH_2I$ was studied in both directions in alc. soln. at 50, 55 and 60°. The equil. const. is $K = 1.2 \times 10^{-6}\, e^{[illegible]/RT}$; the specific rate of the decompn. is $K_1 = 6.4 \times 10^{11}\, e^{[illegible]/RT}$; and of formation of the salt is $K_2 = 7.7 \times 10^{9}\, e^{[illegible]/RT}$. The results are discussed in terms of the transition state theory. A series of unimol. decompns. of quaternary NH_4 salts in soln. are compared. S. L. Gerhard

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1ST AND 2ND ORDERS — PROCESSES AND PROPERTIES INDEX — 3RD AND 4TH ORDERS

The kinetics of the formation of a quaternary ammonium salt from its gaseous components. A. T. Gladyshev and Ya. K. Syrkin. *Acta Physicochim. U. R. S. S.* 8, 323-34 (in English); *J. Phys. Chem.* (U. S. S. R.) 11, 425-33 (1938).—The reaction between triethylamine and methyl iodide in the gas phase with the formation of a solid salt was studied at 20, 40 and 60° under conditions permitting the course of the reaction to be followed by the change in pressure. The reaction follows an equation of the 2nd order. The reaction is heterogeneous. The surface on which the reaction takes place is the solid salt, i. e., the product of the reaction. The reaction is very slow. With an initial pressure of the reactants of 50 mm. in a vessel 600 cc. in vol. with a surface of 300 sq. cm., it takes no less than 10 min. to form a unimol. layer. The apparent activation energy is neg. (−1450 cal.). The rate falls off with increase in temp. Evidently, the heat of adsorption of both components is somewhat greater than the true activation energy. A calcn. of the sp. rate in the adsorbed layer shows that the reaction proceeds with a very small steric factor. An upper limit of 10^{3} was found for the pre-exponential factor in the rate const. If the no. of collisions in the gas phase is taken as the "standard" state, then this amounts to a steric factor of about 10^{-6}. The microsurface of the vessel is in reality greater than the apparent macrosurface, so that the steric factor is less than 10^{-6}. The question of the applicability of the transition state theory to heterogeneous reactions is considered in the present case. The low rate is connected with the low probability of the transition state which is evidently close to the final state, i. e., the solid salt. An approx. evaluation of the entropy of the transition state is given. The reaction was studied also in the presence of added vapors, such as CdI_2, CH_3COCH_3, CH_3OH and H_2O. These substances are frequently employed as solvents in the study of the analogous reactions in soln. The above vapors insignificantly accelerate the reaction. The increase of the rate caused by these substances increases in the order given. A. A. Vernon

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Dipole moments of some nitronaphthylamines. V. G. Vasil'ev and Ya. K. Syrkin. *Acta Physicochim. U. R. S. S.* 9, 209-4(1938)(in English).—See *C. A.* 33, 5248[1].

F. H. Rathmann

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Pressure of saturated vapor. Ya. K. Syrkin. *J. Phys. Chem.* (U. S. S. R.) 11, 161–8(1938).—The van der Waals equation for vapor pressure can be given the form $\log P_s = \log P_c + L/4.57T_c - L/4.57T$. An analogous expression is deduced for the vapor pressure over solid bodies. Both formulas are in agreement with exptl. data. B. C. P. A.

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Dipole moments of some nitronaphthylamines. V. G. Vasil'ev and Ya. K. Syrkin. *J. Phys. Chem.* (U. S. S. R.) 12, 153-4(1938).—The dipole moments μ ($\times 10^{-18}$) of three of the nitronaphthylamines are: (2, 1), 4.89; (1, 2), 4.47; and (5, 1), 5.22. Except for (5, 1), these values do *not* agree with those calcd. from the principle of vector sums. F. H. Rathmann

Comments on Ya. K. Syrkin's paper "Remarks on the problem of the pressure of saturated steam vapor." A. M. Regirer. *J. Phys. Chem.* (U. S. S. R.) 12, 154-5 (1938).—Claim as to priority (cf. *C. A.* 33, 4095[1]). Reply to A. M. Regirer. Ya. K. Syrkin. *Ibid.* 155.—R. has no justified claims. F. H. Rathmann

Dipole moments of some oxygen-containing organic [illegible]. E. A. [illegible] and Ya. K. Syrkin. *J. Phys. Chem.* (U. S. S. R.) 12, 479-80(1938).—The following dipole moments were detd. in Debye units: *o*-hydroxybenzaldehyde 2.[illegible], guaiacol 2.[illegible], vanillin 3.0, [illegible] 0.7[illegible], [illegible] 5.6 and furfural 3.61. F. H. Rathmann

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Equilibrium and kinetics of the formation of oxonium compounds. A. T. Gladishev and Ya. K. Syrkin. *Compt. rend. acad. sci. U. R. S. S.* 20, 145-8(1938)(in English).—Equil. consts. (pressure in atms.; temp. abs.) for oxonium-compd. formation in the gaseous phase between Me_2O and HCl are: 1.05 (260°), 0.4734 (274°), 0.3043 (283°), 0.1862 (293°), 0.1509 (303°). The heat of formation of the oxonium compd. is approx. 7000 cal.; this agrees with the values found by others for union of O of an ether or carbonyl group with H from another mol. Whereas oxonium chloride is formed immediately after the gases are mixed, with Me_2O and HBr at 1° and 20° the reaction is heterogeneous and slow and depends on adsorption on the walls of the vessel. If the HBr is admitted first, the reaction is more rapid than when Me_2O is first added to the reaction vessel. Oxonium bromide formation has a very low steric factor George Avers

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Physical methods used in organic chemistry. Ya. K. Syrkin. *Trudy Sessii Akad. Nauk Org. Khim.* 1939, 261-81.—A review is given of the salient results obtained in the study of org. compds. by the use of electronic patterns, x-rays, Raman spectra and dipole moments.

Bruno C. Metzner

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Kinetics of the formation of the quaternary ammonium salt from gas components. Ya. K. Syrkin. *Uchenye Zapiski Leningrad. Gosudarst. Univ., Ser. Fiz. Nauk* 1959, No. 5 (No. 38), 84-9; *Khim. Referat. Zhur.* 1940, No. 4, 2-3.—The velocity of the reaction of Et_3N with MeI was detd. from the decrease of the pressure in the reaction vessel. The reaction is bimolecular. The velocity decreases with increase in temp. The apparent energy of activation (equal in such reactions to the true heat of activation less the heat of absorption of both components) is approx. 1480 cal. The reaction is very slow. Calcns. showed that not less than 6–10 min. is required for the formation of the unimol. layer of the salt on the walls of the vessel (with a macrosurface of 300 sq. cm.). The steric factor for this reaction is of the order of 10^{-6} to 10^{-8}, whereas the steric factor for similar reactions in soln. is 10^{-4} to 10^{-6}. The low value of the steric factor is discussed from the standpoint of the transition-state method. W. R. Henn

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CA

2

Kinetics of the reaction between carbonyl sulfide and ammonia. A. S. Solovanova and Ya. Kr. Syrkin. *Acta Physicochim. U. R. S. S.* 11, 647-56(1939)(in English).—The reaction $COS + 2NH_3 \rightleftharpoons NH_4S(CO)NH_2 \rightarrow CO(NH_2)_2 + H_2S$ was studied in the gas phase at 0-50°. The reaction is heterogeneous, takes place on the glass walls, and is approx. 2nd order according to $d[NH_3]/dt = 2k[NH_3][COS]$ with $k = 5.5 \times 10^{-4}$ on a clean surface and decreasing on repeating the reaction 3 times in the same unclaimed vessel to 2.31, 0.85 and 0.51 $\times 10^{-4}$ at 22°. The temp. coeff. is small, about 0.90 for 20°; $E = -2000$ cal. The steric factor is $10^{-7} - 10^{-8}$. The first reaction consists of a slow 1st stage and a rapid 2nd stage: $COS + NH_3 \rightarrow COSNH_2 + NH_3 \rightarrow NH_4S(CO)NH_2$. Above 40°, ammonium thiolcarbamate decomposes to urea, H_2S, COS and NH_3. F. H. R.

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CA

2

Dipole moments of phenyl iododichloride and its derivatives. E. N. Gerymova and Ya. K. Syrkin. *Acta Physicochim. U. R. S. S.* 11, 657-8(1939)(in English).—At 25°, the experimentally found dipole moments and those calcd. from the principle of vector sums, of aryl iododichlorides are: phenyl 2.61, —; *o*-tolyl, 2.55, 2.44; *m*-tolyl, 2.82, 2.83; *p*-tolyl, 3.02, 3.01; *o*-chlorophenyl, 2.95, 3.6; *m*-chlorophenyl, 2.11, 2.27; *p*-chlorophenyl, 1.3, 1.06; of *m*-chloroiodobenzene, 1.39, 1.44; *p*-chloroiodobenzene, 0.46, 0.25. The iododichlorides are considered as mixts. of homopolar and internally ionized structures. Values of the dipole moment in excess of the vector sum are due to resonance effects. **The dipole moments of certain compounds containing the carbonyl group.** E. A. Shott-L'vova and Ya. K. Syrkin. *Ibid.* 659-60; cf. *C. A.* 33, 4839[1].—The dipole moment of benzanthrone was found to be 3.49 D. in benzene at 25°; of chloranil 0.86 D. in dioxane at 25°.

F. H. Rathmann

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Raman effect of pyrone compounds and electronic resonance effects. M. V. Vol'kenshtein and Va. K. Syrkin. *J. Phys. Chem.* (U. S. S. R.) 13, 948-64(1939).—Exptl. data are given on the Raman spectra of dimethylpyrone, coumarin, xanthone, coumarone and dioxane alone and in HCl and HBr solns. The results are considered from the standpoint of Pauling's theory of electron resonance.
F. H. Rathmann

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SYRKIN, YA.K.

GURYANOVA4YE8N8 600

1. GUR'YANOVA, Ye. N.; SYRKIN, Ya. K.

2. USSR (600)

"Preliminary Report and Discussion -- Dipole Moments of Phenylodichlorides and Their Derivatives," Zhur. Fiz. Khim, 13, No. 10, 1939. Moscow, Physico-Chemical Institute imeni Karpov, Laboratory of Dipole Features. Received 23 July 1939.

9. [redacted] Report U-1615, 3 Jan. 1952.

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SYRKIN, YA. K. 600

1. SHOTT-L'VOVA, Ye. A.; SYRKIN, Ya. K.

2. USSR (600)

"Dipole Moments of Certain Combinations with the Carbinol Group," Zhur. Fiz. Khim, 13, No. 10, 1939. Moscow, Institute of Fine Chemical Technology. Received 23 July 1939.

9. [redacted] Report U-1615, 3 Jan. 1952.

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Effect of solvent on kinetics. A. S. Selivanova and Va. K. Syrkin. *Compt. rend. acad. sci. U. R. S. S.* 23, 45-9 (1939) (in English).—The rates of saponification at 15°, 25° and 35° were measured for solns. 0.023 *N* in NaOH and EtOAc, the solvents being mixts. of H_2O with MeOH, glycol, glycerol, erythritol or mannitol. Addn. of the alcs. increases the activation energy and decreases the frequency factor. With glycol, glycerol and erythritol the rate reduction depends only on the total concn. of alc. OH groups in the soln., and the rate const. follows the law $K = K_0 G^{Con}$, where K_0 is the rate const. for pure H_2O, K that for the mixed solvent, Con the concn. of alc. OH, and G a const., equal to approx. 1.1 at all temps. studied. MeOH and mannitol do not follow this law, the former giving a smaller, the latter a greater, rate reduction than expected. The νs of the polyhydric alc. solns. used were also measured and found to depend only on the concn. of alc. OH.

A. O. Allen

Activation energy and entropy of the transition state. Va. K. Syrkin and M. A. Gukareva. *Compt. rend. acad. sci. U. R. S. S.* 23, 686-8 (1939).—The kinetics of the reaction between $NPhMe_2$ and EtI in C_6H_6, EtOH and C_6H_6-EtOH mixts. were studied at 35°, 45° and 55°; k_{mono} is about equal to $20k_{sm}$. The energy of activation in EtOH is 6000 g.-cal. greater than in C_6H_6.

B. C. P. A.

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Tautomerism and the Raman effect. Ya. K. Syrkin. *Bull. acad. sci. U. R. S. S., Ser. phys.* 4, 103-5(1940).—This paper discusses the possibility of employing Raman spectra for the study of tautomerism in those cases where there exists only one intermediate form which, owing to the "tunnel-effect," is attained by the superposition of two tautomeric states of the compd. It is suggested that, in order to check the possibility of "tunnel effect," one must photograph Raman spectra of ordinary mols., as well as those in which ordinary H is substituted by heavy H atoms. The idea is illustrated by $CH_3COCH_2C(OH)CH_3$.

Roksalana Gamow

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Valence state and additivity scheme in organic chemistry. Ya. K. Syrkin, A. A. Zhukhovitskii and M. E. Dyatkina. *Uspekhi Khim.* 9, 1143-77(1940).—Quantum mechanics review for use of instructors. F. H. R.

Present status of the theory of valence. A. A. Zhukhovitskii, Ya. K. Syrkin and M. E. Dyatkina. *Uspekhi Khim.* 9, 930-47(1940).—The authors discuss valency from the phys. viewpoint of Schrödinger wave mechanics (*Collected Papers of Wave Mechanics, C. A.* 23, 4146).
F. H. Rathmann

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The Raman spectra of halogenated ethylenes. Preliminary note. E. N. Prilezhaeva, Ya. K. Syrkin and M. V. Vol'kenshtein. *Acta Physicochim. U. R. S. S.* 12, 176-80(1940)(in English).—From expt. data on the Raman spectra of α,α-dichloro(and dibromo-)-β-phenylethylene, α,α-dichloro-β,β-dimethylethylene, tribromoethylene and tetrabromoethylene dissolved in C_6H_6 and CCl_4 solns., as well as from other data in the literature P., S. and V. find that the Raman C=C band frequencies decrease from ν = 1623 in C_6H_6 to 1608 (1598) in monochloro(bromo)-, to 1580 and 1576 (1584 and 1578) in *cis*- and *trans*-dichloro(bromo)-, to 1585 (1553) in trichloro(bromo)-, and to 1569 (1547) in tetrachloro(bromo)ethylene. Calcns. using "valence-force" models show that the effect must be due not to the increasing masses of the vibrating atoms or groups but to resonance structures.

F. H. Rathmann

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[redacted]

Syrkin, Ya. K. CA: 35-976/8

Gantmacher, A. R., Vol'kenshtein, M. V. and Syrkin, Ya. K.
(Karpov Inst. Physical Chemistry, Lab. for Raman Effect, Moscow)
Acta Physicochimica URSS 12, 786-92 (1940) - in English
The Raman effect of oxonium compounds.

[redacted]

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"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

PRILEZHAYEVA, Ye. N.; SYRKIN, Ya. K.; VOL'KENSHTEYN, M. V.

Physico-Chemical Institute imeni Karpov, (-1940-)

Raman-Effect Laboratory, The Minsk State University, (-1940-)

"The Raman Effect of Halogen Derivatives of Ethylene and the Electronic Resonance."

Zhur. Fiz. Khim., Vol. 14, No. 11, 1940.

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GANTMAKHER, A. R.; VOL'KENSHTEYN, M. V.; SIRKIN, Ya. K.

Raman Effect Laboratory, Physico-Chemical Institute imeni L. Ya. Karpov, (-1940-).

"The Raman Effect of Oxonium Compounds."

Zhur. Fiz. Khim., Vol. 14, No. 12, 1940.

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Resonance in organic chemistry. Ya. K. Syrkin, M. E. Dyatkina and A. A. Zhukhovitskii. *Uspekhi Khim.* 10, 121-87(1941), and **Correction,** *Ibid.* 756.—Review. Resonance and valence states of the individual atoms are discussed. The resonance structures of hydrocarbons and their derivs., orientation in the benzene and naphthalene rings, inductive effect and alternating polarity are considered. Classical structures do not indicate the full possibilities of the reactions of org. compds. These can be found only by considering all possible polar as well as ionic structures, also the possibilities of hydrogen bonds, chelation, steric hindrance and valence strains. In considering the various resonance states the relative probability and the energy relations must be taken into account. In the case of reactions the thermodynamic and the kinetic factors must be distinguished, especially in the case of competitive reactions. A reinterpretation of Ingold's ideas completely in terms of quantum mechanics should lead to fruitful results.

F. H. Rathmann

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10

The structure of the naphthalene molecule. Ya. K. Syrkin and M. E. Dyatkina. *Acta Physicochim. U. R. S. S.* 14, 105–18(1941)(in English).—Theoretical. The nos. of structures for given groups and their relative wts. are tabulated and from their consideration conclusions are drawn as to the relative reactivities of benzene, naphthalene, anthracene and more highly condensed ring systems. F. H. Rathmann

The Raman spectra of the halogen derivatives of ethylene and the electronic resonance. E. N. Prilezhaeva, Ya. K. Syrkin and M. V. Vol'kenshtein. *Acta Physicochim. U. R. S. S.* 14, 119–53(1941)(in English); cf. *C. A.* 34, 5760[9].—Complete Raman spectra are given for tetrabromo-, tribromo-, 1,1-dichloro-2,2-dimethyl-, 1,1-dichloro-2-phenyl-, and 1,1-dibromo-2-phenyl ethylenes. In each case the frequency is lower than the corresponding frequency of ethylene. These data together with others from the literature, collected in 10 tables, show that the order of increasing effect on the Raman frequency is alkyl < COOH, $COOC_2H_5$ < OC_2H_5, C_6H_5 < COH < Cl < COCl < CN < C≡CH F. H. Rathmann

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[redacted]

Syrkin, Ya. K.

Gantmacher, A. R., Vol'kenshtein, M. V. and Syrkin, Ya. K. CA: 37-2657/8
(Karpov Inst. Physical Chemistry, Moscow)
Acta Physicochim URSS 14, 157-84 (1941)
Raman effect of oxonium compounds.

[redacted]

Inductive effect. Ya. K. Syrkin and M. E. Dyatkina. *Acta Physicochim. U. R. S. S.* 14, 185-92(1941).—The effect of substituents on the distribution of charges in org. compds. is treated as an effect of resonance with stabilized ionic structures. A quant. examn. of the energies of such structures is made for $NPhMe_3$ ion and PhCl, and the directing influence of these substituents is shown to follow from the assumption made. PhNO$_2$, toluene and PhNO$_2$ are also discussed.

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2

The dipole moments of some nitro and amino derivatives of benzene and naphthalene. V. O. Vasil'ev and Yu. K. Syrkin. *Acta Physicochim. U. R. S. S.* 14, 414-16 (1941).—The dipole moments of 40 substances in benzene and dioxane soln. were det'd. All deviations from strict additivity can be ascribed to the presence of "internally bonded" structures. The specific effect of dioxane is due to formation of complex oxonium compds. F. H. R.

Structure of boron hydrides. Ya. K. Syrkin and M. E. Dyatkina. *Acta Physicochim. U. R. S. S.* 14, 547-61 (1941).—The proposed structure for B_2H_6 contains a B^- ion bonded with 4 H atoms and a B^+ ion bonded with 2 H atoms; in the actual mol. resonance occurs between this and a corresponding structure with the signs reversed. Somewhat similar structures are suggested for the remaining hydrides; all of them contain bivalent B^+ and quadrivalent B^- ions. B. C. P. A.

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RESTRICTED

SYRKIN, YA. K.

SLOVOKHOTOVA, 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.

RESTRICTED

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"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

SYRKIN, Ya. K.

Physico-Chemical Institute imeni L. Ya. Karpov, Moscow (-1943-)
Lab of the Structure of Substances

"Energy of the Bonds of Organic Compounds." Zhur. Fiz. Khim., Vol. 17, No. 5-6, 1943

BR-52059019

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"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

SYRKINA, Ia. K.

DYATKINA, M.E. and IA. K. SYRKINA
To the question of the borohydrides structure.
J. Phys. Chem. USSR
vol. 17, 1943, p. 20.

Discusses small probability of the existance of monoelectric linkage within a molecule and treats the molecule as a result of resonant ionic structure.

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"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

DYATKINA, M. Ye.; SYRKIN, Ya. K.

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

"On the Question Concerning the Structure of Boranes" II
Zhur. Fiz. Khim., Vol. 17, No. 1, 1943

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"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

SYRKIN, IA. K.

TT.142 /Bond energies of organic compounds/ Energii sviazei organicheskikh soedinenii. Zhurnal Fizicheskoi Khimii, 17(7): 347-380, 1943.

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Remarks on the paper "Application of resonance to organic chemistry" by V. I. Ufimtsev, Ya. K. Syrkin, M. E. Dyatkina, and A. A. Zhukhovitskii. *Uspekhi Khim.* 13, 80-1(1944); cf. *C.A.* 35, 7770; 38, 722. Polemical.

F. H. Rathmann

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2

Polarity of some hydrocarbons. Va. K. Gyrkin and R. Shott-Lvova. *Acta Physicochim. U.R.S.S.* 19, 379-84 (1944).—Results of dipole-moment measurements by the Hedestrand method were: fluorene in C_6H_6, 0.53 units, in dioxane 0.65; Ph_3CH in C_6H_6 0.21, in dioxane 0.46; indene in C_6H_6, 0.67; cyclopentadiene in C_6H_6, 0.45. The moments are higher in dioxane than in C_6H_6 because of H bonding. The results are believed to be more accurate than those of previous workers. The moments arise from ionic structures that exist in resonance with the usual homopolar structures.

A. O. Allen

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3

The Raman spectra of some sulfur-containing compounds R. E. Chernitskaya and Ya. K. Syrkin. *Compt. rend. acad. sci. U.R.S.S.* 45, 382-4; *Doklady Akad. Nauk S.S.S.R.* 45, 102-4(1944); cf. *C.A.* 34, 1990.

The principal frequencies in the Raman spectra of thiourea (I), sym. diphenylurea, phenylurea, 1,4-dithiane, and its 1,4-dioxide are tabulated. The lines 635, 655, 960, 1045, and 1150 cm.$^{-1}$ were usually found in compds. contg. the C—S bond. Frequencies in the neighborhood of 1100 cm.$^{-1}$ were believed characteristic of the C—S bond even though such frequencies are observed in hydrazine and compds. of the type H_2NCOOR. The absence of N-H bond frequencies in the spectra of aq. solns. of I was noted.

J. W. Perry

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1ST AND 2ND ORDERS

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Biradical state of hydrocarbons. M. E. Dyatkina and Ya. K. Syrkin. *Bull. acad. sci. U.R.S.S., Classe sci. chim.* 1945, 543-55(in English, 556); *Acta Physicochim. U.R.S.S.* 21, 23-40(1946).—The energies of excitation from the singlet to the triplet (biradical) state were calcd. for 80 hydrocarbons by the mol. orbital method. The numerical results are expressed by the resonance interval β between 2 neighboring C atoms. The biradical triplet form is present in equil. when the energy of excitation is lower than 0.1 β. For polyenes low energies are attained only when the no. of conjugated bonds is very large, i.e. 20 or more. Phenylpolyenes have rather high excitation energies, e.g. 0.36 β for tetraphenyldecapentaene. The quinodimethanes have low energies of excitation. As the no. of rings grows from di-, to tri-, to tetrabenzoquinodimethane the energy decreases from 0.27 β, to 0.13 β, to 0.07 β. Various groups can be arranged in the order of their effect on decreasing the energy of excitation: Ph < vinyl < biphenylyl < *p*-vinylphenyl < phenylvinyl < diphenylvinyl < anthryl < anthrylvinyl. For quinodimethanes with a large no. of rings, or contg. strongly "decreasing" substituents, the energy of excitation is as low as 0.03-0.04 β, i.e. it has a value of the order RT. Low values for the energy of excitation may be expected for derivs. of naphtho-, anthra-, and phenanthrenoquinodimethanes when only one localization of unstrained bonds is to be expected for the original quinodimethane, such as 2,6-naphthoquinodimethane. The energy of excitation decreases more rapidly in the case of linear annulation than for angular annulation.

Oscar W. Bauer

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Raman spectrum study of amine-imine tautomerism. D. N. Shigorin and Ya. K. Syrkin (Karpov Inst., Moscow). *Bull. acad. sci. U.R.S.S., Sér. phys.* 9, 225-9 (1945)(in Russian). - For substituted imidazole derivs. 2 tautomeric forms, a and b, are possible, which so far

could not be sepd. The absence of the C:N frequency in the Raman spectrum used to be interpreted by a tunnel effect for H although that double-bond vibration need not be preserved in the ring system. In view of further confirmation, Raman spectra were taken for a series of substances susceptible of amine-imine tautomerism but with *open* chains. Spectra of 6 compds. with a mobile H atom, PhNHCMe:NPh, PhNHCEt:NPh, PhNHCPh:NPh, PhNHCH:NPh, PhNHCH:NC$_6$H$_4$Me-4, PhNHCH:N:C$_6$H$_3$Me$_2$-2,4, show 2 very close frequencies ν_1 and ν_2 (resp. 1652 and 1639, 1658 and 1632, 1645 and 1621, 1648 and 1641, 1650 and 1636, 1649 and 1638 cm.$^{-1}$) characteristic of the C:N bond. Substances without a mobile H atom, PhNMeCH:NPh, PhNEtCMe:NPh, PhNPhCMe:NPh, show only 1 frequency ν_3 (resp. 1623, 1619, 1633 cm.$^{-1}$). If a tunnel effect were present in the compds. of the 1st category, the C:N bond line would be absent in their Raman spectra; it would only appear on substitution of the H atom. This is not borne out by the facts. The 2 close frequencies ν_1 and ν_2 observed in amine-imine compds. with a mobile H atom can be interpreted as belonging to the 2 geometrically isomeric syn and anti forms; the order of magnitude of the difference $\nu_1 - \nu_2$ is the same as with cis-trans isomers of ethylene derivs.

The somewhat lower ν_3 frequency preserved in the compds. of the 2nd category where the mobile H atom is replaced by a radical corresponds to the syn form. The failure to isolate the 2 tautomers in compds. of the imidazole type is explained by the fact that the salts (e.g., the HCl salt) of the 2 forms are identical, the pos. charge of the amidine ion being localized in both cases on the imine N atom, this is borne out by both kinetic and thermodynamic considerations. The frequency of the C:N bond should consequently be absent in the Raman spectra of the salts.

N. Thon.

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6

Structure of complex [inorganic] compounds. I. Ya. K. Syrkin and M. E. Dyatkina (Karpov Inst. of Phys. Chemistry, Moscow). *Acta Physicochem. U.R.S.S.* 20, 137-60(1945). A theoretical discussion of bonds set up at the expense of the unpaired electrons of the central atom, of resonance of the electronic states of complex-forming atoms, of the small difference in energy of the *d*, *s*, and *p* levels that leads to valencies up to nine, and of the structures of carbonyls, nitrosyls, and nitro complexes.
S. Pakawer

The structure of complex compounds. II. Ya. K. Syrkin and M. E. Dyatkina. *Acta Physicochim. U.R.S.S.* 20, 273-90(1945); cf. *C.A.* 40, 25[5].—A consideration of the structure of the complex cyanides of K and Cr, Mo, Co, Fe, Ni, Mn, and Pt, also several inner complex salts and halogens. Diagrams of the various proposed structures are given. The suggested structures are based on concepts developed in Part I.
Elmer P. Stephan

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CA

2

Polarity and structure of some compounds containing nitrogen. Ya. K. Syrkin and E. A. Shott-L'vova (Inst. Fine Chem. Technol., Moscow). *Acta Physicochem. U.R.S.S.* 20, 397-406(1945); *Bull. acad. sci. U.R.S.S., Classe sci. chim.* 1945, No. 4, 314-21(English summary).—The dipole moments at 25° of 2-nitrofluorene (I), 2-amino-7-nitrofluorene (II), 2,7-dinitrofluorene (III), naphthylenedioxime anhydride (anhydride of dioxime of 1,2-diaminonaphthalene) (IV), *N*-methylketopiperidone (1-methyl-2-piperidone) (V), benzimidazole (VI), and benzoylenebenzimidazole (11-isoindolo[2,1-a]benzimidazol-11-one) (VII) were detd. by a heterodyne method previously described (*C.A.* 32, 4080[illegible]). The electronic polarization P_{el} was computed from bond refractions. The dipole moments $\mu \times 10^{18}$ and P_{el} are, resp., for I 4.5, 60.76; II 6.8, 65.16; III 2.39 (inaccurate because of slight soly. of III in solvent), 66.20; IV 4.3, 45.03; V 4.01, 31.66; VI 4.08, 35.28; VII 1.97, 80.95. Dielec. consts. ϵ, detd. for 3-8 concns. for a substance, are in dioxane solns. for I, II, VI, resp., 2.4921-2.9116; 2.2816-2.5260; 2.3162-2.0002; and in C_6H_6 soln. for IV, V, VII 2.4043-2.5684; 2.4737-2.9541; 2.2978-2.3221. (No data given for III). I has the highest moment of all known NO_2 derivs. The deviation of the detd. dipoles from the vector sums is explained by suggested resonance structures of the valence states of N. Diagrams of these structures are given.

E. R. Schierz

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SYRKIN, Ya. K.

PHASE X TREASURE ISLAND BIBLIOGRAPHICAL REPORT AID 746 - X

BOOK

Call No.: AF333341

Authors: SYRKIN, Ya. K., and M. E. Dyatkina

Full Title: CHEMICAL BOND AND STRUCTURE OF MOLECULES

Transliterated Title: Khimicheskaya svyaz' i stroyeniye molekul

PUBLISHING DATA

Originating Agency: None

Publishing House: State Publishing House of Chemical Literature

Date: 1946 No. pp.: 588 No. of copies: 10,000

Editorial Staff: None

PURPOSE AND EVALUATION: The book is approved as a textbook for university courses in "Structure of Matter". It is also intended for chemists engaged in scientific research. The volume is a fundamental treatise which attracted attention beyond the borders of the USSR. In the English translation (London, Butterworth's Scientific Publications, 1950; New York, Interscience Publishers Inc., 1950) the translators and revisers made only such revision of the original text as was necessited by recent developments in chemical science. One of the merits of this important work is that theoretical and experimental aspects of the problem of molecular structure are discussed side by side.

TEXT DATA

Coverage: The book deals with the modern conception of the nature of chemical reactions and valence. It contains data on bond

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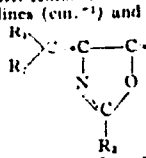
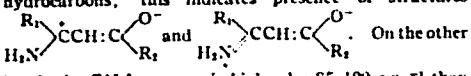
CA

3

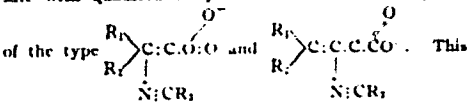
Raman spectra of azlactones and amide-imide tautomerism. D. I. Shirogin and Ya. K. Syrkin (Karpov Phys. Chem. Inst., Moscow). *Izvest. Akad. Nauk. S.S.S.R., Otdel. Khim. Nauk* 1946, 59–63(in Russian).—The Raman lines (cm.$^{-1}$) and intensities (on a 10 scale) of 3 compds



(I) where R_1 = Me, R_2 = H, R_3 = Ph (m. 93°); (II) R_1 = Ph, R_2 = H, R_3 = Me (m. 151°); (III) R_1 = Me, R_2 = Me, R_3 = Ph (m. 100°), all 3 in 13-15 mole % soln. in $CHCl_3$, and of (IV) $Me_2C{=}C\langle^{NHCOPh}_{CO_2Na}$, in aq. soln., are given. I. 1770 (2), 1660(3), 1598(6), 1584(5), 1567(10, b), 1386(2), 1353(2), 1172(2), 1134(1.5), 1100(1.5), 1023(2), 996(5), 917(1), 879(1), 802(1), 688(2), 621(1), 591(1), 457(1). II. 1766(2), 1653(3), 1596(8), 1582(8), 1556(10, b), 1484(2), 1449(4), 1360(4), 1321(2), 1200(2), 1258(1.5), 1114(1.5), 1068(2), 1024(2), 997(5), 922(2), 882(2), 775(1), 709(1), 588(1), 550(1.5). III. 1753(2), 1647 (3), 1598(6), 1586(5), 1563(10, b), 1472(2), 1413(2), 1366(1), 1246(1), 1160(1.5), 1100(1.5), 996(5). IV. 1737(2), 1658(3), 1635(3), 1604(5), 1415(2), 1376(1), 1244(1.5), 1221(3), 1148(3), 1023(2), 998(6). By comparison with other compds. contg. conjugate C:C and C:O bonds, the assignments are made: C:C, I 1567, II 1556, III 1563; C:O, I 1660, II 1653, III 1647; C:N, I 1770, II 1766, III 1737. The C:C and the C:O frequencies are distinctly lower in azlactones than in ketones and ethylenic hydrocarbons; this indicates presence of structures



On the other hand, the CN frequency is higher by 85-120 cm.$^{-1}$ than the usual 1650; this indicates some extent of triple bonding, that is occurrence of structures of the type of an inner salt with quadrivalent pos. N and univalent neg. O, of the type



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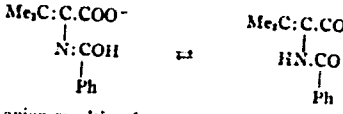
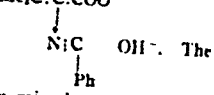
is in keeping with the case of splitting along C—O. As compared with C_6H_6, the frequencies 1598 and 1582 are much more intense in azlactones, becoming comparable to 997; this shift of intensities is evidently linked with the presence of conjugation. Occurrence of the C:N frequency 1737 in IV, along with C:C 1635 and C:O 1658, demonstrates amide-imide tautomerism



of the anion resulting from hydrolysis of III in alk. soln. The high value of the CN frequency is explained, as in azlactones, by its partly triple-bond character, owing to occurrence of the structure



The corresponding resonance energy gain detg. stabilization of the energetically less favored imide form.

N. T.

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N 3

65. Structure of Complex Compounds, Part I, by Ya. K. Syrkin and M. E. Dyatkina. ZHURNAL OBSHCHEI KHIMII 16, p. 342-378, 1946. Complex-forming atoms are distinguished by a small differences between the energy levles of the d, s, and p electrons, which make valencies of up to none possible. Structural formulae based on this assumption are advanced for ionic and non-ionic complexes of the type $[MR_x]$, where M is a metal, and R= CO, CN, NO, NO_2, or NH_3.

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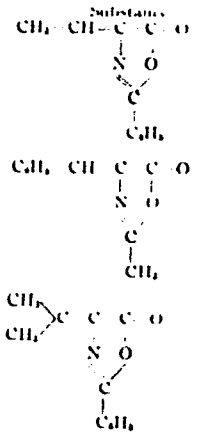
3RD AND 4TH ORDERS

3

Raman spectra of azlactones and amido-imido tautomerism. D. N. Shigorin and Ya. K. Syrkin (Karpov Inst. Phys. Chemistry, Moscow). *Acta Physicochim. U.R.S.S.* **21**, 423-9(1946)(in English); cf. *C.A.* **40**, 1831[9]. Raman spectra were obtained of (1) azlactone of α-*N*-benzoylaminocrotonic acid; (2) azlactone of α-*N*-acetylaminocinnamic acid; (3) azlactone of α-*N*-benzoylamino-β-methylcrotonic acid; and (4) the sodium salt of α-(*N*-benzoyl) amino-β-methylcrotonic acid. The following frequencies were assigned by analogy with previously analyzed compds.



Substance	C=C	C=O	C=N
1	1567	1660	1770
2	1556	1651	1766
3	1563	1647	1737

The occurrence of the C=N frequency is considered evidence of the occurrence of amido-imido tautomerism.

H. P. Knauss

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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1ST AND 2ND ORDERS

3RD AND 4TH ORDERS

PROCESSES AND PROPERTIES INDEX

Ca.

10

Resonance energies of polynuclear aromatic hydrocarbons. Va. K. Syrkin and M. Dyatkina (Karpov Inst. of Phys. Chem., Moscow). *Acta Physicochim. U.R.S.S.* 21, 641-77(1946)(in English); cf. C.A. 40, 6047[2]. The total and resonance energies of 70 hydrocarbons, expressed in terms of the resonance interval of 2 adjacent C atoms, β, were calcd. by the method of mol. orbitals (cf. Huckel, C.A. 26, 5826), assuming plane configurations. From exptl. values, β is evaluated at approx. 17.2 kg.-cal. Hydrocarbons of angular structure (phenes) are more stable and exhibit higher resonance energies than linear polynuclear hydrocarbons (acenes). Fries' rule expresses the fact that the resonance energy runs parallel to the no. of rings with Kekule structure. In the formation of biphenyl, terphenyl, or quaterphenyl, there is an increase of 0.38 β in the resonance energy for each Ph—Ph bond, irrespective of the mode of conjunction. The application of the resonance energies is discussed for the isomerization of methylated aromatic hydrocarbons, the mechanism of addn. to aromatic hydrocarbons, the stability of 3-membered and 5-membered rings, and the dissocn. of hydrocarbons into free radicals. A. Fleischer

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4"

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SYRKIN, YA.

USSR/Chemistry - Quinones
Chemistry - Resonance, Energies

Sep/Oct 46

"The Reduction Potentials of Quinones and Resonance Energy," M. Dytkina, Ya. Syrkin, Karpov Inst Phys Chem, Moscow, 22 pp

"Acta Physicochimica URSS" Vol XXI, No 5

Reduction potentials of quinones are correlated with changes in resonance energy on passing over from the quinone to corresponding hydroquinone. Parallelism found between changes in resonance energy and reduction potentials. Data on resonance energy allow value to be predicted for potentials of uninvestigated quinones. Received, 15 Oct 1945.

PA 54T36

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

25

B

Biradicals. (In Russian) M. E. Diatkin and Ia. K. Syrkin. *Uspekhi Khimii* (Progress in Chemistry), v. 16, no. 1, 1947, p. 29-68.

The possibility of the existence of biradicals, triradicals, etc. (that is, the presence of two or more trivalent carbon atoms in one molecule) was investigated by means of a thorough study, using both chemical and magnetic methods on a series of organic compounds. A new theory of biradical compounds is advanced. 61 ref.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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6

Valency states in the complexes which reversibly add oxygen. Ya. K. Syrkin. (Karpov Inst. Phys. Chem., Moscow). *J. Phys. Chem.* (U.S.S.R.) 21, 1087-8(1947) (in Russian).—The electron structure of the Co compds. described by Calvin, et al., C.A. 41, 656e, is discussed.

J. J. Bikerman

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4"

"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

SYRKIN, Ya K

USSR/Chemistry - Molecules
Chemistry - Platinum Compounds

Jan 1947

"Dipole Moments of Some Platinum Compounds," A. N. Shidlovskaya, Ya K Syrkin, 2 pp

"Dok Ak Nauk SSR" Vol LV, No 3

Institute of Fine Chemical Technology imeni M. V. Lomondsov, Moscow. Published 22 Nov 46. Experiments to clear up the degree of polarization of the combination of Pt-halogen were carried out with $(CH_3)_3$ PtCl, $(CH_3)_3$ Pt Br and $(CH_3)_3$ Pt J in solutions of benzene. Assistance of A. D. Gel'man and A. M. Rubinshteyn acknowledged.

PA 21T9

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1ST AND 2ND ORDERS

3RD AND 4TH ORDERS

PROCESSES AND PROPERTIES INDEX

Raman spectra of halogen derivatives of organic esters. R. E. Chernitskaya and Ya. K. Syrkin. *Compt. rend. acad. sci. U.R.S.S.* 55, 513-15(1947)(in French).—Raman spectra of several α-halogen derivs. of org. esters were measured and the frequency attributable to the C=O bond was detd. and compared to that of the corresponding non-halogen compd. In every case the frequency of the halogen deriv. was slightly greater, the α-chloro deriv. showing a greater increase than the α-bromo deriv. where both were measured. This confirmed the authors' suggestion that substitution of electronegative halogen in the α-position decreased the ionic character of the C=O bond, i.e., an increase in the ionic character of the bond decreases the frequency of its Raman line. Substitution of halogen in the β-position has little effect. The conjugated system in ethyl fumarate caused no significant change in the frequency of the C=O line. Complete Raman spectra are given for Et α-bromoacetate, Me α-bromopropionate, Et α-bromopropionate, Pr α-bromopropionate, Et α-bromobutyrate, Me α-bromoisobutyrate, Et α-bromoisobutyrate, Et α-chloropropionate, and Et fumarate.

Paul F. Cundy

COMMON ELEMENTS

OPEN

MATERIALS INDEX

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

PA 66T33

SYRKIN, YA. K.

USSR/Chemistry - Platinum Compounds Jan/Feb 1948
Chemistry - Valency

"The Theory of Cis- and Trans-Conversion in Complex Platinum Compounds," Ya. K. Syrkin, Phys Chem Inst imeni Karpov, 14 pp

"Iz Ak Nauk SSSR, Otdel Khim Nauk" No 1

Studies this question in the light of the theory of directional valences, and shows that the presence of the ds of hybridization permits clarification of cis- and trans-orientation during intraspheral replacement reactions.

66T33

[redacted]

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4"

"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

SYRKIN, YA. K.

Shidlovskaya, A. Na. and Syrkin, Ya. K. - "The dipole moment of the molecular compound of m-dinitrobenzene and naphthalene", Trudy Mosk. in-ta tonkoy khim. tekhnologii im. Lomonosova, Issue 2, 1948, p. 3-9, - Bibliog: 5 items.

SO: U-3042, 11 March 53, (Letopis 'Zhurnal 'nykh Statey, No. 8, 1949).

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1ST AND 2ND ORDERS

3RD AND 4TH ORDERS

PROCESSES AND PROPERTIES INDEX

C A

2

Dielectric polarization of binary systems. A. N. Shidlovskaya and Ya. K. Syrkin. *Zhur. Fiz. Khim.* (J. Phys. Chem.) 22, 913-19(1948).—To obtain information on the effect of a dipole liquid on the orientation polarization of foreign dipoles, the dielec. const. ϵ of mixts. of acetone with benzene and 9 polar liquids was detd. The ϵ of the solvents at 25 ± 0.05° was for benzene 2.271, dioxane 2.2271, Et ether 4.220 (dipole moment × 10^{18} in benzene 1.2), isoamyl acetate 4.780 (1.8), Et benzoate 5.986 (1.85), Et acetate 6.000 (1.81), diethyl malonate 7.871 (2.54), methyl salicylate 9.533 (2.40), isoamyl alc. 14.733 (1.8), and dimethylethylcarbinol 5.000 (1.7). Addn. of acetone increases ϵ within the concn. interval studied (the mole fraction f of acetone reached 0.11 to 0.41), except for isoamyl alc. in which ϵ passes through a max. (24.034) at f = 0.2704. The apparent orientation polarization P_a of acetone, calcd. from $fP_a = P_1 - (1 - f)P_2$, P_1 and P_2 being the orientation polarizations of the soln. and the solvent, resp., is smaller in dipole liquids than in benzene, except for dioxane and dimethylethylcarbinol in which its extrapolation gives the same value as in benzene. The dipole moments of pure liquids can be calcd. by the equations of Onsager (*C.A.* 30, 7002[8]) and Syrkin (*C.A.* 37, 2626[9]) except for isoamyl alc. Extension of Syrkin's equation to mixts. gives correct results for acetone + isoamyl acetate but not for other mixts. Also other equations connecting P_a with the ϵ of the solvent are valid for some classes of solvents only.

J. J. Bikerman

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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CA

1ST AND 2ND ORDERS

3RD AND 4TH ORDERS

Dipole moments of halogen-substituted esters of carbazylic acids. M. A. Luferova and Va. K. Syrkin. *Doklady Akad. Nauk S.S.S.R.* 59, 79-82(1948).—(1) From detns. of the dielec. const. in soln. in C_6H_6 at 25°, the following values were obtained for the total polarization at infinite diln., the electronic polarization (from the refraction), and the dipole moment (in debyes): CH_2ClCO_2Et 170.2, 27.2, 2.62; CCl_2CO_2Et 162.6, 36.9, 2.53; CH_2BrCO_2Me 131.4, 25.5, 2.26; CH_2BrCO_2Et 140.7, 30.1, 2.40; $MeCHBrCO_2Me$ 120.2, 30.1, 2.18; $MeCHClCO_2Et$ 155.3, 31.8, 2.44; $MeCHBrCO_2Pr$ 152.2, 39.3, 2.54; $EtCO_2CH_2CHBrCO_2Et$ 188.0, 50.2, 2.57; Me_2CBrCO_2Me 146.5, 34.7, 2.32; $PrCHBrCO_2Et$ 174.6, 43.9, 2.51; $CHCl(CO_2Et)_2$ 259.8, 42.7, 3.23; $CCl_2(CO_2Et)_2$ 282.8, 47.6, 3.37; CBr_3CH_2OH 98.9, 36.2, 1.73; Michler's ketone $(p\text{-}Me_2NC_6H_4)_2CO$ 644.0, 94.5, 5.14. (2) The exptl. values of the dipole moment μ of unsubstituted esters, lying between 1.7 and 1.85, agree best with the configuration C—C(=O)—O—C. The somewhat higher, $\mu = 1.9$, esters of HCO_2H may be due to inductive effect of the C:O group, with the structure $C^+—O^-$, on the CH group. As free rotation around the C—O bond would lead to $\mu = 2.25$, the rotation is obviously strongly hindered. (3) Of the 4 possible configurations for α-monohalogen-substituted esters, Cl—C(=O)—C(=O)—O, with $\mu = 2.2$, comes closest to the exptl. values. In this configuration, the neg. ends of the CCl and C:O groups are farthest away from each other. Free rotation is strongly hindered. (4) Of the 2 possible configurations for CCl_2CO_2Et, namely $Cl_2C—C(=O)—O—C$ and $Cl_2C—C(=O)—O—C$, the former would give $\mu = 1.25$, the latter $\mu = 2.7$, much closer to the exptl. value. In this configuration, the H atom of the CH_2 group lies closer to the Cl than in the former structure. (5) For CBr_3CH_2OH, the configurations $Br_3C—C(=O)—H$ and $Br_3C—C(=O)—H$ would give, resp., $\mu = 0.56$ and 2.48. The exptl. μ, lying between those limits, indicates absence of an interaction between the H atoms of the OH group and Br, that would stabilize the latter structure. (6) For Michler's ketone, the exptl. $\mu = 5.14$ is higher than the 4.2 calcd. by the vector sum. The increased μ is due to superposition of resonance structures of the type $O^-—C—C_6H_4NMe_2$ (with N^+Me_2). If, as a result of mutual repulsion of

2

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the rings, the angle between them is more than 120°, then the vector sum is less than 4.2 and the increment due to resonance more than 0.94. N. Thon

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~~YSRKIN, YA. K.~~
SYRKIN, Ya. K.

PA47T14

USSR/Chemistry - Dioxane, Compounds of Mar 1948
Chemistry - Polarity

"Polarity of Molecular Compounds of Dioxane and Pyridine," Ya. K. Syrkin, K. M. Anisimova, Inst Fine Chem Tech imeni M. V. Lomonosov, 3 pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LIX. No 8

Describes measurement of dipole moments of dioxane molecular compounds in dioxane solutions and tabulates results. Gives rate of polarization depending on concentration of the solution.

47T14

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SYRKIN, YA. K.

PA 27/49T27

USSR/Chemistry - Furan, Derivatives Jan/Feb 49
Chemistry - Electric Moments of Furan Derivatives

"Dipole Moments of Compounds of the Furan Group," L. M. Nazarova, Ya. K. Syrkin, Physicochem Inst imeni Karpov, 9 pp

"Iz Ak Nauk SSSR, Otdel Khim Nauk" No 1

Measured dipole moments of 16 furan derivatives and two thiofuran derivatives. On basis of data obtained, reached certain conclusions on their expanded configurations and structure. Submitted 24 May 48.

[redacted]

27/49T27

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PA 65/49T35

USSR/Chemistry - Furan, 2, 3-Dibromo- 2-Furoic Acid, 3-Bromo- Apr 49

"The Synthesis of 2, 3-Dibromofuran and the Structure of 3-Bromo- and 3, 5-Dibromopyromucic Acids, L. M. Nazarova, Ya. K. Syrkin, 3½ pp

"Zhur Obshch Khim" Vol XIX, No 4

Determined the constants of 2, 3-dibromofuran: b p - 166.27° (corr) at 741 mm; d_{25}^{25}-1.99967; n_d^{25}-1.5458; dipole moment - 1.53D. On the basis of the dipole moment and the genetic bond of this [redacted]

65/49T35

USSR/Chemistry - Furan, 2, 3-Dibromo- (Contd) Apr 49

compound, determined that the structure of the subject acids does not conform to Hill's description; and that the acids are actually 4-bromo- and 4, 5-dibromopyromucic, and not 3-bromo- and 3, 5-dibromopyromucic. Submitted 14 Jan 48.

[redacted]

65/49T35

SYRKIN, Ya.K.

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4"

"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

SYRKIN, YA. K.

USSR/Chemistry - Sulfinic Acids Feb 49
Chemistry - Structural Analysis

"Dipole Moments and the Vibration Spectra of Sulfinic Acids," Ye. N. Gur'yanova, Ya. K. Syrkin, Physicochem Inst imeni L. Ya. Karpov, Moscow, 10 pp

"Zhur Fiz Khim" Vol XXIII, No 2

Used dioxane and benzene with sulfinic acids in obtaining subject data. Material was used to formulate deductions on structure of the acids. Submitted 28 May 48.

PA 47/49T22

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"APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001654310007-4

PROCESSES AND PROPERTIES INDEX

C A

2

Diamagnetic susceptibilities of complex compounds of platinum. Ya. K. Syrkin and V. I. Belova. *Zhur. Fiz. Khim.* 23, 604 75(1949).—The diamagnetic susceptibility χ of powd. Pt compds. was detd. with an av. error of 2%. The main source of error was the poor reproducibility of packing which sometimes raised the error to 5%. Taking χ of H_2O to be -0.72×10^{-6}, the following $k = -\chi \times 10^6$ were found: $PtCl_2$ 84, $(NH_4)_2[PtCl_4]$ 141.7, $Na_2[PtCl_4]$ 127.2, $K_2[PtCl_4]$ 145.2, $K_2[PtCl_2(NO_2)_2]$ 134.1, *cis*-$K_2[PtCl_2(NO_2)_2]$ 118.7, $K_2[PtCl(NO_2)_3]$ 99.7, $K_2[Pt(NO_2)_4]$ 88.3, $K[PtCl_3(NH_3)]$ 119.5, *cis*- and *trans*-$[Pt(NH_3)_2Cl_2]$ 99.1 and 99.4, *cis*- and *trans*-$[Pt(NO_2)Cl(NH_3)_2]$ 86.7 and 87.0, *cis*- and *trans*-$[Pt(NO_2)_2(NH_3)_2]$ 73.8 and 71.7, *cis*- and *trans*-$[PtBr_2(NH_3)_2]$ 115.6 and 121.8, *cis*- and *trans*-$[Pt_2(NH_3)_2]$ 148.3 and 139.9, $[Pt(NO_2)(NH_3)_3]Cl$ 99.0, $[Pt(NH_3)_3Cl]Cl$ 116.4, $[Pt(NH_3)_4]X_2$, where X = Cl, Br, NO_3, I, and NO_2, 126.0, 149.0, 123.4, 186.2, and 102, resp., $[Pt(NH_3)_4][PtCl_4]$ 187.3, $[Pt(NH_3)_4][PtCl_3(NH_3)]_2$ 300.8, $[Pt(NH_3)_4Cl][PtCl_3(NH_3)]$ 193.3, $[PtCl(NH_3)_3]_2[PtCl_4]$ 300.8, $[Pt[SC(NH_2)_2]_4]Cl_2$ 246.5, *trans*-$[Pt[SC(NH_2)_2]_2(NH_3)_2]Cl_2$ 191.9, Pt en Cl_2 113.2, $(NH_4)_2[PtCl_6]$ 173.6, $Na_2[PtCl_6]$ 161.2, $K_2[PtCl_6]$ 177.5, $K[Pt(NH_3)Cl_5]$ 150.5, *cis*- and *trans*-$[Pt(NH_3)_2Cl_4]$ 134.3 and 134.3, $[PtCl_3(NH_3)_3]Cl$ 152.5, $[PtCl_2(NH_3)_4]Cl_2$ 166.1, $[PtCl(NH_3)_5]Cl_3$ 188.3, $[PtCl(NH_3)_4](NO_3)_2$ 175.1, $[Pt(NH_3)_6]Cl_4$ 209.1, $Pt(OH)_2(NH_3)_2Cl_2$ 104.6, $PtCl_2en$ 148.5, $PtCl_4$ 93, $PtCl_2en$ 136.4, $Pt(OH)(NH_3)_3Cl_3$ 62.5, $PtCl_2$ 66.7, Pt_2O_3 37.7, $[Pt(NH_3)_4]Cl_2$, H_2O 147, $[Pt(NH_3)_4]Br_2.1.5H_2O$ 171, $K[PtNH_3Cl_5].H_2O$ 136, $K[PtNH_2Cl_3].H_2O$ 168.8, $[Pt(NH_3)_5Cl_2]Cl.H_2O$ 169.8, $[Pt(NH_3)_6]Cl_4.H_2O$ 213.5, and $Na_2[PtCl_6].6H_2O$ 238.9. The simple ions (K, Cl, etc.) have the same χ as in simple salts (e.g., KCl). The k of NO_3 is 10.3 to 11.4. The k of bonds is: Pt-Cl 28.7, Pt-NH_3 20.4, etc., for Pt^{++}, and Pt-Cl 24.6, Pt-NH_3 18.6, etc., for Pt^{++++}. The difference between χ of cis and trans isomers is hardly greater than the exptl. error. The χ of H_2O in the hydrates is that of ice. Trivalent Pt would be paramagnetic; as $PtCl_6$ and the other compds. of this group have χ very similar to χ of Pt^{++} and Pt^{++++} compds., Pt in this group is not trivalent. Presumably these compds. contain 1 atom of bivalent and 1 atom of quadrivalent Pt. Angus' calcn. (*C.A.* 26, 4218) of χ of ions yields too great χ values for ions contg. *d* and *f* electrons. If the screening const. is 1 for the electrons having smaller quantum no. and 0.85 for the other subgroups, the k of Pt^{++} and Pt^{++++} becomes 40.8 and 30.1, resp.; calcd. values of k are given also for 12 other atoms and ions. These k would result in too high k of complex compds. showing the importance of covalent bonds within complex ions. Also χ of $PtCl_4$ and $PtCl_6$ are too small for these compds. to have ionic bonds.

J. J. Bikerman

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C.A.

2

Additivity of diamagnetic susceptibilities of platinum complexes. Ya. K. Syrkin and V. I. Belova. *Izvest. Sektora Platiny i Drugikh Blagorod. Metal., Inst. Obshchei i Neorg. Khim., Akad. Nauk S.S.S.R.* No. 24, 72-8(1949); cf. C.A. 43, 7277g.—In addn. to data given previously, $x \times 10^6$ for K_2PtBr_4 was detd. to be −184.5 and for $(NH_3)_4NH_2ClPtCl_4$ −160.5. M. Hosch

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CA

Diamagnetic susceptibilities of complex compounds of quadrivalent platinum. Ya. K. Syrkin and V. I. Belova. *Doklady Akad. Nauk S.S.S.R.* 69, 873-6(1949); cf. *C.A.* 43, 7277g.—Experimentally detd. values of the sp. and mol. diamagnetic susceptibilities 10^6 χ are: $K_2[PtBr_6]$ 0.305, 229.6; $(NH_4)_2[PtBr_6]$ 0.316, 224.6; $Na_2[PtBr_6]$ 0.295, 212.6; *trans*-$K_2[PtBr_4Cl_2]$ 0.307, 203.6; *cis*-$K_2[PtBr_4Cl_2]$ 0.313, 207.8; $K_2[PtBr_4Cl_2]$ (by simultaneous crystn. of $K_2[PtBr_6]$ and $K_2[PtCl_6]$) 0.313, 207.8; *trans*-$K_2[PtBr_4Cl_2]$ 0.334, 192.1; *cis*-$K_2[PtBr_4Cl_2]$ 0.319, 189.5; *trans*-$[Pt(NH_3)_4Br_2]$ 0.313, 171.8; *cis*-$[Pt(NH_3)_4Br_2]$ 0.311, 170.7; $[Pt(NH_3)_4Br_2](NO_3)_2$ 0.318, 174.0; $[Pt(NH_3)_4Br_2]Br_2$ 0.342, 199.4; $[Pt(NH_3)_4(NH_2)Br]Br_2$ 0.365, 189.5; $[Pt(NH_3)_3Br]Br_2$ 0.374, 234.4; $[Pt(NH_3)_3Cl]Br_2$ 0.386, 214.5; $[Pt(NH_3)_3Cl]Cl_2.H_2O$, 0.346, 196.3; $Na_2[PtBr_6].6H_2O$, 0.352, 291.7. The difference between *cis*- and *trans*-$K_2[PtBr_4Cl_2]$ is greater than the possible exptl. error; on the basis of soly. detns., only the *trans* form is an individual compd. If it is assumed that the bond diamagnetic susceptibilities Pt-NH_3 = 18.6 ± 0.6, Pt-Cl = 24.6, Pt-NH_2 = 11.5, the ionic susceptibilities K^+ 14.9, Na^+ 6.8, NH_4^+ 13.3, NO_3^- 18.9, Cl^- 23.4 ± 1.3, Br^- 34.6 ± 1.6, and for H_2O, 12.6, the bond susceptibility of Pt-Br is found to be 33. Additivity of the susceptibilities holds generally within a few %, with greater deviations found only in cases where the observed values for the cis and the trans form are distinctly different. The fact that the bond susceptibility for Pt-Br is smaller than the ionic susceptibility of Br^- indicates that in complex compds. of Pt the bonds are largely covalent. N. Thon

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Vibrational spectra of organic azides. Yu. N. Sheinker and Ya. K. Syrkin (Moscow Inst. Fine Chem. Technol.). *Izvest. Akad. Nauk. S.S.S.R., Ser. Fiz.* 14, 478-87(1950). Raman lines of N_3N_3, $CH_2{:}CHCH_2N_3$, N_3CH_2COOEt, N_3COOCH_3, $PhCON_3$, $C_6H_5N_3$, and $HOC_6H_4N_3$ are tabulated and the relative intensities of the 2 characteristic frequencies of the N_3 group, $\nu(s)N_3$ (1177-1343 cm.$^{-1}$) and $\nu(as)N_3$ (2080-2169 cm.$^{-1}$), are indicated. Absorption spectra in the region 2.5-10 μ of $C_6H_5N_3$, N_3COOCH_3, $HOC_6H_4N_3$, PhN_3, N_3CH_2COOH, α-$C_{10}H_7N_3$, N_3CH_2COOEt, β-$BrC_6H_4N_3$, p-, o-, and m-$NO_2C_6H_4N_3$, and 2,4-$(NO_2)_2C_6H_3N_3$ are also represented. From the frequencies the force const. of the N—N bond is calcd. to be 11.7 × 10^5 dynes/cm., almost equal to the force const. of the N=N bond. In org. azides the $\nu(s)$ frequency moves to smaller and the $\nu(as)$ frequency to larger values; this is attributed to a configuration change of the group $D_{\infty h}$ and substantiated by calcns. From the measurements deductions are made on the configuration of azide compds. and the relative values of the N—N and N=N bonds. In N_3COOMe 2 spatial configurations in equil. and in N_3COOEt a H-bond are presumed to exist. Ultraviolet spectra confirm the observations made on Raman and infrared spectra. S. Pakswer

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SVRKIN, VAIK.

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USSR/Chemistry - Platinum Compounds
Complex Compounds

Jan 50

155T12

"Chemical Bonds in Complex Compounds," Ya. K. Syrkin, Corr Mem, Acad Sci USSR, Inst of Gen and Inorg Chem imeni N. S. Kurnakov, Acad Sci USSR, 4 pp

"Dok Ak Nauk SSSR" Vol LXX, No 1

Theoretical discussion of complex platinum compounds and experimental data on refraction and diamagnetic susceptibility of complex compounds indicates presence of delocalized bonds and decentralized charges. In all typical cases of complex platinum compounds discussed, system of delocalized bonds is formed by

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155T12

USSR/Chemistry - Platinum Compounds
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2K electrons in field of k+1 centers." Submitted 12 Oct 49.

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155T12

SYRKIN, Ya. K.

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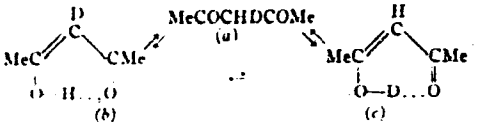
Raman spectra of deuterioacetylacetone and of deuterioacetoacetic acid ester. D. N. Shigorin and Ya. K. Syrkin. *Doklady Akad. Nauk S.S.S.R.* **70**, 1033-6 (1950).—MeCOCHDCOMe (I) and MeCOCHDCO$_2$Et (II) were synthesized by decompn. of the corresponding Cu salts with D_2SO_4. The Raman spectra, taken 24 hrs. after the synthesis, i.e. after the keto-enol equil. has been established, are (cm.$^{-1}$) (I) 2900(2), 2922(20), 2400(1/2), 2300(3), 2223(1), 2172(2), 1720(3), 1652(2), 1600(1b), 1532(10), 1437(3), 1374(5), 1300(1 1/2b), 1246(5), 1170-(1 1/2b), 1082(6), 1037(3), 987(1 1/2), 925(3), 877(4), 836(2), 780(1), 630(10), 554(5), 505(4), 401(1 1/2), 224(4b); (II) 2980(4), 2930(20b), 2238(1), 2177(3), 1737(5), 1712(4), 1629(2), 1589(10), 1452(7), 1340(1 1/2), 1163(3), 1110(6b), 1035(3b), 934(1 1/2b), 898(4b), 865(4b), 798(2b), 757(2b), 732(4b), 627(4b), 594(4), 540(3), 525(2). The Raman spectrum permits an estn. of the forms



in equil. in I. The frequency of C=C is lowered when the C is bound with D. The frequency 1532 cm.$^{-1}$ evidently belongs to C=C in HOC=CD, and 1600 to C=C in DOC=CH. The ratio of the intensities indicates that the enol form with O—H is present in a much greater amt. than the enol with O—D. Similarly, in II, 1589 belongs to OHC=CD, and 1629 to DOC=CH, and the enol with O—H is more abundant than the enol with O—D. The ratio of enols ROH/ROD in I is about twice as great as in II, i.e., the equil. is more strongly shifted in favor of the mol. with light H in the case of stronger acid (enol I). In 1:10 soln. in CCl_4 and C_6H_{14}, the ratio ROH/ROD for I is about 3.5, as against 10 in the pure liquid; for II, that ratio is 5 in the pure liquid, 3.5 in soln. in CCl_4. In light MeCOCH$_2$COMe, the frequency 3075 is assigned to the valence vibration C—H in C=C—H; 1300 and 1246 are deformation vibrations of the CH$_2$ group of the keto form. In I, 3075 is absent, and there appears a frequency 2300, characteristic of the valence vibration C—D in C=C—D; the weakness of 1300 and of 1246 in I indicates absence of CH$_2$ which is replaced by CHD. In this group, the valence vibrations C—D have the frequencies 2223 and 2172; the frequency 1086 is assigned to deformation vibrations C—D. The very weak 2400 is apparently characteristic of O—D. The intensities of the frequencies belonging to O—H are practically the same in I and in light MeCOCH$_2$COMe. The same changes in the frequencies C—H and C—D are found also in II.

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CA SYRKIN, YA. K.

2

Resolutions of the colloquium on the theory on chemical structure in organic chemistry held in Moscow (June, 1951). *Zhur. Fiz. Khim.* 25, 988-91(1951).—Ya. K. Syrkin, M. E. Dyatkina, M. V. Vol'kenshtein, A. I. Kiprianov, and others are criticized for their idealistic and mechanistic concepts of resonance. The Conference calls upon the chemists and scientists working in related fields of physics, to develop creatively the theory of chem. structure of A. M. Butlerov along the principles of dialectric materialism under the guidance of the work of I. V. Stalin. M. B.

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1. SYRKIN, YA. K., DYATKINA, M. YE.

2. USSR (600)

4. Mesomerism

7. On the "resonance theory of mesomerism." Izv AN SSSR Otd khim nauk. No 6 1952. p. 973-9

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

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SYRKIN, YA. K.

Aug 52

USSR/Chemistry - Isotpes

"Investigation of the Interconversion of Diethyl Disulfide and Diethyl Trisulfide With the Aid of a Radioactive Isotope of Sulfur," Ye. N. Gur'yanov, Corr Mem Acad Sci USSR; Ya, K. Syrkin; and L. S. Kuzina

"DAN SSSR" Vol 85, No 5, pp 1021-1024

Org polysulfides of the type $R-S_n-R$ easily take on another atom of S giving compds of a higher order. It is not known at what position the S becomes attached in the mol. With the aid of radioactive S^{35}, this question has been settled. The S atom goes in between the two S atoms in the S-S group and not between R-S.

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PA 234T19

USSR/Chemistry - Isotopes 1 Sep 52

"The Reaction of the Exchange of Sulfur Atoms in Polysulfides," Ye. N. Gur'yanova, Ya. K. Syrkin, Corr Mem, Acad Sci USSR, L. S. Kuzina

"Dok Ak Nauk SSSR" Vol 86, No 1, pp 107-110

The equivalence of sulfur atoms in diethyltetrasulfide and the inorg polysulfides Na_2S_2, Na_2S_3, and Na_2S_4 was studied using radioactive S^{35}. Diethyltrisulfide was treated with radioactive elemental sulfur to obtain tagged diethyltetrasulfide This was then decomposed 1st to diethyltrisulfide

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and then to diethyldisulfide. The diethyltrisulfide was radioactive but not the diethyldisulfide. In the inorg polysulfides, all of the sulfur atoms were about equal in radioactivity.

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SYRKIN, YA. K.

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SHIDLOVSKAYA, A.N.; GOSTEV, M.I.; SYRKIN, Ya.K.

Dipole moments of pentachlorophenol derivatives. Doklady Akad. Nauk S.S.S.R. 87, 101-3 '52. (MLRA 5:11)
(CA 47 no.13:6203 '53)

1. Institut tonkoy khimicheskoy tekhnologii imeni M.V. Lomonosova, Moscow.

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