SOV/20-127-5-29/58

Tunnel Transitions Between Systems Which Are Described by Morse-Potential Curves

(Physics Institute imeni P. N. Lebedev of the Academy of Sciences, USSR)

PRESENTED: April 11, 1959 by V. N. Kondrat'yev, Academician

SUBMITTED: April 1, 1959

Card 3/3

GOLDANSKII, V.I.

"On Two-proton Radioactivity"

report submitted for the 2nd USSR Conference on Nuclear Reactions at Low and Intermediate Energies, Moscow, 21-28 July 1960.

GOLDANSKIY, V. I., KAGAN, Yu. M. (USSR)

"Thermo-Chemical effects of Ionizing Radiations".

paper submitted for the Symposium on the Chemical Effects of Nuclear Transformation (IAEA) Prague, 24-27 Oct. 1960.

S/120/60/000/03/004/055
E032/E514

24.6810

AUTHORS: Gol'danskiy, V.I., Karpukhin, V.A. and Pavlovskaya, V.V.

TITLE: Determination of the Energy Dependence of the Efficiency of Recording of High-Energy Gamma Rays

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, No 3, pp 23-26

ABSTRACT: A new method is described for determining the energy dependence of the efficiency of recording of high-energy gamma rays (35-50 MeV) using a coincidence telescope. The method is based on measurements of Compton scattered gamma rays. The Compton cross-section is well-known and is given by the Klein-Nishina formula. At small angles the scattered gamma rays have a relatively large energy. Thus, for example, at a scattering angle of $\theta = 3°$ and incident gamma ray energy of 250 MeV, the energy of the scattered gamma ray is about 150 MeV. Thus by placing a gamma ray telescope at an angle of 3° to the beam axis, and by varying the maximum energy of the bremsstrahlung from a synchrotron, one can examine a wide energy range. The experiment was carried out in the gamma-beam of the

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Determination of the Energy Dependence of the Efficiency of Recording of High-Energy Gamma Rays

265 MeV synchrotron at the Physics Institute, Ac.Sc., USSR. The experimental arrangement is shown in Fig 1. The gamma ray beam from the synchrotron target was collimated by a lead collimator, its maximum energy being set to 250, 200, 150, 115, 80 and 60 MeV. The gamma rays scattered at angles less than 3° were detected by the four-counter telescope shown in Fig 2 The efficiency of recording of gamma rays between 35 MeV and 150 MeV was measured as a function of energy, and the result obtained is shown in Fig 5.

Acknowledgment is made to A.V.Kutsenko, A.Samiullin, S.P. Balat'yev and Ye. M. Petrov for help during the measurements.

There are 5 figures and 7 English references.

ASSOCIATION: Fizicheskiy institut AN SSSR (Physics Institute, Ac.Sc., USSR)

SUBMITTED: May 25, 1959

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610017-5"

S/026/60/000/04/021/070
D043/D006

The Discovery of the Antiproton

mentioned. There are 6 photographs, 2 graphs and 2 Soviet references.

Card 2/2

83202
S/056/60/039/002/041/047
B006/B070

24.6510

AUTHOR: Gol'danskiy, V. I.

TITLE: The Limits of Stability, the Proton- and Two-Proton Radioactivity of Neutron-deficient Isotopes of Light Nuclei

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol 39, No 2(8), pp 497 - 501

TEXT: By applying the principles of isotopic invariance to light nuclei, the author has been able to derive a very simple relationship between the binding energies of neutrons and protons in distant mirror nuclei:

$$\Delta E_{np} = E_n({}_N^{A}M_Z) - E_p({}_Z^{A}M_N) = [E_{coul}({}_Z^{A}M_N) - E_{coul}({}_{Z-1}^{A-1}M_N)] \quad [E_{coul}({}_N^{A}M_Z) - E_{coul}({}_N^{A-1}M_{Z-1})]$$

ΔE_{np} is the difference of the binding energies of the Zth neutron in the nucleus ${}_N^{A}M_Z$ and that of the Zth proton in the mirror nucleus ${}_Z^{A}M_N$. The first two terms characterize the change in Coulomb energy when a proton is removed from the nucleus, the last two correspond to the

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The Limits of Stability, the Proton- and Two-Proton Radioactivity of Neutron-deficient Isotopes of Light Nuclei

S/056/60/039/002/040/044
B006/B070

same change when a neutron is removed. ΔE_{np} is independent of N to an accuracy of 1%, and may be approximately represented by the formula (2): $\Delta E_{np} \approx 1\ 2(Z-1)(2Z-1)^{-1/2}$ Ultimately, a simple relation for the mass difference of distant mirror nuclei also follows from the isotopic invariance:

$_Z M^A_N - {}_N M^A_Z \approx (Z-N)\Delta M_o$; $\Delta M_o = {}_{A/2+1/2}M^A_{A/2-1/2} - {}_{A/2-1/2}M^A_{A/2+1/2}$ for odd A.

and $\Delta M_o = \frac{1}{2}\left\{{}_{A/2+1}M^A_{A/2-1} - {}_{A/2-1}M^A_{A/2+1}\right\}$ for even A. Formula (2) is very well confirmed by the available experimental material (See Table 1). With the help of the formula given here, the author determines the limit of stability with respect to decay with emission of protons of the neutron deficient isotopes of light nuclei, and predicts the properties of about 90 isotopes of this kind (See Table 2). He discusses the possibility of observing proton radioactivity and indicates some nuclei that may show it (for example, $Be^6 \rightarrow Li^5 + p$). For two-proton radioactivity the following

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The Limits of Stability, the Proton- and Two-Proton Radioactivity of Neutron-deficient Isotopes of Light Nuclei

S/056/60/039/002/039/044
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isotopes are indicated: Ne^{16}, $Mg^{17(18?)}$, $Si^{21(22?)}$, $S^{29(24?)}$, $Ar^{32(28?)}$, $Ca^{33(34?)}$, Ti^{38}, Cr^{42}, $Fe^{44(43?)}$, $Ni^{46(47?)}$, $Zn^{53(54?)}$, $Ge^{59(58?)}$, $Se^{63(62?)}$, $Kr^{67(66?)}$. The main properties of two-proton radioactivity are discussed and the problems of probability are dealt with in detail. The problems of preparation of neutron-deficient light nuclei (bombarding of stable light nuclei with H or He^3 nuclei) are also discussed. The author thanks Ya. B. Zel'dovich for discussions. A. I. Baz' is mentioned. There are 2 tables and 5 references: 4 Soviet and 1 US.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Institute of Physics imeni P. N. Lebedev of the Academy of Sciences of the USSR)

SUBMITTED: March 28, 1960

Card 3/3

87031

S/190/60/002/007/015/017
B020/B052

15.8106

AUTHORS: Barkalov, I. M., Berlin, A. A., Gol'danskiy, V. I., Dzantiyev, B. G.

TITLE: Radiation Polymerization of Phenyl Acetylene

PERIODICAL: Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 7, pp. 1103-1107

TEXT: Purpose of this paper was the investigation of kinetics and the mechanism of the radiation polymerization of phenyl acetylene which was initiated by electrons with an energy of 1.5 Mev. The irradiation was carried out in special cuvettes (Fig. 1 a). The electron beam was introduced through a plane-parallel glass window 0.5 mm thick. For accurate thermostating within the range of positive temperatures, a different type of cuvette was used (Fig. 1,b). The temperatures of the polymerization were -196 to +85°C. The reaction yield was not higher than 10 - 12%, since in all experiments the initial stage of polymerization was investigated. The radiation dose was determined by a chemical dosimeter (0.02 mole/l of

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$CuSO_4$, 0.002 mole/l of $FeSO_4$, and 0.02 n [illegible] H_2SO_4) which was recommended by the Institut im. L. Ya. Karpova (Institute imeni L. Ya. Karpov). The developing Fe^{3+} was photometrically examined by a СФ-4 (SF-4) spectrophotometer. The IR spectra of polyphenyl acetylene were studied by Yu. Sh. Moshkovskiy. The polyphenyl acetylene yield rises proportionally to the dose of wide ranges (10^7 - 10^8 roentgen) (Fig. 2). Even with the largest doses applied, no noticeable destruction of the developed polymer was observed. This seems to prove the absence of effective inhibitor additions whose presence would be indicated by the S-shape of the curve. In the presence of atmospheric oxygen, the polymer yield is increased to the 1.5- to 2-fold under otherwise equal conditions. With a certain dose, the polymer yield does not depend on its quantity, not even at temperatures near the melting point or when the liquid monomer is exposed to radiation. The dependence of the polymer yield on the quantity of the dose was also investigated (Fig. 2) at 0 and -78°C. The extremely low dependence of the polymerization rate of phenyl acetylene on the temperature is also typical. Experiments were carried out regarding the polymerization of phenyl acetylene in nonane and ethyl acetate. In these two solvents the

Radiation Polymerization of Phenyl Acetylene

S/190/60/002/007/015/017
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polymer yield differed widely from that expected on the basis of the additivity law (Fig. 3). A very effective radiation energy transfer (the radiation is absorbed by the solvent molecules) to the phenyl acetylene molecules is observed. Substances with structures of the polyacetylene type have the same properties as aromatic hydrocarbons, namely that of taking up the energy of ionizing radiation. The laws of phenyl acetylene polymerization in many respects are specific, sometimes even the opposite of those of the usual radical polymerization. Summing up one may say that the polyphenyl acetylene yield is approximately 8 - 9 molecules when the radiation is 100 ev. In the liquid phase, polymerization and initiation rates are proportional. The activation energy is as low as approximately 700 kcal/mole. A mechanism was suggested which explains the unusual results by the specific properties of highly conjugated products during the polymerization of phenyl acetylene. In these products a strong delocalization of unpaired elements takes place, and the reactivity of similar molecules is reduced with an increase in their length.
There are 3 figures and 6 references: 4 Soviet and 2 US.

AUTHOR:

TITLE:

PERIODICAL:

TEXT:

Card: 1/

Some Isotopes of Light Nuclei

S/081/60/072/002/002/004
B004/B067

with high neutron excess are dealt with. In the case where all problems of neutron binding energy in the nucleus are discussed (Fig. 2 shows E_n as a function of Z for a large number of N-values). Also experimental results are presented and discussed. The possibilities of an experimental determination of the bineutron (reaction (n^2, a) e.g. N^{14}, $n^2 \rightarrow B^{12}$, a ; 3.2 Mev, $n^2 \rightarrow 2n$ decay on passage of n^2 through matter and measurement of the neutron directional correlation, Fig.7) are discussed. Furthermore experiments for determining H^7 and He^8 are discussed. In part 5 considerations are made on the stability limits and a five-page table containing a survey of various properties (N, A, (M-A), E_p, E_n, E_β, $T_{1/2\beta}$) of isotopes with neutron excess as well as of neutron-deficient electrons for the region Z=3 to 40 is given which is highly valuable for practical work in this field. F. E. Nemirovskiy and A. T. Varfolomeyev are mentioned. There are 8 figures, 1 table, and 24 references: 11 Soviet, 10 US, and 3 Canadian.

Card 2/2

BAZ', A.I.; GOL'DANSKIY, V.I.; ZEL'DOVICH, Ya.B.

Undiscovered isotopes of light nuclei. Usp. fiz. nauk 77 no.2:211-234 O '60. (MIRA 16:8)

(Isotopes)

GOL'DANSKIY, V. I., prof., doktor fiz.-matem.nauk; ZHDANOV, G.B., doktor fiz.-matem.nauk (g.Moskva)

Sample of scientific foresight. Fiz. v. shkole 20 no.3:5-11 My-Je '60. (MIRA 13:11)

(Particles (Nuclear physics))

24.69CC

AUTHORS: Gol'danskiy, V. I., Makarenko, V. M.

TITLE: Hypothesis of the Neutral ρ^0-Meson Basing on Data on the Annihilation of Antiprotons

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 3 (9), pp. 641-643

TEXT: The authors discuss the ρ^0-meson decay modes indicated in publications. The ρ^0-meson is classified as existing and having a zero strangeness according to Gell-Mann and Nishidjima. The three possible decay modes are written down. $\rho^0 \longrightarrow \pi^- + \pi^+ + \gamma$ (1); $\rho^0 = \pi^0_0 \longrightarrow 2\gamma$ (2); $\rho^0 = \pi^0_{10} \longrightarrow 3\gamma$ (3). Starting from the statistical theory of multiple processes, the authors compare these processes with experimental data concerning the annihilation of antiprotons (Ref. 1). The mean values of the yields are given [illegible];

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Hypothesis of the Neutral ρ^0-Meson Based on Data on the Annihilation of Antiprotons

AUTHOR/S/: [illegible]

$\bar{n}_{\pi^-} = 1.58 \pm 0.08$; $\bar{n}_{\rho^0} = [illegible]$. Application of the equations developed in Refs. 11, 12 leads to the following results (Figs. 1-5). The decay mode (1) does not contradict the experimental data obtained with an arbitrary ρ^0-meson mass. Decay mode (2) requires a ρ^0-meson mass of $\geq 3.5\ m_{\pi^-}$ and decay mode (3) can be made to fit experimental data provided the ρ^0-meson mass is at least $[illegible]\ m_{\pi^-}$. The emission of mesons with different signs in the annihilation of antiprotons thus excludes the existence of both π^0- and π^0_2-mesons. There are 5 figures and 15 references: 7 Soviet, 6 US, and 7 Italian.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva akademii nauk SSSR (Institute of Physics imeni P. N. Lebedev of the Academy of Sciences USSR)

SUBMITTED: April 26, 1958

Card 2/2

S/056/60/039/005/046/051
B006/B077

AUTHORS. [redacted]

TITLE. Observation of the Positronium Reaction in Aqueous Solutions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 5(11), pp. 1477 - 1478

TEXT: The present " Letter to the Editor" brings a contribution to the problem of the positron annihilation in aqueous solutions and the influence of different additions on these. The purpose of the tests whose results are compiled in a table was to prove that the different additions act mainly kinetically on the positronium annihilation in aqueous solutions and also to show a comparison of these effects with the oxidation - reduction characteristics and magnetic characteristics of different ions. The authors investigated the rate of 3γ-annihilation of positrons from an Na^{22} source (0.1 mC) in aqueous solutions. The table shows the data with respect to the 3γ-annihilation rate compared to pure water and the

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influence of different additions (mainly different cations in the presence of positronium + inert Cl^- anions). A general tendency to a decrease of the $C_{3\gamma}$ counting rate is found if stronger oxydizers are used but strong deviations can be found too. The deviations may frequently be caused through a $^3S_1 \rightarrow {}^1S_0$ conversion at unpaired electrons of paramagnetic ions, but there is no specific connection between the magnetic properties of the ions and the quantity $C_{3\gamma}$. A strong increase of the $C_{3\gamma}$ counting rate was found also by other authors, if NO_3^- ions were added and also that MnO_4^- ions acted stronger yet. The following data characterize the concentration dependence of $C_{3\gamma}$ for MnO_4^- additions as compared to neutral solutions:

Observation of the Positronium Reaction in Aqueous Solutions

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Concentration MnO_4^- in mole/l	saturated solution	0.1	0.01	0.001	0(water)
$C_{3\gamma}$ min^{-1}	3.6±0.42	5.08±0.45	5.08±0.12	5.50±0.30	6.34±0.09

The authors thank Academician A. N. Frumkin for discussions of the results obtained. There are 1 table and 4 non-Soviet references.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences USSR). Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

SUBMITTED: August 2, 1960

83608

S/056/60/038/005/041/050
B006/B063

24.6700

AUTHOR: Gol'danskiy, V. I.

TITLE: Superheavy Isotopes of Hydrogen and Helium

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki 1960, Vol. 38, No. 5, pp. 1637 - 1639

TEXT: Data on the neutron pairing energy may be used to estimate the stability of numerous isotopes (especially H^5, H^7, and He^8) against neutron emission. The present "Letter to the Editor" shows that this method offers usable results for the above-mentioned isotopes. Fig. 1 shows the pairing energy E_p as a function of Z of the first six neutron shells (from $1s_{1/2}$ to $2s_{1/2}$) for all elements from hydrogen to potassium. (E_p denotes the difference between the binding energies of the (2m+2)nd and (2m+1)st neutron). It may be seen that nuclei with odd proton numbers have a smaller E_p than those with even proton numbers. He^8: The pairing energy is not higher than 2.86 Mev and not lower than 1.54 Mev (the values for He^6 and Li^9, respectively). Thus, the requirement that

Superheavy Isotopes of Hydrogen and Helium S/056/60/038/005/041/050
B006/B063

the $He^7 \rightarrow He^6 + n$ decay energy be smaller than ~1.4 Mev is a necessary condition, and that this energy be not higher than ~0.8 Mev is a sufficient condition for the stability of He^8. A comparison between the masses of Li^7, He^6, and n along with the correction for Coulomb interaction indicates that He^8 is stable if the first level (T = 3/2) for A=7 is not higher than 12.7 Mev, and that it is safely stable if this level is below 12 Mev. If the level with T = 3/2 exists, the $He^7 \rightarrow He^6 + n$ decay has an energy of about 1.1 Mev, and from the condition of stability it follows that the pairing energy of the two last neutrons is not lower than ~ 2.2 Mev. The problem of the stability of He^8 remains unsolved. Some experiments which might contribute to its explanation are given. H^5: Also in this case $E_p \sim 2.86$ Mev (this is the value for He^6 which is the even nucleus with the same number of neutrons). Furthermore, H^5 can be only stable if the energy of the $H^4 \rightarrow H^3 + n$ decay is not higher than ~ 1.4 Mev. A comparison between the masses of He^4 H^3

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Superheavy Isotopes of Hydrogen and Helium S/056/60/038/005/04[illegible]/050
B006/B063

and n along with the correction for Coulomb interaction shows that H^5 can be only stable if the level with T=1 for a-particles is below ~ 22 Mev. The fact that no He^4 levels are known for this range indicates that H^5 is unstable. The upper limit of the level with T=1 is calculated to be ~ 25.2 Mev. The stability against the $H^5 \rightarrow H^3 + 2n$ decay depends on the energy of the level with T = 3/2 for A=5, which is $\lesssim$ 19.4 Mev. All data indicate that this nucleus is unstable. If the H^7 nucleus were stable it would be found in reactions of the mode $Be^9(\pi^-, 2p)$ in photoemulsions. Ya. B. Zel'dovich and A. A. Ogloblin are thanked for discussions. There are 2 figures and 6 references: 2 Soviet, 3 US, and 1 Dutch.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Institute of Physics imeni P. N. Lebedev of the Academy of Sciences USSR)

SUBMITTED: January 16, 1960

S/0 6/60/038/001/018/030, XX
A006/B070

24.6900 (1138, 1191, 1559)

AUTHORS: Gol'danskiy, V. I., Karpukhin, O. A., Kutsenko, A. V., Pavlovskaya, V. V.

TITLE: Elastic γp Scattering at Energies of 40 - 70 Mev and the Polarizability of the Proton

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 6, pp. 1695 - 1703

TEXT: The present paper gives a detailed description of the results of scattering experiments, of the determination of the differential elastic γp scattering cross sections and of a comparison of the results with theory. The object of the experiments was to obtain more exact data giving a definite information on the polarizability of the proton. The experiments were carried out on the 265-Mv synchrotron of FIAN in the gamma energy range of 40 - 70 Mev (maximum bremsstrahlung energy 75 Mev) and at essentially lower than the π^0 production threshold. The experimental arrangement is schematically shown in Fig. 1. The

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Elastic γp Scattering at Energies of 40 - 70 Mev and the Polarizability of the Proton

S/056/60/038/002/018/049/XX
B006/B077

target was a cylindrical vessel (4 [illegible]) filled with liquid hydrogen. Two telescopes consisting of four scintillation counters with a lead converter behind the first and an aluminum filter in front of the last served as high-threshold (~50Mev) gamma detectors. Each counter was connected with an ФЭУ-13 (FEU-13). The block diagram of the electronic apparatus is shown in Fig. 1. A thin-walled ionization chamber placed in front of the first collimator served as an intermediate monitor. The duration of the electron pulses of the synchrotron was up to ~300 μsec. The detecting telescopes were placed at angles of 45°, 75°, 90°, 120°, 135°, and 150° with respect to the bremsstrahlung beam. The experimental conditions and the apparatus are thoroughly described in the paper. One section is devoted to the description of the telescope efficiency, and one to the evaluation of the experimental results. A table gives the measured values of $d\sigma/d\Omega$, the necessary corrections, and the final values. The determination of the corrections for the background and for the γ-rays in the target and the determination of the systematic errors are discussed in the text.

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85676

Elastic γp Scattering at [illegible] 40 - 70 Mev and the Polarizability of the Proton

S,C,6,60,9th/03C/016/C43/XX P90%/B07C

The data obtained are compared with the theoretical results which were obtained by taking into account the anomalous magnetic moment of the proton and the effects of mesonic virtual polarization (see Fig. 4). From $d\sigma/d\Omega(90°) = (1.10 \pm 0.05) \cdot 10^{-28}$ cm^2/sterad, the proton polarizability (electric) was found to be $a_E = (\quad) \cdot 10^{-43}$ cm^3. If dispersion relations are used in addition to the experimental results, it is possible to calculate, from the pion photoproduction data, the sum of electric and magnetic polarizabilities $a_E + a_M = 0.$ [illegible] $\cdot 10^{-43}$ cm^3 (Fig. 5). Then, taking into account also the errors of the fits, $a_E = (9 \pm 2) \cdot 10^{-43}$ cm^3 and $a_M = (2 \pm 2) \cdot 10^{-43}$ cm^3. The results are finally discussed and compared with results of other authors. In particular, the results of neutron polarizability obtained by various authors are discussed and intercompared. From the value $a_E = 0 \cdot 10^{-43}$ cm^3 obtained for protons, the root mean-square fluctuation of the proton electric dipole length is found to be

$$\langle r^2 \rangle^{1/2} = \quad \cdot 10^{-13} \text{ cm}$$

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Elastic γp Scattering at Energies of 40 - 70 Mev and the Polarizability of the Proton

S P Balatbekov, R I Yakovlev, [illegible] and A Sharafutdinov

thanked for assistance [illegible] ments; and A M Baldin and V N Gribov for [illegible] A Aleksandrov and V A Petrun'kin are mentioned. [illegible] table and 30 references: 10 Soviet [illegible] and 2 U.S.

ASSOCIATION: Fizicheskiy institut im P N Lebedeva Akademii nauk SSSR (Institute of Physics imeni P N Lebedev of the Academy of Sciences USSR)

SUBMITTED: January 12, 1960

Card 4/5

2209
15 8000 2209

AUTHORS: Barkalov, I. M., Goldanskiy, V. I., Dzantiyev, B. G., Yegorov, Yu. V.

TITLE: The Welding of Teflon and Other Polymeric Materials by the Localized Action of Neutron Radiation

PERIODICAL: Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 1, pp. 1201-1204

TEXT: A simple process was developed for local welding of Teflon and other polymeric materials by irradiating the materials to be welded with thermal neutrons after pretreatment of the material surface with boron- and lithium compounds. The following polymeric materials were welded: Teflon - polystyrene, Teflon - polymethyl methacrylate, polystyrene - polymethyl methacrylate, polyethylene - polystyrene, polyethylene - polymethacrylate. Prior to irradiation, the surfaces to be welded were treated with solutions of boron- and lithium compounds and subsequently exposed to a thermal neutron flux from the VVR-1000 (IRT-1000) reactor. The tear resistance of the Teflon - polystyrene weld is a fraction of the magn-

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The Welding of Teflon and Other Polymeric Materials by the Localized Action of Neutron Radiation

S/190/62/004/012/007/019
B017/B083

roentgen dose applied to the surface, at constant B_2O_3 concentration, was investigated and the results are shown in a figure. The tear resistance of the Teflon - polystyrene weld is 120 kg/cm². The mechanism involved in welding polymeric materials by localized neutron irradiation is discussed. The thermal effect is assumed to be the main factor in this type of welding. Triple layer welding of polythene and Teflon and other polymeric and non-polymeric materials can be effected by applying interleaves of lithium- and boron-containing polystyrene films. There are 1 figure and 7 references: 1 Soviet and 6 US.

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

SUBMITTED: May 17, 1962

Card 2/2

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610017-5"

Pure and Applied Chemistry, Oxford, Pergamon Press, Ltd.

ALIMARIN, I. P., and [illegible] Yu. A., Institute of [illegible] Academy of Sciences USSR - "Determination of [illegible] by spectrophotometric method" (Section A-1), presented to Section A-1 - 11 Aug 61, Session 1)

BAZANOV, Yu. D., and [illegible] V. A., Institute [illegible] Academy of Sciences USSR - "Radiation chemistry" (Section A-1, Session 1 - 7 Aug 61, morning)

BELOVA, Ye. K., Institute of General and Inorganic Chemistry, Academy of Sciences USSR, Moscow - "The kinetics of the [illegible] analysis of melted salts" (Section A-1, Session 1 - 7 Aug 61, morning)

BELOVARY, Yu. K., Kiev, V. I., [illegible] Chemistry of Melted Salts, Institute of General Chemistry, Academy of Sciences Ukrainian SSR, Kiev - "Electrochemical investigations with melted borate and phosphate [illegible]" (Section A-1, Session 1 - 7 Aug 61, morning)

BELOUSOVA, Yu. K., [illegible] Institute of General and Inorganic Chemistry, Academy of Sciences USSR, Moscow - "Kinetics of diffusion in melted salts" (Section A-1, Session 1 - 7 Aug 61, morning)

ZEMANOV, M. I., Moscow State University imeni M. V. Lomonosov, Section A-1, Session 2(3), 11 Aug 61)

ZHUKOV, V. I., [illegible] Moscow State University imeni M. V. Lomonosov - "On the [illegible] of chlorine and [illegible] oxides" (Section A-1, Session 2(3), 11 Aug 61, morning)

ZHURAVLEV, V. I., Institute of Chemical Physics, Academy of Sciences USSR - "Physical Photometry - a new kind of [illegible] analysis of minerals" (Section A-1 - 7 Aug 61, morning)

Radiation-Induced Polymerization of Monomers in the Solid State

I. M. Barkalov, V. I. Gol'dan[illegible], N. S. [illegible], S. F. Terekhova and G. M. [illegible]

The authors investigated the kinetics of the radiation-induced polymerization of a number of vinyl monomers ([illegible], methylmethacrylate, vinyl acetate, formaldehyde). The polymerization was carried out [illegible] MeV electrons. The temperature range studied (from −196 to 0 C) included the melting point of the monomer. The temperature dependence of the polymerization rate near the melting point changed in a variety of ways. The polymer yield in the solid phase reached a limiting value with increasing dose. The influence of phase transitions on the kinetics of polymerization was established. The results are interpreted on the basis of the theory developed and presented by N. N. Semenov at the International Symposium of Macromolecular Chemistry (Moscow, July 1960), and at the 18th Congress of Pure and Applied Chemistry (Montreal, August, 1961).

Institute of Chemical Physics of the Academy of Sciences of the USSR, Moscow

report presented at the 2nd Intl. Congress of Radiation Research, Harrogate/Yorkshire, Gt. Brit. 5-11 Aug 1962

On

Some Peculiarities of the Radiation-[illegible]ized Polymerization of Acetylene Hydrocarbons

V. L. Gol'danskiĭ, L. M. Barkalov and S. S. Kurtenkov

The kinetics of the gas phase solid polymerization induced by 1.5 MeV electrons of [illegible] cyclohexadiene-1,4 and hexane were studied. Experiments relating to the [illegible] of the volume and pressure changes were also carried out. [illegible] Kinetic curves [illegible] are S-shaped. Rate of polymerization [illegible] from the [illegible] with the rate of [illegible] and [illegible] [illegible] mode. It was possible to separate the [illegible] with an energy of activation equal to that [illegible] on liquid polymerizations which are thought to have [illegible] mechanism, we observe an [illegible] over the melting-point region. For the polymerization in solutions it was found that [illegible] of energy takes place from the solvent [illegible] related to the monomer.

[illegible] Institute of Chemical Physics, Academy of Sciences of the USSR, Moscow

report presented at the 2nd Intl. Congress of Radiation Research,
Harrogate/Yorkshire, Gt. Brit. 5-11 Aug 1962

22291
S/056/61/041/001/004/007
B125/B201

24.6200

AUTHORS: Gol'danskiy, V. I., Peker, L. K.

TITLE: Some problems of the isomerism of atomic nuclei

PERIODICAL: Uspekhi fizicheskikh nauk, v. 73, no. 1, 1961, 661-693

TEXT: The authors wanted to complete the following synoptic articles by the detailed discussion of some special problems of nuclear isomerism: M. I. Korsunskiy "Isomerism of atomic nuclei" (1951), a survey by L. I. Rusinov and G. M. Drabkin in the January 1958 issue of Uspekhi fizicheskikh nauk; an article by L. I. Rusinov (deceased), Uspekhi fizicheskikh nauk, v. 73, no. 4, 1961, 615-670 on the story of the discovery of the isomerism of atomic nuclei and on the outstanding contribution by I. V. Kurchatov to the study of this phenomenon. The first part of the present paper deals with isomeric transitions near the millisecond range (10^{-5} - 1 sec). Until late in 1955, no more than 10 isomeric transitions were known in this range. According to O. I. Leypunskiy, this lack was due to insufficient research work in the field of the excitation of

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such levels by strong pulsed accelerators. According to formulas by Weisskopf and S. A. Moshkovskiy for single-particle transitions, such with $T_{1/2} = 10^{-5}$ to 1 sec and with an energy between 100 and 500 kev must be predominantly octupole transitions (of the type E3 and M3) or magnetic quadrupole transitions (of the type M2). One of the main achievements attained with the single-particle shell model was the explanation of "isomerism islets". According to the generalized shell model, isomeric transitions of an arbitrary type are possible in deformed nuclei. The single-particle shell model is only an approximation model and cannot precisely describe the energy of single-particle levels. O. I. Leypunskiy, A. M. Morozov, Yu. V. Makarov, P. A. Yampol'skiy (ZhETF 41, 337 (1961)) discovered in the Tl arising from the irradiation of Hg by fast protons two shortlived activities with $T_{1/2} = 0.042$ sec (E_γ = [illegible] kev) and $T_{1/2} = 5 \cdot 10^{-3}$ sec. Because of the great variety of the material concerned, only a few conclusions can be indicated in the abstract for a summary: When allowing for the regrouping of single-particle levels in the Goeppert-Mayer scheme, it will be practically possible to explain all "anomalous" isomeric states

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and transitions of the types E3 and M2, by taking account of the configuration levels. The levels with the spins $I_0 + 1$ and $I_0 + 2$ are most probably collective levels forming a rotational band related to the ground state. There are already many signs pointing to the necessity of undertaking a simultaneous study of the collective and the single-particle properties of nuclear levels. Isomeric states in odd-odd nuclei: (a) General characteristic properties: levels with small and large spin values (corresponding to addition or subtraction of j_p and j_n) are found more frequently with odd-odd nuclei than with odd nuclei. It is therefore most probable that one or several levels with widely varying σ_i in values appear near the ground state. Even though the multiplet configuration may be known (values of j_p and j_n), the spin of the isomeric and also of the ground state of an odd-odd nucleus is still difficult to be explained. Fig. 7 shows the intervals ΔE (kev) between the single-particle levels $7+-2-(i_{13/2} - f_{5/2})$ in odd-odd nuclei of $_{81}Tl$ and in odd nuclei of $_{80}Hg$ and $_{82}Pb$ as a function of the number of neutrons. 1 - filled shells. Excited levels are easy to interpret in deformed odd-odd nuclei. In fact, there

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can be only one odd nucleon on a level with asymptotic $\Omega = \Lambda \pm \Sigma$, and the total angular momentum of the odd group of nucleons coincides with the angular momentum $\Omega_{p(n)}$ of this nucleon. In the presence of a deformation the multiplet is always reduced to a doublet, whose elements have the spins $I = K = |\Omega_p \pm \Omega_n|$. Polikhov and M showed the following semiempirical rule: The level with $K = |\Omega_p + \Omega_n|$ is the lower level of the abovementioned doublet if the projections of the spin moments Σ_p and Σ_n are equal. In the opposite case, the level with $K = |\Omega_p - \Omega_n|$ is the level ground state. Most of the experimental data confirm this rule. Isomeric configuration levels and the possibilities of their identification by multicharged ions. The table shows the possible values of the total moments for the configuration levels $(j)^n$. In the transitions between the configuration levels it is necessary that an E2 or M1 radiation be emitted (or also conversion electrons). The cross sections of the excitation of configuration levels by multicharged ions are finally discussed. The configuration levels may appear with inelastic scattering, e...:

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Some problems of the isomerism of... S/053/61/073/004/004/007
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$_{18}Ar^{40}(0) + _{36}Kr^{83}(9/2+) \rightarrow _{18}Ar^{40*}(6+) + _{36}Kr^{83*}(21/2+)$, and sometimes also in neutron transfer processes of the type $_{36}Kr^{83}(9/2+) + _{38}Sr^{87}(9/2+) \rightarrow _{36}Kr^{84*}(8+) + _{38}Sr^{86*}(8+)$. The exponential function of neutron exchange has been calculated similarly to Ye. M. Lifshits. The excitation cross section of a nucleus with N neutrons and Z protons reads

$$\sigma_{n,n'}(N, Z) \approx \sigma_{\text{перед}}(N-1, Z) \exp\left\{-2(R \cdot \varphi_1 \varkappa(N, Z) - \right.$$
$$-2R\frac{I(N, Z)-I^*(N, Z)}{I\varepsilon_0}\operatorname{arctg}\frac{I(N, Z)-I^*(N, Z)}{I\varepsilon_0[\varkappa(N, Z)+\varkappa^*(N, Z)]}$$
$$\left.+2R\frac{I(N-1, Z)-I(N, Z)}{I\varepsilon_0}\operatorname{arctg}\frac{I(N-1, Z)-I(N, Z)}{I\varepsilon_0[\varkappa(N-1, Z)-\varkappa(N, Z)]}\right\}. \quad (5)$$

The dissertation of candidate A. M. Morozov (Institut khimicheskoy fiziki AN SSSR - Moskovskiy inzhenerno-fizicheskiy institut, 1961. g.) (Institute of Chemical Physics of the AS USSR - Moscow Institute of Physics and

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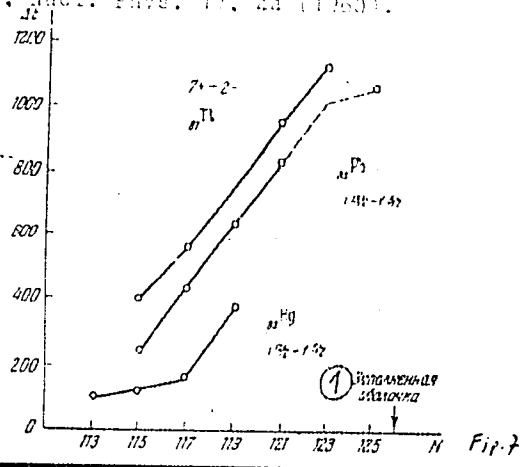
Some problems of the isomerism of...

Engineering, 1961) contains a complete list of the elements bombarded by 19.2-Mev protons. There are 7 figures, 1 table, and 52 references: 23 Soviet-bloc and 29 non-Soviet-bloc. The two most recent references to English-language publications read as follows: A. Zucker, Phys. Rev. Lett. 4, 21, 1960; J. Pinajian, Nucl. Phys. 17, 44 (1960).

Legend to Fig. 7:
1, filled shell.



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GOLOVANOV, V., prof.

"The visible strange world" by I. Efremov. Reviewed by V. Golovanov. Tekh. mol. 29 no.10:34 '61. (MIRA 14:9)
(Physics--Philosophy) (Efremov, I.)

S/030/61/000/01/003/00
B105/B147

AUTHOR: Zel'dankskiy, V. I., Professor

TITLE: Nuclear chemistry and its prospects

PERIODICAL: Akademiya nauk SSSR. Vestnik, no. 1, 1961, 29-34

TEXT: The prospects of the new nuclear chemistry are referred to two main problems. (1) investigation of properties and conversions of atomic nuclei, requiring the application of chemical methods; (2) use of methods and conceptions from nuclear physics and physics of elementary particles for the investigation of chemical properties and conversions. Main problems of nuclear chemistry are: (1) Investigation of multichannel nuclear reactions, and problems of cosmochemistry and geochemistry connected therewith. Similar investigations were conducted in the USSR by A. P. Vinogradov, A. K. Lavrukhina, Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo (Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy), I. V. Kurchatov, Institut atomnoy energii im. I. V. Kurchatova (Institute of Atomic Energy imeni I. V. Kurchatov), A. N. Murin, Radiyevyy institut im. V. G. Khlopina (Radium Institute

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Nuclear chemistry and its prospects

[illegible]

[illegible] ament V. G. Khlopin), and V. N. Mekhedov, Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research). N. A. Perfilov (Radium Institute imeni V. G. Khlopin) developed a method of track photoemulsions for investigating high-energy nuclear reactions. The problem of secondary neutrons in processes of separation and [illegible] investigated by the author at the Institut Khimicheskoy Fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR). (2) Search for new isotopes, new elements, new types of radioactivity. In recent years the formation of neutron-deficient isotopes of rare earths has been investigated in the USSR by F. A. Baranov and A. N. Murin. Th 240, spontaneous fission was discovered in the USSR by K. A. Petrzhak. (3) Nonconservation of parity and symmetry. The [illegible] convention of the preservation of [illegible] was investigated in physics by L. D. Landau. (4) "New atoms" [illegible] investigation and utilization in chemistry. [illegible] properties, and practicable of [illegible] the Mossbauer effect and the structure of molecules. [illegible] transformation in chemistry. "No [illegible] was carried out on the laboratory [illegible]

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Nuclear chemistry and its [illegible]

Institute Khimicheskoy [illegible] Academy [illegible] of Radiation and Nuclear Chemistry of the Institute of Chemical [illegible] of Sciences USSR

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S/020/62/147/001/018/022
B101/B144

AUTHORS: Dol'ganskiy, V. I., Corresponding Member AS USSR, Gorodinskiy, G. M., Kar'yagin, S. V., Korytko, L. A., Krizhanskiy, L. M., Mikarov, Ye. F., Smirnov, I. P., Khrapov, V. V.

TITLE: Investigation into the Mossbauer effect in tin compounds

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 1, 1962, 127 - 130

TEXT: The Mossbauer effect in the symmetrical compounds $SnCl_4$, $SnBr_4$, SnI_4, $Sn(C_6H_5)_4$ and SnO_2 and in the asymmetrical compounds Ph_3SnHal ($Ph = C_6H_5$, Hal = F, Cl, Br, I) was studied using an apparatus in which the absorber moved uniformly with respect to the source and an apparatus with sinusoidal movement. β-Sn or SnO_2 were used as sources of the 23.8-kev gamma-quanta (Sn^{119m}). With the symmetrical compounds the chemical shift δ of the absorber lines with respect to β-Sn, expressed in mm/sec (1mm/sec = $7.9 \cdot 10^{-8}$ ev), was a linear function of the electronegativity of the atoms bound to Sn. The equation $\delta = 1.6 \cdot 10^{-2} \Delta |\psi_s(0)|^2_{absorb} - |\psi_s(0)|^2_{emit}| \Delta R/R$ ev

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given by A. J. F. Boyle, D. J. F. Bunbury, C. Kimaris (Proc. Phys. Soc., 79, 416(1962)) and the data on the ionicity of the Sn-Hal bonds, obtained by the method of A. L. Schawlow (J. Chem. Phys., 22, 1211 (1954)) and those of M. M. Yakshin et al. (ZhNKh, 5, 843(1960)) on refraction and dielectric constant give $\delta_{ion} = -(5.6 \pm 0.5)$ mm/sec $= -(4.4 \pm 0.4)\cdot 10^{-7}$ ev, $R/R(Sn^{119}) = +(1.9 \pm 0.2)\cdot 10^{-4}$ for a completely ionized bond. These data enable $|\psi_{5s}(0)|^2$ to be determined directly from δ. In the asymmetrical compounds, asymmetrical doublets were observed (Fig. 2) similar to those found by Boyle et al. in SnF_4. The asymmetry was found also in dissolved compounds and cannot be explained by a random orientation of the crystals in the direction of the gamma quanta or by ferromagnetic or paramagnetic impurities. From the equation

$$\frac{\sigma_{111\,exp}}{\sigma_{111\,max}} = \frac{\int_{-1}^{+1} [2\sqrt{5}P_0(\cos\vartheta) - P_2(\cos\vartheta)]\, f(\cos\vartheta)\, d\cos\vartheta}{\int_{-1}^{+1} [2\sqrt{5}P_0(\cos\vartheta) - P_2(\cos\vartheta)]\, f(\cos\vartheta)\, d\cos\vartheta}, \qquad (3)$$

where the subscript "max" = total, $P_L(\cos\vartheta)$ is the normalized Legendre

Investigation into the...

polynomial, $f(\cos\vartheta) = \sum a_k F_k(\cos\vartheta)$ is the factor determining the intensity of the Mossbauer line, a_k the decay coefficient, it follows that if $\sigma_{13\ tot}/\sigma_{11\ tot} = (2\sqrt{5}a_0 + a_2)/(2\sqrt{5}a_0 - a_2) \neq 1$ (with $a_2 \neq 0$) and $-2\sqrt{5} < a_2/a_0 < 2\sqrt{5}$, each of the peaks of the Mossbauer doublet may become higher than the other one according to the ratio a_0/a_2. This ratio can be determined experimentally. Assuming a quadrupole splitting of the Mossbauer line in SnF_4 and Ph_4SnHal, $q = 5.2 \cdot 10^{18} x$ v/cm^2 is obtained where $q = \partial^2 v/\partial z^2$ is the gradient of the electric field in the region of the Sn^{119} nucleus, and x is the degree of ionization of the bond. For Ph_3SnHal $x = 0.55$ with Hal = I; $x = 0.7$ with Hal = Br, Cl and $x = 1$ with Hal = F. Another possible interpretation of the asymmetrical splitting might be the different hybridization of the sp^3d^2 bonds. In order to explain this problem it is suggested that the effective charges of the halogen and tin atoms be determined directly. When an equimolecular mixture of $SnPh_4$ and SnI_4 was irradiated with 1.0-Mev electrons the Mossbauer spectrum was

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observed to be greatly changed through the spectra of various disproportionation products $Ph_{4-n}SnI_n$ being superimposed. Hence it is concluded that the Mossbauer effect can be used not only to study the chemical structure but also to solve problems of chemical kinetics and radiation chemistry. There are 2 figures.

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

SUBMITTED: July 21, 1962

SEMENOV, N. N., akademik (Moskva); YENIKOLOPYAN, N. S. (Moskva)
GOL'DANSKIY, V. I. (Moskva)

On the problem of polymerization at low temperatures.
Rev chimie 7 no. 1: 501-511 '62.

1. Institut khimicheskoy fiziki AN SSSR, Moskva.

S/625/62/000/000/006/007
B125/B102

AUTHORS: Gol'danskiy, V. I., Maksimenko, V. M.

TITLE: Annihilation of antiprotons stopped in hydrogen and the hypothesis regarding the neutral ϱ^0-meson

SOURCE: Nekotoryye voprosy fiziki elementarnykh chastits i atomnogo yadra. Ed. by V. S. Mikhaylov and I. L. Rozental'. Mosk. inzh.-fiz. inst. Moscow, Gosatomizdat, 1962, 116-130

TEXT: Gell-Mann's and Nishijima's original and modified classifications of elementary particles predicted the existence of a ϱ^0-meson with zero isotopic spin and zero strangeness. According to Ya. B. Zel'dovich (ZhETF, 34, 1644, 1958), this meson is pseudoscalar and spinless, and in any case its mass is greater than that of the neutral pion. When $m_\pi < m_{\varrho^0} < 2m_\pi$, the main decay mode is $\varrho^0_0 \to 2\gamma$, and when $2m_\pi < m_\varrho < 3m_\pi$, the mode $\varrho^0_0 \to \pi^+ + \pi^- + \gamma$ is also possible. The π^0_0-meson discovered by A. M. Baldin (Nuovo Cimento, 8, 569 (1958)) is regarded as a concrete version of the hypothetical

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Annihilation of antiprotons stopped...

χ_0^0-meson. χ_0^0, and especially π_0^0, may be produced by a strong interaction: $d + d \rightarrow \chi_0^{00} + He^4$. The vectorial spin-1 χ_1^0-meson (vecton) must decay according to $\chi_1^0 \rightarrow \pi^0 + \gamma \rightarrow 2\gamma$ ($\tau \sim 10^{-20}$ sec) when $m_{\chi_1^0} < 4m_\pi$, and according to $\chi_1^0 \rightarrow \pi^+ + \pi^- + \pi^0$ when $m_{\chi_1^0} > 4m_\pi$ ($\tau \sim 10^{-16}$ sec). The data available on the annihilation of antiprotons stopped in hydrogen are incompatible with the existence of χ_0^0-mesons with $m_{\chi_0^0} < 1.5\, m_\pi$ and $m_{\chi_0^0} > 2.5\, m_\pi$. All attempts to discover the χ_0^0-meson experimentally failed; for example, no capture of stopped pions by protons could be observed, and the search for the reaction $d + d \rightarrow \pi^0 + He^4$ and for the decay χ^0-meson failed. An analysis of the possible χ^0 decays when antiprotons are stopped in hydrogen, based on the statistical theory of multiple processes, pointed to the impossibility of χ^0 existing with $m_{\chi^0} < 1.5\, m_\pi$ or $m_{\chi^0} < 2.5\, m_\pi$. The possibility of using the distribution of effective mass ($M = \sqrt{E^2 - p^2}$) in the search for χ^0

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S/523/62/000/006/007
B125/B102

Annihilation of antiprotons stopped...

(Solmitz, F. Proc. Annual Intern. Conf. on High Energy Physics at Rochester, 1962, 1-00) is discussed in detail. E is the total energy of the neutral annihilation products, and p is the total momentum. A single ϱ^0-meson among these products would cause a peak in dN/dM at $M = m_{\varrho^0}$. Experimental data of two-, four-, and six-pronged stars were analyzed from this point of view but the theoretically predicted particularity of the threshold of ϱ^0-meson production according to $\pi^- + p \rightarrow \varrho^0 + n$ could not be verified. There are 5 figures and 1 table.

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610017-5"

GOLDANSKI, V.I. [Gol'danski, V.I.]

Nuclear chemistry and prospects of its development. Analele chimie 17 no.2:3-12 Ap-Je '62.

S/903/62/000/000/026/044
B102/B254

AUTHOR: Gol'danskiy, V. I.

TITLE: Biproton radioactivity

SOURCE: Yadernyye reaktsii pri malykh i srednikh energiyakh; trudy Vtoroy Vsesoyuznoy konferentsii, iyul' 1960 g. Ed. by A. S. Davydov and others. Moscow, Izd-vo AN SSSR, 1962, 352-365

TEXT: The author has already indicated (Nucl. Phys. 19, 482, 1960) that biproton radioactivity should be a general property of neutron-deficient light nuclei with even Z near the proton instability limits. It may not be observable as a special new phenomenon but only via correlation investigations (cf. also Cameron, AECL-CRP-690, 1957). Biproton radioactivity may arise with nuclei up to Sn (Z=50) since heavier nuclei already show α-instability. It is mainly energy correlation considerations and angular correlation that may be applied for identifying biproton radioactivity. Both are analyzed and discussed in great detail. For a great many isotopes $E_{pp} = |B_{p_{odd}}| - B_{p_{ev}}$ and E_{evap} were calculated numerically. Also a complete system of all nuclei that may be biproton-active is described giving the

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Biproton radioactivity

S/903/62/000/000/026/044
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numbers of evaporated neutrons, the threshold energies and the Z numbers of the final nuclei. The formation of biproton-active nuclei in reactions participated by He^3 or multiply-charged ions is analyzed and three-particle decays are discussed. There are 3 figures and 3 tables.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute imeni P. N. Lebedev AS USSR)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610017-5"

42706

S/020/62/147/002/016/021
B101/B186

AUTHORS: Barkalov, I. M., Gol'danskiy, V. I., Corresponding Member AS USSR, Yenikolopov, N. S., Terekhova, S. F., Trofimova, G.M.

TITLE: Peculiarities of solid-phase radiation polymerization during irradiation

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 2, 1962, 395-398

TEXT: To eliminate the aftereffects liable to falsify the results when the solid-phase irradiated monomer is analyzed after thawing, the radiation polymerization of acrylonitrile (AN) and of vinyl acetate (VA) was studied in an apparatus whereby thermal effects and e.p.r. signals during and after irradiation with 1.6-Mev electrons at -196 to 0°C could be recorded simultaneously. Details of procedure and analysis will be published separately (Vysokomolek. soyed., now printing). Results: with AN, the polymerization was limited below - 140°C (4% polymer yield at -196°C). After repeated irradiation with 6 Mrad in each case, thawing and freezing the sample intermediately, the polymerization limit increased proportionally with the number of irradiations. At -196°C, the molecular weight dropped

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S/020/62/147/002/016/021
B101/B166

with increasing dose (2-20 Mrad) from $\sim 3.5 \cdot 10^5$ to $\sim 7 \cdot 10^4$. After-polymerization occurred at -140, -130, and -90°C, but not at lower temperatures. At -90°C, the molecular weight then rose to $\sim 10^6$ within 10 hrs. The activation energy of afterpolymerization was equal to that for liquid-phase polymerization: 7.7 kcal/mole. The e.p.r. signals of AN remained unchanged during and after irradiation. The heat of fusion of AN samples irradiated at low temperatures remained constant within the errors of measurement: 35 ± 1 cal/g. The polymerization of AN thus proceeds at t° < -140°C completely in solid phase, whereas slight, slow aftereffects occur at t° -130°C. The polymerization of VA was not limited. The rate of polymerization of glassy VA was one order of magnitude higher than that of crystalline VA. The molecular weight of glassy VA (at -196°C) decreased with increasing dose from $3 \cdot 10^4$ to $7 \cdot 10^3$. The molecular weight of crystalline VA was only a fraction of that of glassy VA. Afterpolymerization did not occur. When irradiated VA was thawed, the e.p.r. signal disappeared at -129°C, the point of phase transition from glassy to crystalline state. The loss of heat in the phase transition (24 ± 1 cal/g) and the heat absorption (32 ± 2 cal/g) in melting were recorded thermographically. Thus, the polymerization of VA also occurred in

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B101/B186

Peculiarities of solid-phase...

the solid phase. The following causes are assumed for solid-phase radiation polymerization: (a) formation of short-lived excited molecules; (b) loosening of substance along the tracks of primary particles and δ-electrons, which imparts properties to the substance similar to those that occur near phase transitions and near the melting point. There are 4 figures.

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

SUBMITTED: August 3, 1962

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610017-5"

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610017-5"

S/544/62/000/000/077/129
D425/D507

AUTHORS: Burlakov, I. K., Gol'danskiy, V. I., Denisov, E. T. and Kargin, V. A.

TITLE: Radiation polymerization of acetylene and its derivatives

SOURCE: Akademiya nauk SSSR. Otdeleniye khimicheskikh nauk. Soveshchaniye po radiatsionnoy khimii. Sb. st. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 458-469.

TEXT: The reaction kinetics and the mechanism of polymerization of phenylacetylene, hexene and cyclohexylacetylene were studied, in both bulk and dissolved monomers, between +80 and -196°C, initiating the polymerization by 1.5 kev electrons. The polymerization, the yields increasing proportionally to the time of radiation, and the yields increasing proportionally to the time of radiation, inhibiting the presence of inhibitors. Atmospheric oxygen increased the yield of the phenylacetylene polymer, but not those of hexene and cyclohexylacetylene, owing to the absence of the phenyl group in the latter 2 compounds. The rate of polymerization (V) is directly proportional to the radiation intensity (I) and not to

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Radiation polymerization of ...

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

Card 2/

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610017-5"

S/844/62/000/000/004/127
D444/D307

The welding of teflon ...

[illegible] of the strongly binding particles produced. The [illegible] were [illegible] element of this model, in which the [illegible] to [illegible] and [illegible] of polyethylene [illegible] by weight of boron, [illegible] an irradiation time of [illegible] hours (longer times [illegible] and [illegible] in the film and in the [illegible] of the joined materials of 200 - 300 kg/cm² to 50 - 60 kg/cm², respectively, the following joint strengths (kg/cm²) were obtained: teflon with teflon, polyethylene, aluminum and quartz, 90 - 110, 90 - 100, 120 - 140 and 80 respectively; polyethylene with polyethylene and aluminum, 130 - 140 and 110 - 135, respectively; aluminum with polymethylmethacrylate 120 - 150. There are 2 figures and 1 table.

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

Card 2/

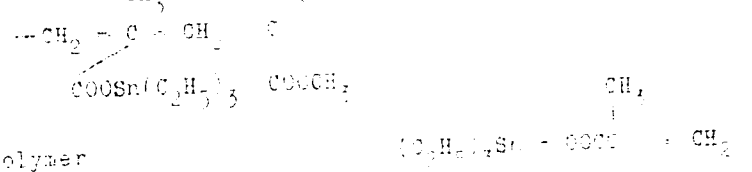
S/056/62/043/002/051/055
B108/B138

AUTHORS: Bryukhanov, V. A., Goldanskiy, V. I., Dolgoplo..., N. N., Makarov, Ye. F., Shpinel', V. S.

TITLE: Mossbauer effect in tin containing [illegible]

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 2, 1962, 557-559

TEXT: Mossbauer effect in polymers is very weak because polymers usually contain only light nuclei and have no distinct crystal structure. Successful studies were made, however, with the tin organic compound



which is the copolymer

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S/056/62/042/002/051/055
B108/B136

Mossbauer effect in tin-

ASSOCIATION Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)
Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University)

SUBMITTED. December 13, 1961

Card 3/3

S/056/62/043/003/014/063
B102/B104

AUTH. ES: Gol'danskiy, V. I., Khrapov, V. V.

TITLE: Comparison of the effect of electron irradiation on the optical activity of racemates and optical antipodes

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 3(9), 1962, 833-837

TEXT: The literature contains contradictory statements as to the effect of electrons (from β-decay or accelerated) on mirror isomers (antipodes). Therefore the authors studied carefully the electron irradiation effects on solid racemates and separated forms of optical isomers. 22 forms of 14 organic compounds (as $C_{20}H_{24}F_2O_2$) were irradiated by 1) β-electrons from Rh^{104} (produced in an MT-1000 (IRT-1000) reactor with a neutron flux of $5 \cdot 10^{11} - 1 \cdot 10^{12}$; Rh^{104} activity 20-300 curies, γ-dose 150-1,000 Mrad); 2) electrons accelerated at the microtron of the IFP AN SSSR (6.5 Mev, 1-4 μa, beam diameter 6 mm; dose 50-500 Mrad); 3) electrons accelerated in a cascade accelerator of the IKhF AN SSSR (1.5 Mev, 0.5-1 ma, beam

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S/056/6[illegible]/0[illegible]/00[illegible]/01[illegible]/0[illegible]
B1[illegible]/B1[illegible]

Comparison of the [illegible] of...

[illegible]. In the latter experiments the [illegible] at [illegible]°C. In almost all experiments the [illegible] placed in a magnetic field ([illegible] oe) perpendicular to the electron beam direction. No [illegible] activity of the irradiated compounds or difference in the activity [illegible] irradiation in the optical antipodes was observed in any of the cases investigated. All changes fell within the accuracy limits of measurement. A very weak reduction in optical activity of quinine and quinidine could be observed only in the experiments mentioned under ([illegible]).

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

SUBMITTED: April 12, 1962

Card 2/2

12736
S/020/62/146/006/006/016
B104/B186

AUTHOR: Gol'danskiy, V. I., Corresponding Member AS USSR

TITLE: Emission of delayed protons in the positron decay of neutron deficient nuclei

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 146, no. 6, 1962, 1309-1311

TEXT: It is investigated which isotopes are able to emit delayed protons after a β^+ decay. Starting from the emission of delayed protons by $_{10}Ne^{17}_{7}$ and $_{12}Mg^{20}_{8}$ the condition $_{Z}D^{A}_{N} - {}_{Z-2}D^{A-1}_{N+1} > \left|1.2\,\frac{Z}{A^{1/3}} + 6.8\right|$ Mev is obtained for the possibility of an emission of delayed protons, $_{Z}D^{A}_{N}$ being the mass defect of the respective nucleus. From the atomic mass numbers for neutron-deficient nuclei as given in previous papers (V. I. Goldansky, Nuclear Phys. 19, 482 (1960) and A. G. Cameron, Report CRP-690 (1957)) it is deduced that the following isotopes of even elements can emit delayed

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protons: Ar^{35}, Ca^{37}, or Ca^{39}, Ti^{39}, Cr^{43}, Fe^{47}, Ni^{51}, Zn^{57}, Ge^{61}, Se^{65}, Kr^{69}, Sr^{73}, Zr^{77}, Mo^{81}, [illegible], Pd^{91}, Cd^{95} and Sn^{99}. From the half-period of the β^+ decay it is estimated that the delay time lies between 0.1 sec (Ar) and 0.01 sec (Sn). Delayed protons may possibly be emitted in isolated cases (I^{89}, Se^{64}, Pd^{90}, Cd^{89}, Sn^{92}) resulting from β^+-decays not only into an excited state but also into the ground state. In such a case proton-radioactive nuclei are produced. The examples of delayed protons emission (Ti^{41} and Se^{67}) given by V. A. Karnaukhov and N. I. Tarantin proved to be inappropriate according to the above condition, because in the first of these cases an energy difference of zero and in the second case a negative energy difference are obtained, whereas the emission of delayed protons required not only a positive energy difference but also a difference exceeding the energy T_p of the proton emitted. It is stated in conclusion that the delayed protons observed by I. Preiss in experiments at Yale University did not, as assumed, result from a two-proton radioactivity of N^{16} which occurs in the reaction $Be^9 + C^{12}$, but from a β^+-decay of Ne^{17} on

S/020/62/146/006/006/016
B104/B186

Emission of delayed protons in...

excited F^{17} levels.

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

SUBMITTED: July 21, 1962

Card 3/3

GOLDANSZKIJ, V.I. [Goldanskiy, V.I.] (Szovjetunio)

Nuclear chemistry and prospects of its development. Technika 6 no.9:2 S '62.

S/064/62/000/012/001/006
B119/B180

AUTHORS: Barkalov, I. M., Gol'danskiy, V. I.

TITLE: Radiation polymerization

PERIODICAL: Khimicheskaya promyshlennost', no. 12, 1962, 1 - 6

TEXT: The article reviews Western and Soviet research work carried out between 1959 and 1962 on polymerization by means of ionizing radiation. Particular attention is paid to the polymerization of hardly polymerizable monomers (fluorine compounds, oxides of tertiary monovinyl phosphines, etc.), polymerization by the ion mechanism, and polymerization in the solid phase. There are 57 references.

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

Card 1/1

BARKALOV, I.M.; GOL'DANSKIY, V.I.

Recent developments in radiation polymerization. Khim.prom. no.12:859-864 D '62. (MIRA 16:2)

1. Institut khimicheskoy fiziki AN SSSR.
(Polymerization)
(Radiation)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610017-5"

ABLOV, A. V.; BERSUKER, I. B.; GOL'DANSKIY, V. I.

"Mossbauer spectra of iron complexes with chloranilic acid and their interpretation."

report presented at 7th Intl Conf, Coordination Chemistry, Vienna, 7-11 Sep 64.

GOL'DANSKIY, Vitaliy Iosifovich; KHASKIN, V.A., red.; SUSHKOVA, L.A., tekhn. red

[Mossbauer effect and its application in chemistry] Effekt Messbauera i ego primenenila v khimii. Moskva, Izd-vo AN SSSR, 1963. 81 p. (MIRA 16:10)

1. Chlen-korrespondent AN SSSR (for Gol'danskiy).
(Mossbauer effect) (Chemistry, Physical and theoretical)

BARKALOV, I.M., GOLDANSKIY, V.I, AND HO MIN HAO

"Radiation polymerization of acetylene hydrocarbons: special features."

Report submitted to the Congerence on the Application of Large Radiation Sources in Industry Salzburg, Austria 27-31 May 1963

GOLDANSKII, V. I.

"The Application of the Mossbauer Effect to Chemical Problems"
Institute of Chemical Physics, USSR Academy of Sciences, Moscow, USSR.

19th International Congress on Pure and Applied Chemistry, London 10-17 Jul '63

4

PARKALOV, I.M., GOLDANSKIY, V.I., TENIKOLOPYAN, N.S., TROFIMOVA, G.M., TEREKHOVA, S.F.

Radiation-induced solid-state polymerization.
PartI..Polymerization of acrylonitrile.
PartII..Polymerization of vinyl acetate.
Various kinds of polymerization rate temperatures dependences.

Report submitted for the International Symposium of Macromolecular chemistry, Paris, 1-6 July 63

GOL'DANSKIY, V. I., KIPAROV, V. V., MAKAROV, E. F.,

"Structural Studies of Tin-Organic Carboxylates, Polymer Tin-oxanol Oxides and Related Compounds by the Mössbauer Effect,"

Paper presented at the 3rd Intl. Conf. on the Mossbauer Effect, Harwell, G.B., New York, 4-7 Sep 63.

S/190/63/005/003/013/024
B101/B186

AUTHORS: Barkalov, I. M., Berlin, A. A., Gol'danskiy, V. I., Kuo Min-kao

TITLE: Kinetics of phenylacetylene polymerization initiated with benzoyl peroxide

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 3, 1963, 368 - 372

TEXT: The decomposition of benzoyl peroxide (BP) in phenylacetylene (PA) was studied in the absence of oxygen at 60 - 80°C by iodometrically determining the remaining BP, by titrating the benzoic acid formed and by cryoscopically determining the molecular weight of the polymer formed. The concentration of the components dissolved in benzene was 1.72 - 9.11 mole/l PA, 0.0137 - 0.0840 mole/l BP. It has been found that the polymerization stops at a low degree of conversion, that the decomposition of BP in PA takes place more rapidly than in vinyl monomers, and that the reaction is of first order with respect both to PA and to BP. The maximum yield of poly-PA is directly proportional to the BP concentration where 6.8 mole PA are polymerized per mole BP. The molecular weight of the polymer was 730. The activation energy of polymerization is 21 ± 1 kcal/mole. Hence the following reaction order is suggested for the polymerization process:

Kinetics of phenylacetylene...

(0) $M + P \xrightarrow{k_0} R^{\cdot} + B^{\cdot}$; (1) $M + R^{\cdot} \xrightarrow{k_1} R^{\cdot}$; (2) $M + R^{\cdot} \xrightarrow{k_2} RH + M^{\cdot}$;
(3) $M + B^{\cdot} \xrightarrow{k_3} BA + M^{\cdot}$; (4) $R^{\cdot} \xrightarrow{k_4}$ termination; (5) $M^{\cdot} + M^{\cdot} \xrightarrow{k_5}$ termination;
(6) $R^{\cdot} + R^{\cdot} \xrightarrow{k_6}$ termination. M is the monomer, P is benzoyl peroxide, $R^{\cdot}$ is the polymer radical, $B^{\cdot}$ the benzoyl radical, BA benzoic acid. Since $[R^{\cdot}] \ll [M^{\cdot}]$ reaction (6) and reaction (4) can be neglected. $W = (3 + k_1/k_2)k_0[M][P]$ holds for the reaction rate, $\nu = 3 + k_1/k_2$ for the chain length, from which it follows that at $\nu \approx 7$, $k_1/k_2 = 4$. Conclusion: In the radiation polymerization studied earlier (Vysokomolek. soyed., 2, 1103, 1960) as well as in the peroxide-initiated polymerization the same mechanisms are active, which is obviously a characteristic feature of the polymerization of acetylene hydrocarbons. There are 5 figures and 2 tables.

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

SUBMITTED: August 18, 1961

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610017-5"

S/190/63/005/003/014/024
B101/B203

AUTHORS: Barkalov, I. M., Gol'danskiy, V. I., Kotova, L. M., Kuz'mina, S. S.

TITLE: Radiation polymerization of acetylene derivatives

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 3, 1963, 373-377

TEXT: The radiation polymerization of hexyne-1, cyclohexyl acetylene, and octyne-1 up to 10-12% degree of conversion was studied by a method described earlier (Vysokomolek. soyed., 2, 1103, 1960). The results were compared with those obtained for phenyl acetylene. The rate of polymerization decreases in the order phenyl acetylene > octyne > hexyne, cyclohexyl acetylene, and is proportional to the first degree of irradiation intensity. The polymer yield between -196 and 0°C is independent of the radiation dose. Admission of oxygen does not inhibit the process. A reaction sequence is suggested which corresponds to the degradational chain transfer:

(0) $M \xrightarrow{k_0} R^*$; (1) $M + R^* \xrightarrow{k_1} R^*$; (2) $M + R^* \xrightarrow{k_2} RH + M^*$; (3) $R^* + M^* \xrightarrow{k_3}$ termination; (4) $M^* + M^* \xrightarrow{k_4}$ termination; (5) $R^* + R^* \xrightarrow{k_5}$ termination; where

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R' = polymer radical; M' radical type R-C≡C'; M = monomer. Since $[R^{\cdot}] \ll [M^{\cdot}]$, reaction (5) can be neglected. If termination occurs according to (3), $W = (2 + k_1/k_2)k_0 I[M]$ holds for the reaction rate, and $\nu = 2 + k_1/k_2$ for the chain length. If termination occurs according to (4), $W = (3 + 2k_1/k_2)k_0 I[M]$ and $\nu = 3 + 2k_1/k_2$. The latter equation corresponds better to the experimental length $\nu = 10 - 13$. k_1/k_2 does not depend on the nature of the radical. The free valence of the polymer chain is situated on a link of the structure -CR=CR'. Owing to intense self-inhibition by the monomer, the inhibiting effect of O_2 is not efficient. On the contrary, the yield increases in octyne-1 and phenyl acetylene in the presence of oxygen due to the formation of the more active peroxide radicals. There are 1 figure and 1 table.

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

SUBMITTED: August 18, 1961

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610017-5"

GOL'DANSKIY, V.; YEGOROV, Ye., nauchnyy sotrudnik

Neutrons weld and crosslink polymers. Tekh.mol. 31 no.2:30-31 '63. (MIRA 16:6)

1. Chlen-korrespondent AN SSSR (for Gol'danskiy). 2. Laboratoriya yadernoy i radiatsionnoy khimii Instituta khimicheskoy fiziki AN SSSR (for Yegorov).

(Polymers) (Neutrons)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610017-5"

L 13829-63 EWP(j)/EPF(c)/EWT(1)/EWP(q)/EWT(m)/BDS AFFTC/ASD Pc-4/
Pr-4 RM/WW/JD

ACCESSION NR: AP3003557 S/0020/63/151/002/0357/0360

AUTHOR: Gol'danskiy, V. I.(Corr. member, AN SSSR); Makarov, Ye. F.; Stukan, R. A.; Trukhtanov, V. A.; Khrapov, V. V.

TITLE: Analysis of the structure of polymeric organo-tin oxides R_2SnO by Mossbauer effect

SOURCE: AN SSSR. Doklady*, v. 151, no. 2, 1963, 357-360

TOPIC TAGS: Sn, Mossbauer effect

ABSTRACT: New assumptions are proposed on the structure of R_2Sn_nO organo-tin molecules, based on the presentation of the results of the Mossbauer effect, investigations in these oxides and related compounds. The Mossbauer spectra for all these compounds consist of two lines. Also the probability of the Mossbauer effect for some R_2Sn_nO organo-tin oxides is investigated. "In conclusion, the authors express their sincere gratitude to Ye. M. Panov, O. A. Ptitsyna, and N. I. Sheverdina for submitting preparations of tin-organic compounds." Orig. art. has: 2 figures, 5 formulas, and 1 table.

Card 1/2 Inst of Chemical Physics, Academy of Sciences

S/056/62/[illegible]/064/001
B104/B138

AUTHORS: Gol'danskiy, V. I., Makarov, E. F., Murin, V. V.

TITLE: The difference of [illegible] the peaks [illegible] splitting of Mössbauer spectra

PERIODICAL: Zhurnal eksperim. i teoret. fiziki, v. 42, no. 2, 1962, [illegible]

TEXT: In ortho- and meta compounds of [illegible] Sn(C6H5)2Cl2, an asymmetry in the [illegible] Mössbauer spectra was found. It is shown that the [illegible] of the Mössbauer spectra of the polycrystalline [illegible] theoretically given peaks of different shape and height, and that the [illegible] are equal only in the special case of the isotropic Mössbauer effect. This means that the asymmetry can be explained without assuming the presence of two different chemical compounds, and that it occurs even in [illegible] polycrystalline specimens as a direct consequence of the anisotropy of the Mössbauer effect. In order to test this view the asymmetry of the Mössbauer peaks was studied in relation to the degree of orientation of

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S/058/63/044/002/054/065
E193/E183

The Difference of the two peaks in ...

triglycine sulphate crystals for two different angles of incidence of the specimen with respect to the direction of the beam of ... rays. Spectroscopic determination of the molecular weight in benzene solutions showed that there is no molecular association. The measurements were carried out at 78°K with the UKF-2M 3600K instrument with a CaO_2 ... . Isotropic specimens were prepared as layers of finely ground ... on aluminium substrates. Other anisotropic specimens were prepared by melting and subsequent slow cooling on an aluminium substrate, in order to obtain coarsely crystalline lamellae, preferentially oriented ... to the substrate. The isotropic as well as the anisotropic specimens were placed at angles of 90° and 0°, respectively, also respect to the beam of γ rays. With the isotropic specimen, the symmetric spectrum was the same for both angles. At 90°, the shape of the spectrum of the anisotropic specimen is different from that of the isotropic specimen. This excludes the possibility of an explanation of the difference of the two peaks by the assumption that singlet lines of two different chemical ... are superimposed. If the anisotropic specimen is turned to 0°, there is again a change in the spectrum. The experimental results

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APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610017-5"

S/076/63/037/002/054/065
B125/B186

The difference of the two peaks is ...

are considered to give evidence for the view stated above. There is 1 figure.

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

SUBMITTED: November 12, 1962

Card 3/3

L 14352-63 EWT(m)/BDS AFFTC/ASD/ESD-3 RM

ACCESSION NR: AP3003857 S/0020/63/151/003/0608/0611

AUTHORS: Gol'danskiy, V. I. (Corr. mem. AS, SSSR), Solomenko, T. A.; Shantarovich, V. P.

TITLE: Moderation and inhibition of positronium formation in aqueous and organic solvents

SOURCE: AN SSSR. Doklady*, v. 151, no. 3, 1963, 608-611

TOPIC TAGS: positronium, positron, organic solvent, aqueous solvent

ABSTRACT: R. E. Ball et al (Phys. Rev. 90, 1953, 644) have shown that duration of life of a positron in liquid or solid phase depends on formation of two kinds of complexes, called para or ortho positronium. Since the annihilation of the positron and formation of positronium is an interrelated occurrence, the moderation or inhibition of positronium formation has a direct connection with the duration of life of the positron. The

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moderation of positronium can be explained by: (a) conversion of ortho into para positronium; (b) annihilation of positron in ortho-positronium; (c) oxidation-reduction reaction liberating the positron; (d) addition of ortho-positronium to the unsaturated molecule. Since the potential of ionization of positronium is 6.8 ev, the effective formation of positronium takes place in an energy interval $E>Te^{+}>6.8$ ev. By introducing into the solution the additions for which the first level of excitation is lower than for the molecule of solvent, the inhibition of positronium can be achieved. In the present work, the effect of additions of NO_3^-, CrO_4^{--}, $Cr_2O_7^{--}$ and MnO_4^- to aqueous solutions and C_6H_5J to C_6H_6 has been investigated, using the equipment similar to that used by R. G. Green et al (Nucl. Instrum. 3, 1958, 127). Experiments with aqueous solutions have shown that CrO_4^{--}, $Cr_2O_7^{--}$ and MnO_4^- are moderators and NO_3^- is an inhibitor. C_6H_5J also turned out to be an inhibitor. A further experimental proof about the correctness of Ore's postulation is desirable, since it can be used to evaluate the energy of first level excitation of large amount of molecules. Orig. art. has: 3 figures.

 Inst. of Chemical Physics

GOL'DANSKIY, V.I.

Some problems of nuclear chemistry. Nauka i zhizn' 30 no.3:16-18 Mr '63. (MIRA 16:5)

1. Zaveduyushchiy laboratoriyey yadernoy i radiatsionnoy khimii Instituta khimicheskoy fiziki AN SSSR. Chlen-korrespondent AN SSSR.
(Chemistry, Physical and theoretical--Problems, exercises, etc.)
(Nuclear physics--Problems, exercises, etc.)

BARKALOV, I.M.; GOL'DANSKIY, V.I.; GO MIN'-GAO [Kuo Min-kao]

Kinetics of benzoyl peroxide decomposition in acetylenic hydrocarbons. Dokl. AN SSSR 151 no.5:1123-1126 Ag '63. (MIRA 16:9)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR (for Gol'danskiy).

(Benzoyl peroxide) (Hydrocarbons)

ABLOV, A.V., akademik; BELOZERSKIY, G.N.; GOL'DANSKIY, V.I.; MAKAROV, Ye.F.; TRUKHTANOV, V.A.; KHRAPOV, V.V.

Mössbauer's spectra of complex compounds of iron with diacetylthiosemicarbazone oxime. Dokl. AN SSSR 151 no.6:1352-1355 Ag '63. (MIRA 16:10)

1. Institut khimicheskoy fiziki AN SSSR i Institut khimii AN Moldavskoy SSR. 2. AN Moldavskoy SSR (for Ablov). 3. Chlen-korrespondent AN SSSR (for Gol'danskiy).

ABLOV, A.V., akademik; BERSUKER, I.B.; GOL'DANSKIY, V.I.

Interpretation of the resonance absorption of γ-quanta by some complex iron compounds with allowance for the covalence of bonds and induction effects. Dokl. AN SSSR 152 no.6: 1391-1394 O '63. (MIRA 16:11)

1. Institut khimii AN Moldavskoy SSR i Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR (for Gol'danskiy).

GOL'DANSKIY, V.I.

Conference on Reactions between Complex Nuclei, held in the United States. Vest. AN SSSR 33 no.9:65-68 S '63. (MIRA 16:9)

1. Chlen-korrespondent AN SSSR.
(Nuclear reactions) (Physics--Congresses)

L 8873-65 EWT(m)/EPF(c)/EPF(n)-2/EWP(j)/T Pc-4/Pr-4/Ps-4 RPL AS(mp)-2/ASD(m)-3/ESD(t)/BSD/AFETR GG/RM

ACCESSION NR: AP4009152 S/0190/64/006/001/0092/0097

AUTHORS: Barkalov, I. M.; Gol'danskiy, V. I.; Yenikolopyan, N. S.; Terekhova, S. F.; Trofimova, G. N.

TITLE: Radiation polymerization in solid phase. 1. Polymerization of acrylonitrile

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 6, no. 1, 1964, 92-97

TOPIC TAGS: kinetics, acrylonitrile, polymerization, fast electron, irradiation, diathermal calorimeter, solid phase, energy chain

ABSTRACT: The radiation polymerization in the solid phase of monomers was investigated along with the temperature dependence of the initial polymerization rate, post-polymerization kinetics, and heat absorption rates. The study centered around the kinetics of acrylonitrile (AN) polymerization induced by fast electrons with an energy of 1.6 Mev obtained in an electron accelerator at the Institute of Chemical Physics AN SSSR. The specimen was placed in a special vessel under vacuum and its temperature controlled to within 2C during irradiation. The radiation dose varied from 0.2 to 10 Mrad/min. To determine when effective polymerization reactions occurred, a diathermal calorimeter was also used. The calorimetric determination showed that solid phase polymerization of AN occurs directly in the solid phase and not in the course of the following thawing process. There is practically no

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L 8873-65

ACCESSION NR: AP4009152

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activation energy of the solid phase polymerization. From -196 to -150C a yield limit is observed at large doses, and there is no noticeable post-effect. Post-polymerization takes place from -140° up to the melting point, the activation energy of this process being 3 kcal/mole. It is presumed that the specific features of solid phase polymerization in the course of irradiation may be due to the effective participation of short-lived excited states in the propagation of the energy chains or due to a change in state of the solid during irradiation. "The authors express their sincere appreciation for the great interest and attention with which N. N. Semenov has followed the work, as well as their thanks to V. N. Shamshev for assisting in the measurements." Orig. art. has: 4 figures.

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

SUBMITTED: 10Aug62 ENCL: 00

SUB CODE: OC, MP NO REF SOV: 011 OTHER: 004

Card 2/2

L 8879-65 EWT(m)/EPF(c)/EPF(n)-2/EPR/EWP(j)/T Pc-4/Pr-4/Ps-4/Pu-4 RPL/
AS(mp)-2/AFETR/RAEM(t)/ESD(gs)/BSD/ASD(m)-3 WW/GG/RM

ACCESSION NR: AP4009153 S/0190/64/006/001/0098/0102

AUTHORS: Barkalov, I. M.; Gol'danskiy, V. I.; Yenikolopyan, N. S.; Terekhova, S. F.; Trofimova, G. M.

TITLE: Radiation polymerization in solid phase 2. Polymerization of vinyl acetate. Temperature variation dependence of polymerization rate

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 6, no. 1, 1964, 98-102

TOPIC TAGS: kinetics, polymerization, vinyl acetate, solid state, irradiation

ABSTRACT: The kinetics of the polymerization of vinyl acetate (VA) induced by 1.6-Mev electrons in the electron accelerator of the Institute of Chemical Physics (AN SSSR) was investigated for the liquid, crystalline, and glassy states in the course of studies which were undertaken with the purpose to clarify the problems of the radiation polymerization of monomers in the solid phase; in particular, the temperature dependence (0 to -196C) of the initial rate of polymerization was investigated in connection with an attempt to establish the radical or ionic type of the mechanism of polymerization. Polymerization in the solid state occurs with practically no temperature dependence, and the absolute rate values are about an order of magnitude higher for glassy VA than for the crystalline product. There is no post-polymerization at any of the temperatures investigated, and direct calori-

Card 1/2

metric measurements have shown that polymerization of VA in the solid phase occurs only in the process of irradiation; by no means is the process purely radical, as the process of polymerization in the liquid phase is. The temperature dependence of the rate of radiation polymerization in both solid and liquid phases has also been investigated in the case of methyl methacrylate (MMA), formaldehyde (FAL), phenylacetylene (PAC), and isobutylene (IB). Two basic types of such dependence have been established: 1) $E>0$ for the liquid and $E\approx 0$ for the solid phases (VA, MMA, FAL, and acrylonitrile); and 2) $E<0$ for the liquid and $E>0$ for the solid phases, with maximum rate at the melting point (IB and other monomers, which polymerize by an ionic mechanism). The specific features of the rapid solid phase polymerization in the course of irradiation may be due either to the effective participation of short-lived, excited states in the propagation of the energy chains or to the change in state of the solid during the course of the irradiation. Orig. art. has: 4 figures.

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

SUBMITTED: 10Aug62 ENCL: 00

SUB CODE: GC, NP NO REF SOV: 006 OTHER: 007