On the Affinity of Hydrogen and Limit Hydrocarbons to a Proton 20-119-6-34/56

inequalities for the numerical values of the proton affinity of methane, ethane, and propane are written down. The great difference found in the proton affinity of methane and its homologs must be explained theoretically yet. There are 3 figures and 13 references, 6 of which are Soviet.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics AS USSR)

PRESENTED: October 24, 1957, by V. N. Kondrat'yev, Member, Academy of Sciences, USSR

SUBMITTED: October 21, 1957

Card 3/3

TALROSE, V. L.

"Free Radicals and Ions and Their Interactions in the Gas and Solid Phases."

paper to be submitted Fourth Intl. Symposium on Free Radical Stabilization, Washington, D. C., 31 Aug - 2 Sep. 1959.

SOV/62-59-2-39/40

5(4)

AUTHOR: Tal'roze, V. L.

TITLE: Chemical Nature of the Traps Produced by Radiation Effect and Their Role in Radiation-chemical Reactions (Khimicheskaya priroda lovushek, obrazuyushchikhsya pri radiatsionnom vozdeystvii i ikh rol' v radiatsionno-khimicheskikh reaktsiyakh)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk, 1959, Nr 2, p 369 (USSR)

ABSTRACT: In this letter to the editor the author writes: During the irradiation of organic substances traps of different types are formed. On the irradiation of saturated hydrocarbons unsaturated compounds are thus formed the ionization potentials of which are lower than those of the corresponding saturated compounds and which, accordingly, must play the role of p-traps in the system irradiated. Free radicals (free valences) must play the most important part as p- and n-traps, the ionization potentia of which are below those of saturated hydrocarbons and which have, at the same time, positive electron affinity. As far as the author knows, the significance of these facts had not been taken into account so far in radiation chemistry. But these

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SOV/62-59-2-39/40

Chemical Nature of the Traps Produced by Radiation Effect and Their Role in Radiation-chemical Reactions

facts are so important because the main elementary process of the formation of free radicals under the influence of ionizing radiations is the recombination of the pair "plus-minus". On accumulation of traps in the condensed system this elementary process will take place more frequently if there is some free valence in addition to which most likely one or two of the newly formed radicals will affiliate. For hydrocarbon systems this probability is practically equal to one as the pair of radicals being formed consists of the radical which remains on the place of formation and of the H-atom "flying off". The elementary process under review can be illustrated schematically as follows $R^- + \text{hole} + RH = R - R + H$ or $R^+ + \text{electron} + RH = R - R + H$. It will be easily understood that such elementary processes can be determining, e.g. in the mechanism of the radiation built-up of polymers, in the mechanism which determines the maximum concentration of free "frozen" radicals on their formation etc.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences, USSR)

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SOV/63-4-2-4/39

5(0), 24(7)

AUTHORS: Lavrovskaya, G.K., Candidate of Chemical Sciences, Skurat, V.Ye., Tal'roze, V.L., Frankevich, Ye.L., Candidates of Physico-Mathematical Sciences

TITLE: Application of Mass-Spectroscopy for Chemical Analysis

PERIODICAL: Khimicheskaya nauka i promyshlennost', 1959, Vol 4, Nr 2, pp 154-163 (USSR)

ABSTRACT: Mass-spectroscopy employs two methods: a static and a dynamic method. The first uses electric and magnetic fields for the separation of ions, the second alternating fields. Molecular mass-spectral analysis is applied to substances which are easily evaporated, e.g. alcohols, aldehydes, organic acids. Multi-atomic molecules show a great number of spectral bands. To avoid this difficulty, ionization by low-energy electrons is recommended [Ref 5-8]. Group analysis is made use of in the analysis of petroleum fractions containing aromatic and sulfur compounds. In these cases the bands are placed one above the other so that differentiation is difficult [Ref 11]. These complex mixtures can be analyzed by combining mass-spectroscopy with chromatography [Ref 15, 16] and in infrared and ultraviolet spectroscopy

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Application of Mass-Spectroscopy for Chemical Analysis SOV/63-4-2-4/39

[Ref 17-18]. The composition of analyzed mixtures is determined by absolute or relative methods. The absolute graduation coefficients vary in every spectrometer, the relative coefficients are more stable. A measure for the content of a substance is the "complete ionization" which is the sum of all band intensities of the spectrum of the mixture. Recently electronic computers have come to be used for calculating the composition of mixtures [Ref 24]. Mass-spectroscopy has also been used for the analysis of esterified fatty acids, condensates from industrial fumes from the atmosphere of big cities, etc [Ref 29, 30], for the determination of gases in metals [Ref 31-33], etc. The distribution of the band intensities usually corresponds to the structure of the molecules. The theoretical calculation of the band intensities is possible only for the simplest case, i.e. the molecule H_2. A theory of the mass-spectrum must still be developed. The kinetics of chemical reactions is determined by taking samples at the beginning and the end of the process or by the continuous method in which the reacting mixture is directly passed into the ion source of the mass-spectrometer. The last method can be used for the determination of intermediate products, like free radicals. The use of low-energy electrons avoids the dissociative ionization of molecules. It has been proposed to use photoionization, because the monochromatization of light is simpler

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Application of Mass-Spectroscopy for Chemical Analysis

than that of slow electrons [Ref 9]. Free radicals are passed into the area of ionization in the form of a molecular bunch in order to avoid reactions with metal surfaces, etc. The mass-spectroscopy of free radicals is applied on a broad scale. It is also employed for the determination of ions in the flames of hydrocarbons and hydrogen [Ref 91, 92]. A system for the determination of the composition of free radicals has been developed by the authors [Ref 73, Figure 3]. Recently the cross-sections of ion-molecular reactions have been determined [Ref 98, 99]. Levina determined the isotopes of Fe, Zn, Mg, Ni, Cr, Pb and Sb by means of mass-spectroscopy [Ref 106]. Solid bodies are evaporated in a vacuum spark. In substances with low ionization potentials surface ionization may be used. Admixtures of 10^{-3} to 10^{-5}% may be determined by these methods. This is important for the production of semiconductors, pure metals, etc. Mass-spectroscopy is used in the USSR for the control of the evacuation conditions of electrovacuum apparatus [Ref 116]. Tantsyrev controlled the purity of inert gases by this method. Improvements of the method consist in the application of new cathodes, e.g. a thorium-iridium cathode [Ref 119], and the utilization of an electrometric amplifier, a secondary electronic amplifier measuring currents of less than 10^{-15} a. In the USSR the mass-spectrometers MI 1301, MI 1305, MKh 1303 have a resolving power of 400 - 600, the apparatus MV 2301, a power of 5,000.

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SOV/63-4-2-4/39

Application of Mass Spectroscopy for Chemical Analysis

There are 3 diagrams, 2 tables and 126 references, 36 of which are Soviet, 55 English, 11 American, 8 Canadian, 5 German, 5 Belgian, 3 French, 2 Swedish and 1 Polish.

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SOV/62-59-7-37/38

5(4)

AUTHORS: Tal'roze, V. L., Frankevich, Ye. L.

TITLE: Measurements of Reaction Constants of Ion-Molecule Reactions by Means of the Pulse Method (Izmereniya konstant skorostey ionno-molekulyarnykh reaktsiy impul'snym metodom)

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 7, p 1351 (USSR)

ABSTRACT: It followed from observations made in the ion-molecular processes in the ion source of the mass spectrograph (Refs 1-3) that the processes, if not endothermally, mostly proceed without activatin energy, and that their cross section often exceeds that of gas kinetics. In connection therewith, a measuring method was worked out by the authors, by the aid of which it is possible to observe directly the kinetics of ion-molecular processes in the ionization chamber of the mass spectrograph. Ionization is excited here by periodic electron pulses of the duration of 10^{-6} sec. Th thermal energy of the ions produced first is determined from the temperature of the chamber walls. The secondary ions are produced in the time t after ionization. The rate constant is then expressed by the ratio of the secondary and primary flux in its

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Measurements of Reaction Constants of Ion-Molecule Reactions by Means of the Pulse Method

SOV/62-59-7-37/38

dependence of t. In this way, the constants of the following reactions were determined:
$CH_4+CH_4^+ = CH_5^+ + CH_3$(11.6.$10^{-10}$ cm^3/mol.sec at T= 370°K) and
$H_2O + H_2O^+ = H_3O + OH$(8.5.$10^{-10}$ cm^3/mol.sec at T=410°K). There are 3 references, 1 of which is Soviet.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences, USSR)

SUBMITTED: March 17, 1959

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SOV/76-33-4-32/32

5(4)

AUTHORS: Tal'roze, V. L., Frankevich, Ye. L.

TITLE: On Ionic Molecular Reactions in the Gaseous Phase and the Ion Impact Method (O ionno-molekulyarnykh reaktsiyakh v gazovoy faze i metode ionnogo udara). On the Reply of F. W. Lampe and F. H. Field (Ref 1) (Po povodu otveta F. V. Lampa i F. G. Filda (1))

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 4, pp 955-957 (USSR)

ABSTRACT: The authors of the article under review found that in the case of ionic molecular reactions in the gaseous phase a transition of the proton as well as of the hydrogen atom takes place with larger cross section in a collision with a molecule, and no activation energy is required if the reaction is exotherm or thermoneutral. Similar results were obtained by the American scientists (Refs 7, 8). It is pointed out that the criterion established by the authors in an earlier work (Ref 9):"in the case that no transition reaction of the H-atom or proton is observed, there is an endotherm reaction" is of an empirical nature and was confirmed with 50 reactions. The fact is referre to that Lampe and Field (Ref 10) could not observe the ions

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SOV/76-33-4-32/32

On Ionic Molecular Reactions in the Gaseous Phase and the Ion Impact Method. On the Reply of F. W. Lampe and F. H. Field (Ref 1)

CD_4H^+ in the ionization of the mixture $CD_4 - H_2$ probably because of an insufficient differential evacuation of the mass spectrometer, because the experimental results (Table) of the authors point to the formation of CD_4H^+ ions. After mentioning some examples the authors state that in the transition of hydrogen in an ionic molecular reaction in the gaseous phase the occurrence of a "solubility barrier" is a general phenomenon, independent of whether the transition takes place in form of protons, atoms or hydride ions. There are 1 table and 15 references, 8 of which are Soviet.

ASSOCIATION: Akademiya nauk SSSR, Institut khimicheskoy fiziki, Moskva (Academy of Sciences, USSR, Institute of Chemical Physics, Moscow)

SUBMITTED: January 16, 1959

Card 2/2

USCOMM-DC-61061

5 (4)

SOV/76-33-5-21/33

AUTHORS: Frankevich, Ye. L., Tal'roze, V. L. (Moscow)

TITLE: The Proton Affinity of the Molecules of CH_3OH and C_2H_5OH (Srodstvo k protonu molekul CH_3OH i C_2H_5OH)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 5, pp 1093-1099 (USSR)

ABSTRACT: The affinity mentioned in the title was determined by means of the ionic impact method. At first the formation of $CH_3OH_2^+$ ions in the ionization of methyl alcohol vapors or mixtures of alcohol with acetylene, ammonia, or water was investigated. The results of measuring methyl alcohol are shown in figures 1-5. The relative yield of $CH_3OH_2^+$ ions increases proportionally to the stream of ions $I_{CH_3OH^+}$. Hence the reaction $CH_3OH^+ + CH_3OH \longrightarrow CH_3OH_2^+ + CH_3O$ is derived. Then the process of the ionization of the mixtures

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The Proton Affinity of the Molecules of CH_3OH and C_2H_5OH SOV/76-33-5-21/33

and of ethyl alcohol is analyzed in the same way (Figs 6-9). Table 1 shows the ionization potentials and the dissociation energies of the R-H bond. The limits obtained are: $177 \text{ kcal/mol} \leqslant P_{CH_3OH} < 182 \text{ kcal/mol}$ and $185 \text{ kcal/mol} \leqslant P_{C_2H_5OH} < 202 \text{ kcal/mol}$. By comparison of these values with $P_{H_2O} = 169 \pm 2$ kcal/mol determined earlier (Table 2) it appears that they are about 20 kcal/mol higher than the values obtained so far by an indirect way. The author thanks Academician V. N. Kondrat'yev for valuable advice given. There are 9 figures, 2 tables, and 9 references, 5 of which are Soviet.

ASSOCIATION: Akademiya nauk SSSR institut khimicheskoy fiziki Moskva (Academy of Sciences of the USSR, Institute of Chemical Physics, Moscow)

SUBMITTED: October 24, 1957

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67269

5.4500(B)

SOV/20-129-4-40/68

~~5(4), 21(8)~~

AUTHORS: Tal'roze, V. L., Frankevich, Ye. L.

TITLE: A Comparative Investigation of the Induced Electrical Conductivity and the Free Radicals in Solid Paraffins Subjected to Radiolysis

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 4, pp 858-861 (USSR)

4

ABSTRACT: After a survey of the different courses taken by processes caused in the gaseous or in the condensed phase by radiolysis, the authors speak about the attempt at covering the processes in the radiolysis in the condensed phase by means of an experiment. They used solid paraffin with the melting point at 52-55°. Irradiation was carried out by means of fast electrons in a nitrogen atmosphere at the boiling temperature of liquid nitrogen by means of the 1.6 Mev cascade generator of the Institute mentioned under Association. At the same time, the electrical conductivity of paraffin in the case of a potential difference of 1000 v was measured by means of an EMU-2-type electromagnetic amplifier and a potentiometer of the type EPP-09, and also the electron paramagnetic resonance spectrum was mea-

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67269

5.4500(B)

SOV/20-129-4-40/68

~~5(4), 21(8)~~

AUTHORS: Tal'roze, V. L., Frankevich, Ye. L.

TITLE: A Comparative Investigation of the Induced Electrical Conductivity and the Free Radicals in Solid Paraffins Subjected to Radiolysis

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 4, pp 858-861 (USSR)

4

ABSTRACT: After a survey of the different courses taken by processes caused in the gaseous or in the condensed phase by radiolysis, the authors speak about the attempt at covering the processes in the radiolysis in the condensed phase by means of an experiment. They used solid paraffin with the melting point at 52-55°. Irradiation was carried out by means of fast electrons in a nitrogen atmosphere at the boiling temperature of liquid nitrogen by means of the 1.6 Mev cascade generator of the Institute mentioned under Association. At the same time, the electrical conductivity of paraffin in the case of a potential difference of 1000 v was measured by means of an EMU-2-type electromagnetic amplifier and a potentiometer of the type EPP-09, and also the electron paramagnetic resonance spectrum was mea-

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SOV/20-129-4-40/68

A Comparative Investigation of the Induced Electrical Conductivity and the Free Radicals in Solid Paraffins Subjected to Radiolysis

sured. After switching off of the electron beam, conductivity began to decrease in the temperature range of between 77 and 250°K within an interval of time that was shorter than the electrometer circuit constant (0.5 sec). At higher temperatures the switching off of the electron beam was also followed by a rapid decrease of conductivity, which decrease was reduced with rising temperature and was followed by a slow decrease (Fig 1). If the paraffin was irradiated at 77°K and was subsequently heated (temperature increase 22 degrees/min), electrical conductivity was observed to increase; this increase occurred some dozens of degrees sooner and was greater than the conductivity observed in the heating of non-irradiated paraffin. With further heating, conductivity approached that of non-irradiated paraffin (Fig 3). This phenomenon of electrical conductivity "conflagration" is not repeated if the paraffin is again cooled and again heated. It occurs in that temperature interval and at that instant of time at which the intensity of the electron paramagnetic resonance spectrum begins to fall. Such a spectrum is shown in figure 2; it corresponds to the alkyl radical of the

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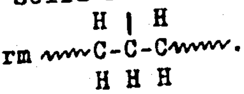
A Comparative Investigation of the Induced Electrical Conductivity and the Free Radicals in Solid Paraffins Subjected to Radiolysis

form  $\sim\overset{H}{\underset{H}{C}}-\overset{|}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}\sim$. In figure 3 the course of electrical conductivity is compared with the variation of the concentration of the free radicals in paraffin. The inaccuracies of temperature determinations observed on this occasion are not due to errors of measurement, but are caused by the temperature drop in the sample as a consequence of rapid heating. The authors mention two possible causes for the rapid increase of conductivity during heating of the irradiated paraffin: 1) Thermal ionization of the radicals. 2) Energy liberated in the recombination of radicals, the order of magnitude of which (3 - 4 ev) suffices for the formation of ions. The experimental data do not render it possible to come to a decision in favor of either of the two explanations. The authors, however, draw the conclusion that the formation of ions in radiolyzed solid and liquid substances occurs by way of the stage of free radicals. This would mean that in the gaseous phase the free radicals are in the first line transformation products of ions, whereas in the condensed phase they are ion transformation products of the

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A Comparative Investigation of the Induced Electrical Conductivity and the Free Radicals in Solid Paraffins Subjected to Radiolysis

free radicals. It is further said that the authors thank Academician V. N. Kondrat'yev for valuable discussions, G. I. Krivonosov and V. N. Shamshev for taking part in plotting the spectra, and the team of the high-voltage department for carrying out irradiations. The authors finally mention N. V. Ril' (Ref 8). There are 3 figures and 12 references, 5 of which are Soviet.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences, USSR)

PRESENTED: July 10, 1959, by V. N. Kondrat'yev, Academician

SUBMITTED: July 1, 1959

Card 4/4

TALROZE, V. L., (USSR)

"Recations of Postive Ions with Molecules in the Gas Phase in the Range of $3.10^{-2} - 10^{-2}$eV."

Papers Presented at the IAEA Symposium on the Chemical Effects of Nuclear Transformations, Prague 24-27 Oct. 1960.

34403

S/081/62/000/002/011/107
B149/B102

5.3300

AUTHORS: Ponomarev, A. N., Tal'roze, V. L.

TITLE: Model studies by the deuterium exchange method of elementary reactions of atomic hydrogen occurring during radiolysis of solid hydrocarbons

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 2, 1962, 78, abstract 2B557 (Tr. Tashkentsk. konferentsii po mirn. ispol'zovaniyu atomn. energii. v. 2. Tashkent AN UzSSR, 1960, 420 - 424)

TEXT: The mechanism of hydrogenation of olefins by atomic hydrogen and the kinetics of deuterium-hydrogen exchange between the gaseous and the solid phases during hydrogenation at -196 °C were studied. The olefin was frozen onto the surface of a spherical container. The dissociation of H_2 molecules took place on a heated W filament. Deuterium gas was led into the vessel at a pressure $P = (4-5) \cdot 10^{-2}$ mm Hg. The partial pressures of D_2, HD, and H_2 were measured from the changes of the corresponding mass-

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Inst. Chem Phys. AS USSR

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B149/B102

Model studies by the ...

spectroscopic bands during the course of the reaction. Experiments were carried out using propylene (I), isobutylene (II), 2-methylbutylene (III), 3-methylbutylene (IV). The rate of hydrogenation of (II) was much lower than that of (I) at equal temperatures and initial pressure of D_2. Rapid isotope exchange occurred besides the absorption of D. In the case of (II) the rate of exchange approached that of the absorption of D; in the case of (I), it was considerably lower. As with (I) and (II) so also with (III) and (IV) there is an "antibatnost'" of the rate of absorption and the rate of exchange. The process of hydrogenation of an olefin entails the formation in the solid phase of free alkyl radicals, which react rapidly with hydrogen atoms under the conditions of the experiment. No significant concentration of free radicals could be demonstrated by the method of electron paramagnetic resonance. Apart from the recombination reaction, the exchange $R^\circ + D^\circ \rightarrow R^\circ + H^\circ$ is possible. The "antibatnost'" of the rate of hydrogenation and of the exchange favors the reaction $R^\circ + D^\circ\uparrow \rightarrow HD$ + olefin, leading to deuterium-hydrogen exchange between the solid and the gaseous phases. [Abstracter's note: Complete translation.]

Card 2/2

86746

9.6150
5.5900(1043, 1228, 1273)
26.2312
11.1320

S/120/60/000/006/021/045
E032/E514

AUTHORS: Tal'roze, V.L., Dekabrun, L.L., Tantsyrev, G.D., Frankevich, Ye.L., Vetrov, O.D., Lyubimova, A.K., Lavrovskaya, G.K., Yerofeyev, V.I., Grishin, V.D., Skurat, V.Ye. and Yukhvidin, A.Ya.

TITLE: The PMC-2 (RMS-2) Mass Spectrometer Designed for Studying Chemical Reactions and the Determination of Free Radicals

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, No.6, pp.78-84

TEXT: A double magnetic mass-spectrometer designed for studying reactions in the gaseous phase and, in particular, for the determination of free radicals is described. Two methods are used to produce the ions. In the first method the mixture to be analysed is ionized by charge transfer to specially produced ions. The latter are formed in a separate ion gun by means of electron bombardment and are mass-analysed in a small magnetic analyser. In the second method the mixture under consideration is ionized directly by electron bombardment. Quasi-monochromatization is achieved by a method based on that reported by Fox et al. (Ref.11). The gas from the "reactor" is introduced into the ion source in the

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The PMC-2 (RMS-2) Mass Spectrometer Designed for Studying Chemical Reactions and the Determination of Free Radicals

form of a molecular beam which is mechanically interrupted at a known frequency. In distinction to the method described by Foner and Hudson (Ref.2), in which the molecular and ion beams are perpendicular, in the present system the two beams are coaxial, which means that smaller voltages are necessary for the "extraction" of the ions from the ionization region and it is possible to reduce the intensity of the background mass-spectrum. A particular feature of the present instrument is the use (in the measuring part of the spectrometer) of K-stabilization of parameters such as the accelerating voltage, the voltage supplying the detector, the emission current of the ion gun cathode, and the supply voltage for the ion source cathode. This was described by the second of the present authors in Ref.10. The mass numbers are determined from a knowledge of the magnetic field which in turn is measured with the aid of a Hall probe (germanium crystal). The basic mass spectrometric arrangement employed is shown in Fig.2. Products of chemical reactions taking place in the "reactor" I enter the region II through a small aperture in the thin glass diaphragm 8

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The PMC-2 (RMS-2) Mass Spectrometer Designed for Studying Chemical Reactions and the Determination of Free Radicals

in the form of a molecular beam. This molecular beam is collimated further by the diaphragm 6 which separates the volume II from the region in which ionization takes place. A moveable screen 7 is placed in front of the diaphragm 6 and interrupts the molecular beam 33 times per sec. In the case of ionization by charge transfer, the primary ions are produced in the ion gun III. The ion beam formed there is mass analysed in the 60° magnetic analyser IV which has a working radius of 100 mm. The primary ion beam, consisting of ions of the required mass, intersects the molecular beam and charge transfer takes place. In the case of ionization by electron impact, the source becomes analogous to that described by the first and fourth of the present authors in Ref.9. In the case of ionization by a monochromatized electron beam, the modulation of the molecular beam by the chopper 7 is not employed. The ion current in the mass-spectrometer is measured either by a d.c. amplifier or by an electron multiplier. The vacuum chamber of the mass-spectrometer is an all-metal system and all the sections are out-gassed at 300 to 350°C before the operation is begun. As an illustration of

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The PMC-2 (RMS-2) Mass Spectrometer Designed for Studying Chemical Reactions and the Determination of Free Radicals

the possible applications of the instrument, data are quoted on the formation of free radicals in the pyrolysis of hydrazine. In these experiments the hydrazine entered from a glass container into a quartz capillary through a control valve. The capillary was heated to a known temperature, as a result of which the hydrazine decomposed into nitrogen, hydrogen, ammonia and some unstable products (Foner and Hudson, Ref.18). Fig.7 shows the distribution of line intensities in the mass-spectrum of hydrazine obtained by the charge transfer method using HH_3^+ ions formed from ammonia. The pressure in the source was 5×10^{-5} mm Hg and the pressure in the chamber of the small analyser was 4×10^{-5} mm Hg. For comparison, the dotted line shows the mass-spectrum obtained on bombarding hydrazine with 50 eV electrons. Fig.8 shows the intensity distribution obtained under similar conditions at 1000°C (dotted lines) and 25°C (continuous lines). Acknowledgments are expressed to Ye. K. Russiyan, B. T. Vorob'yev, B. G. Belov, M. N. Morozov and M. I. Markin for assistance in this work. There are 8 figures and 20 references: 11 Soviet and 9 non-Soviet.

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86746
S/120/60/000/006/021/045
E032/E514

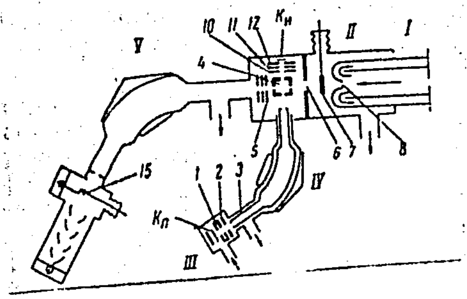
The PMC-2 (RMS-2) Mass Spectrometer Designed for Studying Chemical Reactions and the Determination of Free Radicals

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, AS, USSR)

SUBMITTED: October 15, 1959

Fig.2

I - reactor, III - ion gun, IV - small magnetic analyser,
V - large magnetic analyser



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E032/E514

The PMC-2 (RMS-2) Mass Spectrometer Designed for Studying Chemical Reactions and the Determination of Free Radicals

Fig.7

Comparison of mass-spectra of hydrazine obtained on electron bombardment (dotted) and charge transfer from NH_3^+ ions (full lines).
Key: 1 - relative intensity,
2 - mass number.

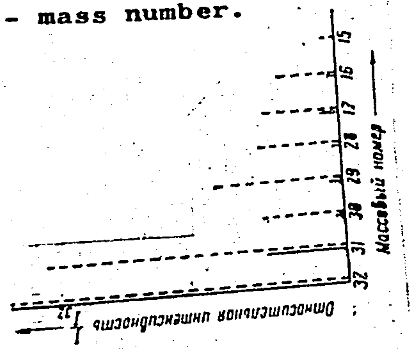
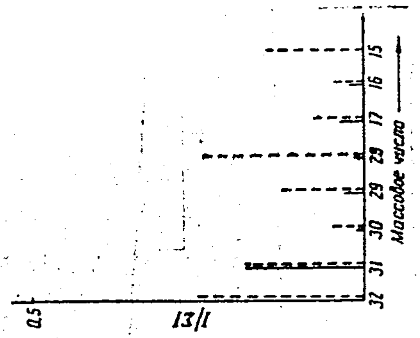


Fig.8

Charge transfer mass spectra of hydrazine and its decomposition products at 1000°C (dotted) and 25°C (full line).



Card 6/6

82838
S/048/60/024/008/015/017
B012/B067

X

24.6100

AUTHOR: Tal'roze, V. L.

TITLE: Elementary Processes Taking Place in the Collision of Slow Ions With Molecules

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 8, pp. 1001-1005

TEXT: Heavy particle transitions were systematically studied in the author's laboratory (Ref. 1) as well as by the groups of D. P. Stevenson (Ref. 2), and F. H. Fuld (Ref. 3). For this purpose a mass spectrometer with a monochromatic electron beam was constructed in the mentioned laboratory (Ref. 4). The secondary ions were identified on their occurrence according to the potential and according to the pressure dependence of the ratio between the secondary ion currents and the primary ion currents. A momentum method was developed for determining the velocity constants of the ion - molecular reactions (Ref. 5). The authors studied the following processes: $H_2^+ + H_2 = H_3^+ + H$,

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B012/B067

Elementary Processes Taking Place in the Collision of Slow Ions With Molecules

$RH^+ + M = R + MH^+$, and $RH + M^+ = R + MH^+$. The investigations showed that such processes need no activation energy and that their cross sections, in case they are exothermal, have a gas kinetic or somewhat higher order of magnitude. Experiments, however, showed that the lack of activation energy must not be applied to arbitrary ion-molecular reactions with heavy particle transition. In this connection the paper by S. Ya. Pshezhetskiy and M. T. Dmitriyev (Ref. 7) is mentioned. The investigations further showed a strong anisotropy in the velocity distribution of the reaction products. On the other hand, the experiments show that in the elementary process an intermediate particle is formed. The studies also covered the charge exchanges in collisions of ions with molecules. A large number of such processes was studied in single and complex molecules in the region of the energies of the incident ions from 10 to 10^3 ev. These investigations were made by means of a special double mass spectrometer (Ref. 9) with a recording of the secondary ions by means of a secondary electron multiplier. The investigations above all showed that charge exchanges in polyatomic molecules lead to a large number of different ways of dissociation-ionization. The fundamental

Elementary Processes Taking Place in the Collision of Slow Ions With Molecules

82838
S/048/60/024/008/015/017
B012/B067

fact is the presence of lines of the fragment ions in the mass spectrum of charge exchange. The investigations also showed that the transition of the kinetic energy into the energy of the process may play an important part in the charge exchange of the ions in complex molecules. On the other hand also the "resonance" factor retains considerable importance. In this connection the paper by N. P. Tunitskiy (Ref. 10) and his collaborators is mentioned. The following scientists took part in the investigations: Ye. L. Frankevich (heavy particle transitions), G. K. Lavrovskaya, M. I. Markin (charge exchange processes), L. L. Dekabrun, G. D. Tantsyrev and A. K. Lyubimova (development of the apparatus). There are 4 figures and 10 references: 6 Soviet, 3 British, and 1 German.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Physical Chemistry of the Academy of Sciences USSR)

Card 3/3

00257

S/076/60/034/012/008/027
B020/B067

5.4500 (B)

AUTHORS: Tal'roze, V. L., Frankevich, Ye. L.

TITLE: Pulse Method for Determining the Rate Constants of Elementary Ion - Molecule Processes

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 12, pp. 2709-2718

X

TEXT: The reactions between ions and molecules which were first observed in the ionization chamber of the mass spectrometer have become of great concern. They are an important stage in the chain of conversions which proceed in the material under the action of ionizing radiation. Fig. 1 shows the scheme of the ionization chamber of a mass spectrometer. The present paper was presented at the VIII Mendeleyevskiy s"yezd po obshchey i prikladnoy khimii (VIII Mendeleyev Congress on General and Applied Chemistry). It describes a new mass-spectrometric method for determining the rate constants of ion - molecule reactions, which is based on the direct measurement of the kinetics of the ion - molecule reaction in the ionization chamber without electric field. The periodic ionization of the

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Pulse Method for Determining the Rate Constants of Elementary Ion - Molecule Processes

S/076/60/034/012/008/027
B020/B067

gas in the ionization chamber is made by means of short electron pulses. The primary ions which are formed after ionization and the secondary ions which are formed in the collision of molecules are conducted into the analyzer by means of short voltage pulses. The authors thoroughly describe ion formation during pulse ionization. In the experimental part they demonstrate that the differences in the distribution of the concentration of primary and secondary ions are only unimportant and that they do almost not influence the rate constants. The ion - molecule reactions were studied by a mass spectrometer with magnetic sector field which had been used already earlier (Ref. 13) for determining the potentials in the occurrence of primary and secondary ions. The scheme of the ion source is shown in Fig. 2. Fig. 3 shows the scheme of the vacuum system of a mass spectrometer. The pressure in the ionization chamber was measured by an ionization manometer which was directly connected with the chamber. The temperatures of the chamber walls, the velocity of the ionic motion were measured by a nichrome - constantan thermocouple. The duration of the extraction of the impulses t_e was so chosen that all ions could be extracted from the chamber. Fig. 4 shows a typical dependence of the ion

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Pulse Method for Determining the Rate Constants of Elementary Ion - Molecule Processes

S/076/60/034/012/008/027
B020/B067

current on the duration of the extraction impulse. It indicates that at $t_e = 5\,\mu$sec practically all ions are extracted which is in good agreement with the calculations. The authors measured the rate constants of the formation of the methonium ion in the reaction $CH_4 + CH_4^+ \longrightarrow CH_5^+ + CH_3$.

Yu. A. Andreyev, student of the LPI (Leningradskiy politekhnicheskiy institut = Leningrad Polytechnic Institute) also took part in the experiments which were made at different pressures of the ion source; the results are given in Table 1. Table 2 gives the measurements of the reaction rates in the formation of CH_5^+ with different duration of the extraction impulses. The measured rate constants of the reaction $H_2O + H_2O^+ \longrightarrow H_3O^+ + OH$ are given in Table 3. There are 6 figures, 3 tables, and 15 references: 7 Soviet and 8 US.

ASSOCIATION: Akademiya nauk SSSR, Institut khimicheskoy fiziki (Academy of Sciences USSR, Institute of Chemical Physics)

SUBMITTED: March 13, 1959

Card 3/3

5.3200(A)
5.1600

~~5(4)~~

67956

SOV/20-130-1-34/69

AUTHORS: Ponomarev, A. N., Tal'roze, V. L.

TITLE: Deuterium-Hydrogen Exchange in the Course of the Reaction of the Hydrogenation of Solid Olefins by Atomic Hydrogen at -196° 19 21

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 1, pp 120-121 (USSR)

ABSTRACT: In the papers by R. Klein and M. Scheer (Refs 1, 2) the hydrogenation of the olefins was carried out at -196°. The authors investigated the deuterium-hydrogen exchange between the gaseous phase and the solid phase under similar conditions with propylene and isobutylene. The reaction which was carried out in a glass bulb was studied by means of a mass spectrometer type MKh-1302 (Refs 3, 4). In the center of the bulb a tungsten filament produced atomic hydrogen. The inner surface of the bulb cooled with liquid nitrogen was coated with a layer of frozen olefin, subsequently deuterium was filled in until a pressure of $4 \cdot 10^{-2}$ torr was reached, the tungsten filament was switched on, and the change of total pressure and of partial pressure of D_2, HD and H_2 was measured on the basis of the intensity change of the mass spectral lines. The isobutylene hydrogenation proceeded considerably more slowly than that of propylene,

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67956

Deuterium-Hydrogen Exchange in the Course of the SOV/20-130-1-34/69
Reaction of the Hydrogenation of Solid Olefins by Atomic Hydrogen at -196°

therefore the tungsten filament temperature was kept correspondingly lower in an experiment with propylene to keep hydrogenation approximately at the same velocity. Figure 1 shows the change of the partial pressures and of total pressure. 4 Figure 2 shows the relative change of the total pressure and of the D-content. With isobutylene the velocity of the H-D-exchange is almost equal to the velocity of the H-addition while with propylene the exchange takes place more slowly than the H-addition. The reaction $\dot{R} + \dot{H} \longrightarrow \text{olefin} + H_2$ is assumed, a reaction between the free alkyl molecules occurring as intermediate stage and atomic H. This process inhibiting hydrogenation

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SOV/20-130-1-34/69

Deuterium-Hydrogen Exchange in the Course of the Reaction of the Hydrogenation of Solid Olefins by Atomic Hydrogen at -196°

is regarded as the reason for a limited concentration of the frozen free radicals of paraffins and polyethylene (Ref 6). There are 2 figures and 6 references, 3 of which are Soviet. 4

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences, USSR)

PRESENTED: August 7, 1959 by N. N. Semenov, Academician

SUBMITTED: August 4, 1959

Card 3/3

84831

15-8500 2209 only

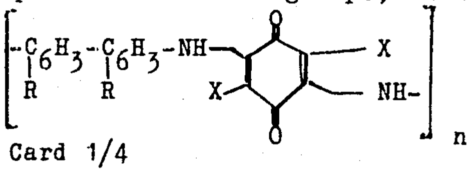
S/020/60/134/005/019/023
B004/B064

AUTHORS: Balabanov, Ye. I., Berlin, A. A., Parini, V. P., Tal'roze, V. L., Frankevich, Ye. L., and Cherkashin, M. I.

TITLE: Electrical Conductivity of Polymers With Conjugated Bonds

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 134, No. 5, pp. 1123-1126

TEXT: To investigate the electrical conductivity σ and its temperature dependence, the authors synthesized the following polymers: 1) Polymers with a noncyclic conjugated chain, such as polyphenyl acetylene, and its copolymers with hexine or paradiethinyl benzene; 2) polymers with benzene rings in the conjugation chain, such as polyphenylene, polyphenylene diazo compounds, polymeric-aromatic and aliphatic-aromatic compounds with quinoid and amino groups, such as



(X = H, Cl at R = H; X = H at R = COOH);

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Electrical Conductivity of Polymers With Conjugated Bonds

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B004/B064

poly-p-phenylenediamino quinone, polyhexamethylene diamino quinone; polyphenylene azoquinone; a polymeric triazene $[-C_6H_4-C_6H_4-NH-N=N-]_n$ and a substance (16) with a quinoimine group $[-C_6H_4-N=C_6H_4=N-]_n$; polymeric chelate compounds of polydiphenyl aminoquinone with metals (e.g. Cu); molecular complexes of acenaphthene with chloranil, and with a pyridonium derivative of polyphenylene aminoquinone; 3) chelate compounds, such as tetra-salicyl ferrocene and its polymeric chelate complexes with Fe^{2+} (21) and Be^{2+} (22); polymeric chelate complexes of percyanoethylene with Cu^{2+} and Fe^{2+}. In all compounds, σ rose with temperature according to the equation $\sigma = \sigma_o \exp(-E/kT)$. σ_o and E are constants characteristic of each compound (Table 1). E varied from 4.6 kcal/mole (substance 16) to 49.5 kcal/mole for polyphenyl acetylene, and reached 92 kcal/mole in the complex compound of acenaphthene with chloranil. The treatment of the sample influences σ_o and E. If the polyphenyl acetylene film obtained from the solution is pressed into tablets at 200°C, σ_o decreases by 22 orders

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Electrical Conductivity of Polymers With Conjugated Bonds

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B004/B064

of magnitude. Since, however, E decreases at the same time, σ remains almost constant. (σ_0 ranged from $10^{-12}\text{ohm}^{-1}\cdot\text{cm}^{-1}$ in polyphenylene to $6\cdot10^{51}\ \text{ohm}^{-1}\cdot\text{cm}^{-1}$ in the complex of acenaphthene with chloranil.) This compensation effect was observed in nearly all substances, as may be seen from the function $\log \sigma_0 = f(E)$ (Fig. 1). A change of σ_0 by 60 orders of magnitude and of E by 20 times was observed in substances of different structures. In the substances (16), (21), (22), σ was close to the electrical conductivity of organic semiconductors. In the case of polyphenyl acetylene, which is an insulator at room temperature, σ rises with rising temperature so much that, in consequence of its high σ_0, the conductivity of many polymers is reached that are conductive already at room temperature. There are 1 figure, 1 table, and 17 references: 14 Soviet, 2 US, and 1 German.

X

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

Card 3/4

84831

Electrical Conductivity of Polymers With Conjugated Bonds

S/020/60/134/005/019/023
B004/B064

PRESENTED: June 14, 1960, by V. N. Kondrat'yev, Academician

SUBMITTED: June 11, 1960

X

86840

S/020/60/135/005/030/043
B004/B075

24.3500 (1138, 1160, 1345)

AUTHORS: Gusynin, V. I. and Tal'roze, V. L.

TITLE: A Study of Energy Transfer Along a $\sim CH_2 \sim$ Chain by Quenching of Luminescence

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 5, pp. 1160-1163

TEXT: The authors have studied the intramolecular energy transfer by means of luminescence. Interaction between solvent S, activator F, and quencher Q shows the following possibilities: 1) $S \rightarrow S^*$, formation of excited molecules of the solvent subjected to gamma radiation; 2) $F \rightarrow F^*$, the same for the activator; 3) $Q \rightarrow Q^*$, the same for the quencher; 4) $S^* \rightarrow S$ + photon, emission of the excited molecules of the solvent; 5) $S^* \rightarrow S$, spontaneous deactivation; 6) $S^* + S \rightarrow S + S$, self-quenching of the excited molecules of the solvent; 7) $S^* + F \rightarrow S + F$, quenching by the activator;

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86840

A Study of Energy Transfer Along a$\sim CH_2 \sim$ Chain by Quenching of Luminescence

S/020/60/135/005/030/043
B004/B075

8) $S^* + Q \longrightarrow S + Q$, quenching by the quencher; 9) $S^* + F \longrightarrow S + F^*$, transfer of excitation energy from the solvent to the activator; 10) $F^* \longrightarrow F$ + photon, emission of the excited molecules of the activator; 11). $F^* \longrightarrow F$, spontaneous deactivation of the activator; 12) $F^* + S \longrightarrow F + S$, quenching of the activator by the solvent; 13) $F^* + F \longrightarrow F + F$, self-quenching of the activator; 14) $F^* + Q \longrightarrow F + Q$, quenching of the activator by the quencher. For the intensities I_I, I_{II} of light emission of two solutions having the concentrations n_{sI}, n_{fI}, n_{qI}, and n_{sII}, n_{fII}, n_{qII} the following relation is written: $I_I/I_{II} = \left[n_{fI}(1+yn_{qII} + zn_{fII})(1 + xn_{qII})n_{sI})\right] / \left[n_{fII}(1 + yn_{qI} + zn_{fI})(1 + xn_{qI})n_{sII}\right]$ (2), where $x = k_{14}/(p_{10}+p_{11}+p_{12})$, $y = k_8/(p_4 + p_5 + p_6)$, $z = (k_7+k_9)/(p_4+p_5+p_6)$, are the relative rates of the interactions recognized as being of influence. Emission has been measured by means of an ФЭУ-19 (FEU-19) photomultiplier during the experiments performed with terphenyl as an activator, dioxane as a solvent, and methanol

86840

A Study of Energy Transfer Along a $\sim CH_2 \sim$ Chain S/020/60/135/005/030/043
by Quenching of Luminescence B004/B075

ethanol, propanol, hexanol, and nonanol as quenchers under irradiation by Co^{60} (dose rate about 5.4 r/h). Terphenyl concentrations of $2.89 \cdot 10^{-3}$, $7.23 \cdot 10^{-3}$, and $2.89 \cdot 10^{-2}$ moles/l were used. The alcohol concentrations (mole/l) amounted to: 0.21-1.03 for methanol, 0.14-0.73 for ethanol, 0.11-0.56 for propanol, 0.07-0.34 for hexanol, 0.05-0.24 for nonanol. Fig. 1 graphically shows the result. Quenching is caused by the interaction between the excited molecules of the solvent and the alcohol molecules. The quenching cross section increases with increasing length of the CH_2 chain. This chain acts as an "antenna" that receives energy and transfers it to the OH group, where it is dissipated in an unknown way. This energy transfer along the CH_2 chain can be interpreted as a charge transfer. There are 1 figure, 2 tables, and 4 references: 2 Soviet, 1 US, and 1 Czechoslovakian.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

Card 3/4

86840

A Study of Energy Transfer Along a ~CH_2~ Chain by Quenching of Luminescence

S/020/60/135/005/030/043
B004/B075

PRESENTED: June 23, 1960, by V. N. Kondrat'yev, Academician

SUBMITTED: June 18, 1960

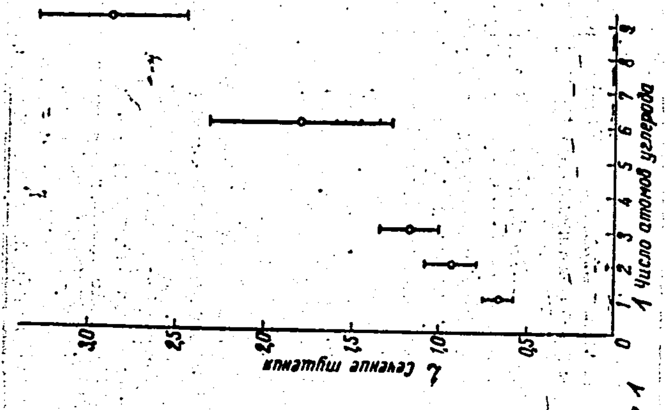

Fig 1

Legend to Fig. 1: Dependence of the quenching cross section on the length of the CH_2 chain of alcohols. 1: number of C atoms, 2: quenching cross section (in relative units).

Card 4/4

87414

15.8000 2209, 2109 only

24.7900 1144, 1160 only

S/020/60/135/006/032/037
B004/B056

AUTHORS: Tal'roze, V. L. and Blyumenfel'd, L. A.

TITLE: The Interrelation Between the Electrical Conductivity of Organic Substances With Conjugate Bonds and Their Electron Magnetic Resonance Spectra

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 6, pp. 1450 - 1452

TEXT: The authors discuss published data according to which in polymers with a well-developed system of conjugate double bonds, narrow, symmetric lines of electron paramagnetic resonance (epr) appear (width 4-8 oe), whereas some of such polymers containing hetero-atoms, electron donor and electron acceptor groups, have broad (500 - 1000 oe) asymmetric epr lines. Numerous polymers were investigated; for the latter Fig. 1 shows $E = f(\log\sigma_0)$. E is the activation energy, σ_0 is the factor of the exponential function of conductivity, + denotes the substances, which show narrow epr lines, and • denotes such substances with broad epr lines. All

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The Interrelation Between the Electrical Conductivity of Organic Substances With Conjugate Bonds and Their Electron Magnetic Resonance Spectra

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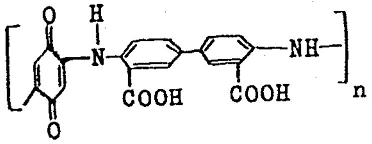
B004/B056

substances with broad epr lines have increased conductivity at room temperature. For substances with narrow epr lines there exists a linear relation between E and logσ_0. There exists not only a correlation between conductivity and the appearance of the epr spectra of the conjugate system, but, above all, a correlation between the pseudoferromagnetic properties of the organic structure and its conductivity. Substances with broad epr lines are assumed to have large ordered regions with a large number of unpaired electrons, and the motion of charge in these regions occurs nearly without any resistance. The numbers of Fig. 1 correspond to the following substances: 1,2 = polyphenylacetylene;

7,9 =



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The Interrelation Between the Electrical Conductivity of Organic Substances With Conjugate Bonds and Their Electron Magnetic Resonance Spectra

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B004/B056

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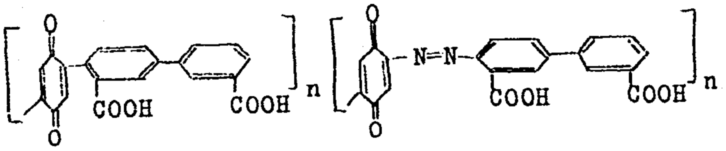
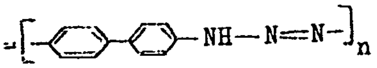
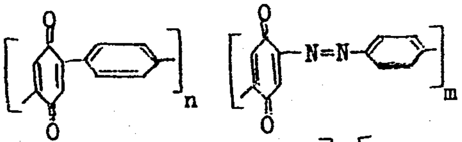
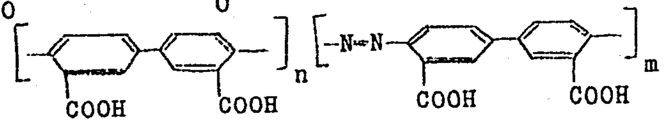


11, 12 -


14 -


16, 17 -


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87414

The Interrelation Between the Electrical Conductivity of Organic Substances With Conjugate Bonds and Their Electron Magnetic Resonance Spectra

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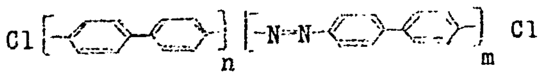
B004/B056

18, 19 =



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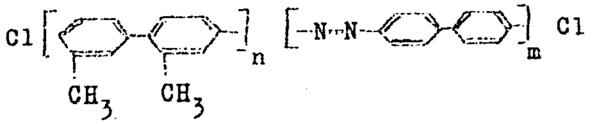
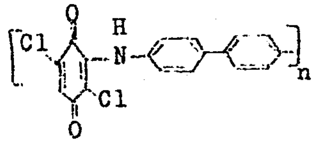


21 =



22 = complex of 21 with copper acetate; 26 = complex of tetrasalicyl ferrocene with Fe^{2+}; 29 - copolymer from polyphenylacetylene and hexyne; 31 = polytetracyanoacetylene ; 32 = polytetracyanoacetylene with cyanoethylene; 34, 35 = polyphenylacetylene; 36 = copolymer from polyphenylacetylene and p-diethynyl benzene; 37, 39 = complex of acenaphthene with

Card 4/6

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The Interrelation Between the Electrical Conductivity of Organic Substances With Conjugate Bonds and Their Electron Magnetic Resonance Spectra

S/020/60/135/006/032/037
B004/B056

chloranil; 74 = polyphenylene. There are 1 figure and 10 references: 7 Soviet, 1 US, 1 British, and 1 Australian.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the AS USSR)

PRESENTED: June 25, 1960, by N. N. Semenov, Academician

SUBMITTED: June 23, 1960

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Card 5/6

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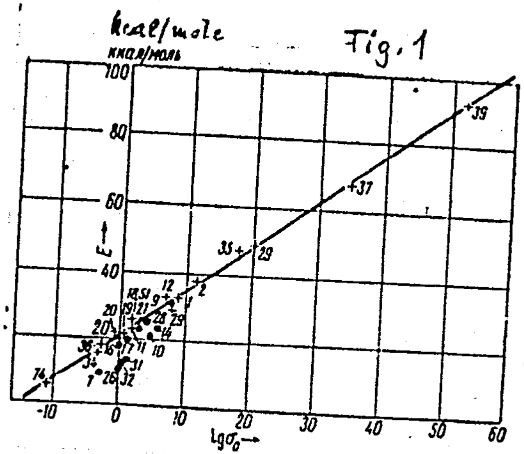
B004/B056

Fig. 1



Card 6/6

TAL'ROZE, V. L. (USSR) Dr., Institute of Chemical Physics, Academy of Sciences USSR.

"Reactions of Ions and Molecules in the Gas Phase". (Section A.1).

report to be submitted 18th Intl. Congress of Pure & Applied Chemistry, 21st Conf., Montreal, Canada, 6-12 Aug 61.

TERENT'YEV, A.P., otv.red.; **ALIMARIN, I.P.**, red.; **GEL'MAN, N.E.**, red.; **KLIMOVA, V.A.**, red.; **KRESHKOV, A.P.**, red.; **KUZNETSOV, V.I.**, red.; **LEVIN, E.S.**, red.; **PODGAYSKAYA, Z.I.**, red.; **RUKHADZE, Ye.G.**, red.; **TAL'ROZE, V.L.**, red.; **TSUKERMAN, A.M.**, red.; **SHEMYAKIN, F.M.**, red.; **SHEYNKER, Yu.N.**, red.; **YERMAKOV, M.S.**, tekhn.red.

[Conference on organic analysis] Soveshchanie po organicheskomu analizu. Tezisy dokladov. Moskva, Izd-vo Mosk.univ., 1961. 170 p. (MIRA 14:4)

1. Soveshchaniye po organicheskomu analizu. 1961.
(Chemistry, Analytical--Congresses)
(Chemistry, Organic--Congresses)

20989

S/195/61/002/001/003/006
B101/B216

26.2312

AUTHORS: Lavrovskaya, G. K., Markin, M. I., Tal'roze, V. L.

TITLE: Exchange of charge between ions on complex molecules

PERIODICAL: Kinetika i kataliz, v. 2, no. 1, 1961, 21-37

TEXT: Processes within the energy range 10^{-1} to 10^{1}-10^{2} ev involve two elementary processes: (I) exchange of heavy particles and molecular regrouping, and (II) exchange of charge which may be accompanied by dissociation. Process (II) which may occur in the case of comparatively slow ions has been little investigated as yet. The present work was undertaken with a view to clarifying this process on complex systems and establishing the extent of competitive occurrence of (I) and (II). It studies the exchange of charge between monoatomic and polyatomic ions in the energy range 10-500 ev. The mass spectrometer used is shown in Fig. 1. Primary ions produced in the ion source 1 by ionizing gas with 60-ev electrons were accelerated to 110-500 ev and separated according to mass in the magnetic analyzer I (angle of deflection 60°, r = 100 mm). Ions of specific mass were passed through the collector slit 2 (2 × 8 mm)

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B101/B216

into the charge exchange chamber 3. The secondary ions formed in it were deflected at right angles to the beam of primary ions by a weak magnetic field extending into the chamber, accelerated to 1500-2000 v, and separated in the magnetic analyzer II (60°, r = 200 mm). In chamber 3, gas ionization could also be excited by electrons emitted from cathode 4. The vacuum in the charge exchange chamber was 10^{-6}-$5\cdot10^{-5}$ mm Hg. The primary ion current was 10^{-8}-10^{-7} a, measured by an electrometer amplifier (a). 5 is an electron multiplier tube, 6 are the deflecting electrodes. Charge exchange was measured on CH_4, C_2H_6, C_3H_8, C_2H_4, C_3H_6, CH_3COCH_3, NH_3, and N_2H_4. As primary ions the authors used (1), NH_3^+, NO^+, CH_4^+, CH_3^+, CCl_3^+, Xe^+, Zn^+, Hg^+ (for which the recombination energy was lower than the ionization potential of the molecule), and (2) He^+, Ar^+, N_2^+, H^+, H_2^+, H_3^+ (possessing high recombination energies). The experimental data are listed in Tables 1-5. The first columns of these tables indicate the values of m/e in atomic mass units, the potentials at which ions of that mass occur being given in parentheses. The second columns give the mass spectra as obtained by ionizing the respective molecules with 60-ev electrons. The following columns indicate the mass spectra as obtained by exchange of charge with the ions listed in the first line. The recombination energies are given below the symbols of the primary ions. The amperage I of the secondary ions is given relative to the sum of amperages of all ions produced. The thermal effects of ion formation also appear in the tables. The last line refers to the relative cross section calculated from $\sigma_{rel} = \sigma/(\sigma_{A^+ - A}) = i_{A^+}(dI/dP)/i(dI_{A^+}/dP_A)$, where i_{A^+} denotes the current of primary A^+ ions, I_{A^+} the current of secondary A^+ ions, i the current of primary ions, I the sum of currents of separated secondary ions fromed at exchange of charge of the primary ions on the respective molecule, P_A the argon pressure, P the pressure of the gas under investigation. The mass spectra were taken with primary ions of energy 300-500 v, and a potential of 200 v applied to the drawing electrode. It was found that in the energy

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B101/B216

Exchange of charge between ions ...

range 10^1-10^3 ev the transition of kinetic energy to internal energy by charge exchange becomes easier with increasing complexity of the molecule. The cross sections of the charge exchange processes are, therefore, considerable even close to the threshold of endothermic processes, and must be large for exothermic processes, even at low temperature. Consequently, these processes are of considerable importance in real systems (radiation chemistry, reaction during discharges, ion formation in flames, processes in the upper layer of the atmosphere). Basing on these results, all ion-molecule interactions may be divided into processes with and without formation of a long-lived intermediate ion. One of the two mechanisms is realized depending on the kinetic energy of the collision. The authors thank A. K. Lyubimova and A. A. Bulatova, Technician, for their assistance, G. K. Karachevtsev, Student, for cooperating in several experiments, and Academician V. N. Kondrat'yev for discussions. N. N. Tunitskiy, Ye. L. Frankevich, Yu. F. Bydin, and A. M. Bukhteyev are mentioned. There are 5 figures, 5 tables, and 23 references: 9 Soviet-bloc and 16 non-Soviet-bloc. The 3 references to English-language publications read as follows: E. C. Melton et al.,

Card 4/15

20989

S/195/61/002/001/003/006
B101/B216

Exchange of charge between ions ...

J. Amer. Chem. Soc., 26, 1302, 1957; F. H. Field, F. W. Lampe, J. Amer. Chem. Soc., 80, 5587, 1958; D. R. Bates, Proc. Roy. Soc., A257, 22, 1960.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics of the AS USSR)

SUBMITTED: October 31, 1960

Card 5/15

S/181/61/003/001/023/042
B006/B056

AUTHORS: Frankevich, Ye. L. and Tal'roze, V. L.

TITLE: Thermostimulated emf occurring in irradiated solid hydrocarbons in the presence of a temperature gradient

PERIODICAL: Fizika tverdogo tela, v. 3, no. 1, 1961, 180-181

TEXT: The phenomenon of the "ignition" of electrical conductivity has been discovered by the authors in paraffin irradiated with electrons at low temperatures (Ref. 1); a similar effect was found in the case of polyethylene. Now, the emf occurring during irradiation at low temperatures on the faces of paraffin and polyethylene specimens was studied, and a brief report is presented. The specimens (1 x 3 x 5 mm) were placed between two electrodes in a vacuum chamber, one of which served as a cooler, while the other was connected with the electrometer; electron bombardment (1.6 Mev) was carried out at 200°K; the dose could be varied between 1 and 100 mrad. When heating the specimens and, at the same time, measuring the emf, peaks of the latter were discovered in the presence of a temperature gradient; this was the case in such temperature ranges, within which an intensive

Card 1/3

S/181/61/003/001/023/042
B006/B056

Thermostimulated emf occurring in...

recombination of radicals and an "ignition" of electrical conductivity occurred: for paraffin between 250 and 280°K, for polyethylene between 260 and 300 and 340 and 380°K. During measurement, the temperature drop on the specimen did not exceed 20°. The total amount of the emf between the outer surfaces depended on the radiation dose, as well as on the temperature drop. Its maximum was 50-1000 v. In the absence of a temperature gradient, the emf was equal to zero. The occurrence of emf is related to that of volume carriers, which are trapped during irradiation in some "shallow traps" (e.g., radicals). The reason for the occurrence of the emf is thus a volume inhomogeneity of the carrier density. It may be assumed that during the irradiation of frozen solid dielectrics, regions near the surface show impoverishment in secondary electrons, which had been knocked out of the substance by primary electrons or γ-quanta; a volume charge is formed, which is conserved also after irradiation ceases; by non-uniform heating, the carriers are partly liberated from the traps. The effect was simulated by means of the equivalent circuit diagram shown in a figure. It could be shown that, also if no inhomogeneity of the frozen charge carriers exists, the temperature gradient caused a density gradient of the charge carriers, but the emf occurring in this case was

Card 2/3

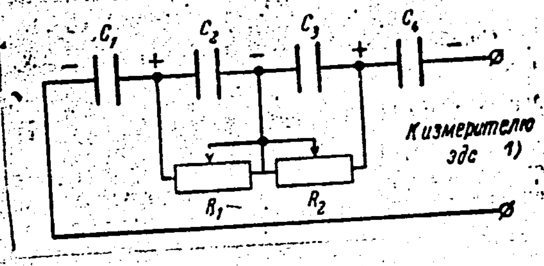
S/181/61/003/001/023/042
B006/B056

Thermostimulated emf occurring in...

lower than in the former case. There are 1 figure and 3 Soviet-bloc references.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR Moskva (Institute of Chemical Physics, AS USSR, Moscow)

SUBMITTED: June 15, 1960



Card 3/3

KARACHEVTSEV, G.V.; MARKIN, M.I.; TAL'ROZE, V.L.

Pulse method study of the charge exchange of Ar^+, Kr^+, Xe^+ thermal ions on CH_4, C_2H^6, C_2H^4 molecules. Izv. AN SSSR. Otd.khim.nauk no.8:1528 Ag. '61. (MIRA 14:8)

1. Institut khimicheskoy fiziki AN SSSR.
(Mass spectrometry)
(Ion sources)

PONOMAREV, A.N.; TAL'ROZE, V.L.

Interaction between atomic hydrogen and solid acetylene at 77° K.
Izv. AN SSSR. Otd.khim.nauk no.9:1716-1717 S '61. (MIRA 14:9)

1. Institut khimicheskoy fiziki AN SSSR.
(Hydrogen) (Acetylene)

S/844/62/000/000/001/129
D290/D307

AUTHORS: Pshezhetskiy, S. Ya. and Tal'roze, V. L.

TITLE: The elementary processes of radiation chemistry and the mechanisms of various radiation-chemical reactions

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 5-27

TEXT: The authors review the elementary processes occurring when electrons interact with molecules and discuss the mechanisms of some of the subsequent reactions. They discuss the subject under the following main headings: 1. Fundamental primary processes of radiation chemistry; 2. Fundamental secondary elementary processes of radiation chemistry; 3. The elementary processes of radiation chemistry in condensed phases; 4. Fundamental types of complex radiation-chemical reactions and the mechanisms of some of these reactions. The authors conclude that more use must be made of physical methods which give direct information about the fundamental

Card 1/2

The elementary processes ... S/844/62/000/000/001/129
D290/D307

primary processes of radiation chemistry. There are 5 figures.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR; Fiziko-khimicheskiy institut im. L. Ya. Karpova (Institute of Chemical Physics AS USSR; Physico-Chemical Institute im. L. Ya. Karpov)

Card 2/2

43222
S/844/62/000/000/006/129
D290/D307

5.4200

AUTHORS: Lavrovskaya, G. K., Markin, M. I. and Tal'roze, V. L.

TITLE: The elementary processes of charge transfer from slow ions to polyatomic molecules

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 48-51

TEXT: The authors studied the process of charge transfer from slow ions to multiatomic molecules in many different reactions in order to infer charge transfer cross-sections at thermal energies in endothermic reactions or to deduce the behavior of the cross-sections near the threshold energy for endothermic reactions. The effects were investigated of He^+, A^+, Xe^+, N_2^+, H^+, H_2^+, H_3^+, NO^+, NH_3^+, CH_3^+, CH_4^+, CCl_3^+, Zn^+, Hg^+, and other ions on molecules such as CH_4, C_2H_6, C_2H_4, C_3H_8, C_3H_6, $(CH_3)_2CO$, NH_3, N_2H_4, and oth-

Card 1/2

The elementary processes ... S/844/62/000/000/006/129
D290/D307

ers; the energies of the ions ranged from 10 to 1000 ev. A special double mass spectrometer was used. The authors discuss the way in which the experimental results provide evidence for the occurrence of dissociative charge transfer, the ease of conversion of kinetic and internal energy, the effect of the presence of metastable excited ions in the original beam, and the formation of complex intermediate ions. It is concluded that the ease of conversion of kinetic into internal energy and vice versa increases sharply with increasing complexity of the molecule and that, therefore, the charge transfer cross-sections in exothermic reactions become larger at thermal energies. There are 2 figures.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, AS USSR)

Card 2/2

S/844/62/000/000/011/129
D290/D307

AUTHORS: Gusynin, V. I. and Tal'roze, V. L.

TITLE: A study of the energy transfer along aliphatic chains by means of luminescence quenching

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 79-82

TEXT: The intramolecular transfer of energy along aliphatic chains was studied by measuring the quenching effect of various alcohols on the luminescence of solutions of terphenyl in dioxan. Methyl, ethyl, propyl, hexyl, and nonyl alcohols were used; the luminescence was induced by Co^{60} γ rays. The authors considered all possible reactions that could occur in such complex solutions. Quenching depends on interactions between excited solvent and alcohol molecules. The quenching cross-sections for both solvent and activator increase linearly with the increasing length of the aliphatic chain in the alcohol molecule. No quenching was observed when the corresponding

Card 1/2

A study of the energy ...

S/844/62/000/000/011/129
D290/D307

hydrocarbons were substituted for the alcohols, indicating that the aliphatic chains do not act directly as quenching agents but absorb energy which is rapidly transferred along the chain and dispersed by the hydroxyl group. The increase of quenching with chain length means that the probability of intramolecular energy transfer is much greater than that of intermolecular transfer. There are 1 figure and 2 tables.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, AS USSR)

Card 2/2

S/844/62/000/000/112/129
D207/D307

AUTHORS: Frankevich, Ye. L. and Tal'roze, V. L.

TITLE: Free radicals and electrical phenomena in irradiated solids

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 651-655

TEXT: Paraffin wax and polyethylene were irradiated with 1.6 Mev electrons (about 10 megarads in the case of polyethylene) below 180°K. On subsequent heating the electrical conductivity σ peaked at the same temperatures (300°K for paraffin wax and 360°K for polyethylene) at which the concentration of free radicals, produced by electron bombardment, fell to nearly zero. It is suggested that electrons and holes, initially trapped by free radicals, are liberated at the temperatures of the conductivity peaks (in the case of polyethylene there were two peaks corresponding to the two-stage radical annihilation: first the alkyl radicals partly recombined

Card 1/2

Free radicals and ...

S/844/62/000/000/112/129
D207/D307

and were partly converted into allyl radicals, next the allyl radicals disappeared). The trap depth was estimated from the slope of the log $\sigma = f(1/T)$ curve to be 0.6 ev in the case of paraffin wax. Nonuniform heating of paraffin wax and polyethylene irradiated (0.1 - 100 megards) at low temperatures produced transient inhomogeneities of space charge due to local carrier liberation. These inhomogeneities appeared as voltages up to 100 v across the samples. There are 4 figures.

ASSOCIATION: Institut fizicheskoy khimii AN SSSR (Institute of Chemical Physics, AS USSR)

Card 2/2

35061

11.1510
11.1210

S/195/62/003/001/002/010
E071/E136

AUTHORS: Lomanov, Yu.P., Ponomarev, A.N., and Tal'roze, V.L.

TITLE: A calorimetric study of the reactions of atomic hydrogen with solid olefines at 77 °K

PERIODICAL: Kinetika i kataliz, v.3, no.1, 1962, 49-57

TEXT: The importance of studying the reactions of atomic hydrogen with olefines for the understanding of the mechanism of radiolysis of organic substances is stressed. In this way the reactions of atomic hydrogen, formed in the primary elementary act of radiolysis on interaction of a fast electron with a molecule, can be elucidated. The object of the present work was the development and application of the method of kinetic calorimetry for the investigation of the interaction of atomic hydrogen with solid hydrocarbons at low temperatures. In the course of the work the method was developed permitting simultaneous measurement of the velocity of absorption of atomic hydrogen and the velocity of heat evolution in the reaction layer (up to 10^{-4} cal/sec) on interaction of hydrogen atoms

X

Card 1/ 4

A calorimetric study of the ...

S/195/62/003/001/002/010
E071/E136

(formed in the gaseous phase) with hydrocarbons at 77 °K. The method was based on the observation of the amount of evaporated nitrogen as a measure of heat evolution and of hydrogen pressure as a measure of hydrogen absorption. The apparatus is described in some detail. It was calibrated by passing an electric current and measuring the amount of evaporated nitrogen. The results obtained indicated that the apparatus is capable of measuring rates of heat evolution of about 3-5 x 10^{-4} cal/sec and a total heat evolved of the order of 10^{-2} cal. Experiments with solid propylene indicated that the ratio of heat evolved to the amount of absorbed hydrogen during reaction of atomic hydrogen with propylene amounted to 110-115 kcal/mole and remains constant when the thickness of the hydrocarbon layer is 2 x 10^{-4} cm. This indicated that the heat evolution is almost completely due to the hydrogenation of the olefine and the apparatus measures most of the heat evolved in the reaction layer, i.e. heat losses did not exceed 15%. Thus, under experimental conditions recombination of hydrogen atoms inside the hydrocarbon does not practically take place. For comparison

Card 2/4

the evolution of heat in a layer of pure solid propane under the same experimental conditions was measured. The velocity of heat evolution was 0.06 of that taking place in propylene. This can be ascribed only to the recombination of hydrogen. For similar experiments with isobutylene the value of heat evolved was 118 kcal/mole, close to the heat of hydrogenation with atomic hydrogen (131.4 kcal/mole). With increasing thickness of the isobutane layer covering isobutylene the ratio of heat evolved to hydrogen absorbed (Q/N) increases, indicating that the recombination of hydrogen ($H^\cdot + H^\cdot \longrightarrow H_2$) in the hydrocarbon layer becomes noticeable. The evolution of heat due to the above process for an isobutane layer of about 10^{-4} cm becomes comparable to the heat of the hydrogenation of isobutylene (whilst the velocity of absorption of hydrogen is 5-7 times lower than that on the surface of pure butylene). On the basis of the results obtained and the literature data on deuterium-hydrogen exchange an evaluation of the relative role of some reactions is carried out.

S/195/62/003/001/002/010
E071/E136

A calorimetric study of the ...

There are 4 figures and 3 tables.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR
(Institute of Chemical Physics, AS USSR)

SUBMITTED: July 11, 1961

Card 4/4

S/190/62/004/008/016/016
B117/B144

AUTHORS: Tal'roze, V. L., Blyumenfel'd, L. A.

TITLE: Report by A. V. Ayrapetyants, R. M. Voytenko, B. E. Davydov, and V. S. Serebryanikov

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 8, 1962, 1282

TEXT: The scientists mentioned in the title published a paper (Vysokomolek. soyed., 3, 1876, 1961) on the absence of a compensation effect in differently treated polyacrylonitrile samples. They stated that the absence of this effect contradicts the results obtained by the authors of the present paper (Dokl. AN SSSR, 135, 1450, 1960). Here there would seem to be a misunderstanding, for the above-mentioned paper contained the following information: The polymers studied, especially those with conjugate bonds, may be divided into two groups: (1) substances with insulating properties at room temperature ($\varrho_{20^\circ} = 10^{13} - 10^{16}$ ohm·cm) and a distinct compensation effect; (2) polymer semiconductors with an electric conductivity of $10^{-5} - 10^{-10}$ ohm^{-1}·cm^{-1} at 20°C which had no

Card 1/2

Report by A. V. Ayrapetyants...

S/190/62/004/008/016/016
B117/B144

compensation effect. Hence the results of the two papers are consistent.

SUBMITTED: February 5, 1961

Card 2/2

GUSYNIN, V.I.; TAL'ROZE, V.L.

Quenching of the radioluminescence of terphenyl solutions in dioxane by bromides. Opt. i spektr. 12 no.1:136-137 Ja '62. (MIRA 15:2)

(Terphenyl) (Dioxane) (Bromides)

TAL'ROZE, V. L.

Dissertation defended for the degree of Doctor of Chemical Sciences at the Institute of ~~N~~Petrochemical Synthesis: in 1962:

"Ion-Molecular Reactions in Gases (From Compilation of Studies)."

Vest. Akad. Nauk SSSR. No. 4, Moscow, 1963, pages 119-145

VASIL'YEV, G.K.; TAL'ROZE, V.L.

On the theory of the accumulation of stabilized radicals in solids.
Kin. i kat. 4 no.4:497-507 Jl-Ag '63. (MIRA 16:11)

1. Institut khimicheskoy fiziki AN SSSR.

PONOMAREV, A.N.; TAL'ROZE, V.L.

On the theory of low-temperature interaction between atomic hydrogen obtained in the gas phase and solid olefins. Kin.i kat. 4 no.5: 657-661 S-O '63. (MIRA 16:12)

1. Institut khimicheskoy fiziki AN SSSR.

KARACHEVTSEV, G.V.; TAL'ROZE, V.L.

Measurement of the decay rate of ions formed by electronic impact in the gas phase. Kin. i kat. 4 no.6:923-926 N-D '63.
(MIRA 17:1)

1. Institut khimicheskoy fiziki AN SSSR.

VASIL'YEV, G.K.; SKURAT, V.Ye.; TAL'ROZE, V.L.

Formation of hydrogen in low-temperature radiolysis of polyethylene.
Izv. AN SSSR Ser.khim. no.10:1871-1873 O '63. (MIRA 17:3)

1. Institut khimicheskoy fiziki AN SSSR.

L 10271-63 EWT(l)/BDS/ES(w)-2--AFFTC/ASD/SSD--Pab-4--IJP(C)
ACCESSION NR: AP3002734 S/0120/63/000/003/0118/0121

62
61

AUTHOR: Tantsy"rev, G. D.; Karpov, G. V.; Tal'roze, V. L.

TITLE: Analytical mass spectrometer with modulated molecular beam

21 21

SOURCE: Pribory i tekhnika eksperimenta, no. 3, 1963, 118-121

TOPIC TAGS: mass spectrometer, trace detectability, molecular beam modulation

ABSTRACT: Modifications of existing mass spectrometer design are described, consisting of modulating the injected gas molecule beam prior to its ionization and replacing the usual collector head with a multiplier tube, electrometer amplifier, a-c amplifier, and phase detector. This method increases the detectability of small traces which tend to be obscured by noise effects in the apparatus, such as residual gas in the vacuum chamber, gas evolution from chamber elements, and adsorption. Beam modulation (see Fig. 1 of Enclosure) is obtained by the action of shutter 7, which is energized by solenoid 8 to interrupt the beam between diaphragms 2 and 6 at periodic rates up to 100 cps. In this way, only the desired gas in modulated form is detected for analysis. Electrometer amplifier input impedance is approximately 100 megohms, and a-c amplifier gain is about 300. Sample data are given showing the comparative interference effects with and without

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L 10271-63
ACCESSION NR: AP3002734

beam modulation for two cases where contaminating traces of water or ethyl alcohol are present in the injection system. The registered line intensities in both instances are almost an order of magnitude less when using modulation. Other advantages cited are 1) a much reduced degree of interaction between contaminant-introducing chemically active elements in the beam and chamber sections, and 2) the fact that the temperature stabilization required to maintain spectral clarity can now be accomplished in the injection system, which is easier than effecting stabilization in the ionization chamber. The modifications described are adaptable to existing mass spectrometers. Orig. art. has: 6 figures and 1 table.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics AN SSSR)

SUBMITTED: 09Jul62 DATE ACQ: 12Jul63 ENCL: 01

SUB CODE: 00 NO REF SOV: 003 OTHER: 004

Card 2/3

L 16109-65 EWG(j)/EPA(s)-2/EWT(m)/EPF(c)/EPF(n)-2/EWP(j)/T/EWA(h)/EWA(1)
Pc-4/Pr-4/Pt-10/Peb/Pu-4/Pa-4 ESD(t)/ESD(gs)/BSD/AFWL/ASD(a)-5/ASD(m)-3
GG/RM

ACCESSION NR: AP4045834 S/0062/63/000/012/2124/2131

AUTHOR: Vasil'yev, G. K.; Tal'roze, V. L. 1 3

TITLE: Mass-spectrometric studies of radiolysis of certain polymers with conjugated bonds

SOURCE: AN SSSR. Izv. Seriya khimicheskaya, no. 12, 1963, 2124-2131

TOPIC TAGS: mass spectrometry, radiolysis, polymer, conjugated bond, semiconductor, chloranyl, polymerized olefin, polyacrylonitrile, aniline black, energy transfer, radiation stability 19

ABSTRACT: Such polymers are used as semiconductors, 15 catalysts, etc. Their radiation stability, the energy transfer effects of radiation and physico-electrical properties compared to radiation data were studied. A highly sensitive mass-spectrometric method was developed. The equipment is described and figured. Electroconductivity, activation energy of conductivity, the composition and kinetics of liberation of gaseous products due to the radiolysis were determined, affording measuring of radio-chemical liberation of hydrogen and CO_2 from

Card 1/3

L 16109-65

2

ACCESSION NR: AP4045834

0.002 + 0.001 molec/100 eV. The polymers used were chloranyl with polymerized olefins, chloranyl with polyacrylonitrile, and aniline black with HCl. Irradiation with 1.6 MeV was coupled with spectrometry and gas analysis. The liberation of H_2 was considered a measure of polymer stability, since H_2 is an essential component. Great differences were detected in hydrogen liberation by the various polymers. A correlation between hydrogen liberation and activation energy of conductivity was observed; this was apparently caused by an intramolecular or intermolecular break in conjugation of the hydrocarbon chain. Relation of thermal EMF to temperature seemed related to the mobility of the energy carriers rather than their formation. Radiation stability is proposed as one of the qualitative indices of conjugation in polymer chains. CO_2 originating from oxygen admixtures was liberated at the rate of 4.2 molec/100 eV; it seemed chemically bound (according to studies on the concentration of oxygen-containing groupsin the polymers). Study of CO_2 liberation showed an insignificant effect of energy transfer to the admixed oxygen-containing groups. "The authors wish to thank A. A. Berlin for supplying the material for these studies". Orig. art. has: 9 figures and 1 table.

Card 2/3

L 16109-65
ACCESSION NR: AP4045834

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Physical Chemistry of the Acad. of Sciences, SSSR).

SUBMITTED: 26Jul63 ENCL: 00

SUB CODE: GC, GP NO REF SOV: 003 OTHER: 001

Card 3/3

TAL'ROZE, V.L.; ZIMINA, K.I.; POLYAKOVA, A.A.; TANTSYREV, G.D.

Mass spectrum analysis of mixtures of organic substances. Trudy Kom.anal.khim. 13:456-474 '63. (MIRA 16:5)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut po pererabotke nefti i gaza i polucheniyu iskusstvennogo zhidkogo topliva.
(Organic compounds) (Mass spectrometry)

LAVROVSKAYA, G.K.; MARKIN, M.I.; TAL'ROZE, V.L.

Using the ion recharging method in the mass spectrometric determination of radicals formed in the pyrolysis of acetone, di-tert-butyl peroxide and hydrazine. Trudy Kom.anal.khim. 13:474-482 '63. (MIRA 16:5)

1. Institut khimicheskoy fiziki AN SSSR.
(Radicals (Chemistry)) (Mass spectrometry)

L 15671-63 EWP(j)/EPF(c)/EWT(m)/BDS AFFTC/ASD/ESD-3 Pc-4/Pr-4/Pi-4
RM/WW/RH/JFW/JT
ACCESSION NR: AP3004311

S/0030/63/000/007/0113/0114

AUTHORS: Tal'roze, V.L. (Doctor of chemical sciences); Frankevich, Ye.L. 83
(Candidate of physical and mathematical sciences) 77

TITLE: Elementary processes of high energy chemistry /Symposium held in Moscow from 18 to 22 March 1963/

SOURCE: AN SSSR Vestnik, 33 no. 7, 1963, 113-114

TOPIC TAGS: elementary process , gas , fluid , solid , high energy chemistry, state of excitation, free radical , ion , quantum generator , negative temperature

II

ABSTRACT: The symposium was held March 18-22 in Moscow at the Institute of Physical Chemistry of the Academy of Sciences, SSSR. The following general problems were discussed: elementary processes in gases, 7 elementary processes in fluids and solids, including states of excitation, free radicals 7 and ions, and elementary processes in quantum generators. Most of the papers on gases dealt with the problem of ionization and transformation of ions. The formation of ions from collision of neutral particles was also discussed. Three new methods for measuring the life span of excited ions were submitted. The reaction of ions with molecules in gases was discussed, as was the transmission of energy by

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L 15671-63
ACCESSION NR: AP3004311

6

various mechanisms. The latter problem brought about a difference of opinions, and a special committee was named to prepare concrete conclusions and recommendations for future work. The adjacent fields of low-temperature and photochemical reactions, as well as of solid phase polymerization by radiation, also received attention. Two papers were devoted to the reactions of radicals with oxygen. It was also reported that a substantial concentration of charged particles is being stabilized in saturated hydrocarbons. Theoretical requirements for the creation of a "negative temperature" were outlined. It is stated, in conclusion, that while the scientists were all working in the same theoretical field of chemical kinetics, they were actually covering a variety of domains, such as radiation, photochemistry, chemistry of plasma, high temperature, ionosphere, and cosmic chemistry.

ASSOCIATION: None

SUBMITTED: 00 DATE ACQ: 15Aug63 ENCL: 00

SUB CODE: CH NO REF SOV: 000 OTHER: 000

Card 2/2

TAL'ROZE, V.L., doktor khim. nauk

Chemistry of high energies. Vest. AN SSSR 33 no.12:12-15 D '63. (MIRA 17:1)

L 12657-63 EWP(j)/EPF(c)/EWT(m)/BDS ASD Pr-4/Pc-4 RM/WW
ACCESSION NR: AP3003563 S/0020/63/151/002/0388/0391

64
62

AUTHORS: Skurat, V. Ye ; Tal'roze, V. L.

TITLE: The formation of HD during the reaction of hydrogen atoms, formed in the gas phase, with solid deuteropolyethyl

SOURCE: AN SSSR. Doklady*, v. 151, no 2, 1963, 388-391

TOPIC TAGS: HD, deuteropolyethyl, activation energy

ABSTRACT: A functional relation between the rate of HD formation during the reaction of H atoms with deuteropolyethyl, containing 98% of D atoms, and temperature is given. It is concluded that no possible "mixtures" in deuteropolyethyl participates in the reaction of HD formation and that the activation energy corresponds to the reaction

$$H + M \rightarrow H_2 + R \qquad (1)$$

where M is the hydrocarbon and R is the free radical. Thus, it is shown that in solid polyethyl a reaction of type (1) is possible

Card 1/2

L 12657-63
ACCESSION NR: AP3003563

during the activity of thermal H atoms on polymers. Orig. art. has: 2 figures. This report was presented by Academician V.N.Kondrat'yev 1 Apr 1963.

2

ASSOCIATION: Institut khimicheskoy fiziki, Akademii nauk SSSR (Institute of chemical physics, Academy of sciences, SSSR)

SUBMITTED: 23Mar63 DATE ACQ: 30Jul63 ENCL: 00

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

Card 2/2

VASIL'YEV, G.K.; SKURAT, V.Ye.; TAL'ROZE, V.L.

Gas evolution kinetics in low-temperature radiolysis of paraffin and polyethylene. Dokl. AN SSSR 152 no.2:356-358 S '63.
(MIRA 16:11)

1. Institut khimicheskoy fiziki AN SSSR. Predstavleno akademikom N.N. Semenovym.

ACCESSION NR: AP4016514 S/0020/64/154/005/1160/1162

AUTHOR: Lavrovskaya, G. K.; Skurat, V. Ye.; Tal'roze, V. L.

TITLE: Radiation synthesis of xenon fluorides

SOURCE: AN SSSR. Doklady*, v. 154, no. 5, 1964, 1160-1162

TOPIC TAGS: xenon fluoride, radiation, xenon difluoride, xenon tetrafluoride, infra red spectrum, xenon fluorine radiation

ABSTRACT: A mixture of fluorine and xenon was irradiated with a 1.6-Mev beam of electrons (electron current 30-40 microamps, 10^{-3} mm. Hg pressure, reactor liquid-air cooled during reaction). After irradiation unreacted F and Xe were measured and removed from the reactor while cooled with liquid nitrogen. After removal of unreacted gases, the reactor pressure at room temperature was 3 mm. Hg, corresponding to the vapor pressure of XeF_2 and XeF_4. After remaining in the reactor, the Xe fluorides decomposed to F and Xe. Xenon reacts to the extent of 30-50%. The xenon fluorides were identified by their IR

ACCESSION NR: AP4016514

spectra; and it was found that XeF_2 and XeF_4 were formed to a lesser extent. The radiation dose was about 3000 megarads. The radiation yield, based on xenon consumption, is 0.4-0.7; the same yield is obtained with larger doses. Orig. art. has: 1 table.

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