The kinetics of cooperative ...

The scheme of successive approximations is represented in Fig. 1. The first and second approximations are calculated. There are 2 figures and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Institut vysokomolekulyarnykh soyedineniy AN SSSR Leningrad (Institute of High-molecular Compounds AS USSR, Leningrad)

SUBMITTED: May 4, 1960

Card 11/12

KLENIN, S.I.; PTITSYN, O.B.

Interpretation of experimental data on the translational friction of flexible macromolecules in good solvents. Vysokom.soed. 3 no.6:912-918 Je '61. (MIRA 14:6)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.
(Macromolecular compounds)

PTITSYN, O.B.

Theory of polyelectrolyte solutions. Part 1: Dimensions of polyelectrolyte molecules with a low degree of ionization. Vysokom. soed. 3 no.7:1084-1090 Jl '61. (MIRA 14:6)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.
(Electrolyte solutions)

PTITSYN, O.B.

Theory of polyelectrolyte solutions. Part 2: Polyelectrolyte macromolecules in salt solutions. Vysokom.soed. 3 no.8:1251-1259 Ag '61. (MIRA 14:9)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.
(Electrolyte solutions) (Macromolecular compounds)

PTITSYN, O.B.

Theory of polyelectrolyte solutions. Part 3: Effect of the non-uniform distribution of charges along the chain on the dimensions and shape of macromolecules. Vysokom.soed. 3 no.9:1401-1405 S '61. (MIRA 14:9)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.
(Macromolecular compounds) (Electrolyte solutions)

S/190/61/003/011/009/016
B110/B101

AUTHOR: Ptitsyn, O. B.

TITLE: Geometry of linear polymers. VIII. Approximative statistical theory of volume effects in linear polymer chains

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 11, 1961, 1673 - 1683

TEXT: The dimensions of macromolecules in good solvents depend on the interaction of chain segments approaching each other at random. The following holds near the θ point: $\alpha^2 = \overline{h^2}/\overline{h_0^2} = 1 + 4z/3 - 2{,}08\,z^2 + \ldots$ (1), where $\overline{h^2}$ = mean square distance between the chain ends; $\overline{h_0^2} = \overline{h^2}$ in the absence of volume effects; N = number of chain segments; a = effective length of the link connecting adjacent segments; $z = (3/2\pi)^{3/2}\,(\sqrt{N}v_0/a^3)$, where v_0 = effective exclusive volume of the segment. For high z-values (good solvents), the following holds according to Flory's theory:

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Geometry of linear polymers...

$\langle^5 - ^3 = Cz$ (3) ($C = 3\sqrt{3/2}$). This is contradicted by the fact that $(\langle^5 - ^3)/\sqrt{N}$ grows with increasing N. In the present paper, the author suggests an approximative theory which roughly takes account of the segment bond and gives an equation different from Flory's. The strict theory of volume effects gives:

$$\overline{h^2} = \overline{h_0^2} + \left(\frac{d\overline{h^2}}{dv_0}\right)_{v_0=0} v_0, \qquad (5)$$

$$\left(\frac{d\overline{h^2}}{dv_0}\right)_{v_0=0} = \sum_{i<j}\sum \int h^2 [W_0(\vec{h}) W_0(O_{ij}) - W_0(\vec{h}, O_{ij})] d\vec{h}, \qquad (6)$$

where W = distribution function for the vector $\vec{h}$ and $\vec{r}_{ij}$ connecting the i-th and j-th segments; O_{ij} means $r_{ij} = 0$; the indices 0 indicate the absence of volume effects. Introduced in Eq. (6), the Gaussian distribution functions give:

$$\left(\frac{d\overline{h^2}}{dv_0}\right)_{v_0=0} = \left(\frac{3}{2\pi}\right)^{3/2} \frac{1}{a} \sum_{i<j}\sum \frac{1}{\sqrt{j-i}} = \frac{4}{3}\left(\frac{3}{2\pi}\right)^{3/2} \frac{N^{3/2}}{a}. \qquad (7)$$

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Geometry of linear polymers...

Thus, the correction term is inversely proportional to a. Introduction of effective Gaussian functions of the segment length a in Eq. (6) gives: $d\alpha^2/dz = 4/3\alpha$, the solution for $\alpha(v_o = 0) = 1$ is: $\alpha^3 = 1 + 2z$ (9). For small z, this corresponds to the linear term of Eq. (1), and for large z: $\alpha^3 \sim z$ (instead of $\alpha^5 \sim z$ according to Flory). Since there is no Gaussian distribution, α is not $(\overline{h^2}/\overline{h_o^2})^{1/2}$ but: $d\alpha^2/dz = p/\alpha$ (10), where p and q = coefficients of z and z^2 in Eq. (1). For $z \neq 0$, $\alpha^3 = 1 + 6qz/p$ (11). For linear polymers ($p = 4/3$; $q = 2.08$), $\alpha^2 = (1/4.68)\cdot[3.68 + (1 + 9.36z)^{3/2}]$ (13). It follows from (9) and (13) that, in agreement with the experiments, $(\alpha^5 - \alpha^3)/\bar{N}$ increases with increasing N. Eq. (13) well describes the N dependence of α in the interval N, in which $\alpha \sim 1.5$, which is typical of macromolecules in good solvents. The values of $(\alpha^5 - \alpha^3)/(4/3)M$ and $(4.68\alpha^2 - 3.68)^{3/2} - 1]/9.36M$ (M = molecular weight) also show a better constancy of the second expression. (13) gives a stronger dependence of α on N than the Flory equation (for $\alpha \gg 1$, $\alpha^2 \sim N^{1/3}$; according to Flory's

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Geometry of linear polymers...

equation: $(\overline{h^2} \sim N^{1/5})$. The ε dependence of $\varepsilon = d \ln \overline{h^2}/d \ln N$ is expressed by:

$$\varepsilon = \frac{\alpha^3 - 1}{5\alpha^2 - 3} \qquad (14)$$

$$\varepsilon = \frac{1}{3}\left[1 - \frac{0{,}786}{\alpha^2} - \frac{1}{10{,}1\alpha^3\sqrt{1 - \frac{0{,}786}{\alpha^3}}}\right], \qquad (15)$$

For $\alpha = 1.2$, $\overline{h^2} = 0.95\, z^{2/3} + 0.786$ and $\overline{h^2} = 0.786\, Na^2 + 0.95(3/2\pi)N^{4/3}v_o^{2/3}$ (16). Then, $\overline{h^2}/N = F(N^{1/3})$ is a straight line. The effective length a of the link can be determined from the section on the ordinate, the effective exclusive volume v_o of segment can be determined from the inclination. From (9), (13), and (16) it follows that $\overline{h^2}$ is independent of a for high z (good solvents). From (13) it is derived: $\lim z/\alpha^3 = 1.08$. Hence, it follows that the theories of Flory - Krigbaum - Orofino (see below) and Casassa - Markovitz (see below) give a finite value of $\varepsilon(\infty)$ for $\alpha \to \infty$. The former agrees better with theory and experimental values. Together with Yu. Ye. Eyzner (Zh. fiz. khimii, 32, 2464, 1958) the author had investigated

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Geometry of linear polymers...

the influence of volume effects on the hydrodynamic properties of macromolecules in solution. In the equations $[\eta] = 6^{3/2}(\overline{R^2})^{3/2}/M$ and $F = P6^{1/2}$ (η_0 = viscosity of the solvent), the Flory factors and P decrease with increasing (growth of):

$$P(\varepsilon) = 5{,}11\left(1+\frac{5\varepsilon}{6}+\frac{\varepsilon^2}{6}\right)^{1/2}\left(1-\frac{4\varepsilon}{4}+\frac{7\varepsilon^2}{3}\right) \cong 5{,}11\left(1-\frac{11}{22}\varepsilon-\frac{65}{288}\varepsilon^2\right), \quad (20)$$

With an increase of from 0 to 1/3, drops from $2.86\cdot10^{23}$ to $1.175\cdot10^{23}$; P from 5.11 to 3.44. The high dependence of on M may mean partial penetrability of the solvent in the strongly swollen molecule. There are 7 figures, 1 table, and 62 references: 12 Soviet and 50 non-Soviet. The three most recent references to English-language publications read as follows: P. Flory, W. Krigbaum, J. Chem. Phys., 18, 1086, 1950; T. Orofino, P. Flory, J. Chem. Phys., 26, 1067, 1957; E. Casassa, H. Markovitz, J. Chem. Phys., 29, 493, 1958.

Card 5/6

Geometry of linear polymers... S/190/61/003/011/009/016
B110/B101

ASSOCIATION: Institut vysokomolekulyarnykh soyedineniy AN SSSR (Institute of High-molecular Compounds AS USSR)

SUBMITTED: December 23, 1960

Card 6/6

S/181/61/003/011/022/056
B125/B104

AUTHORS: Gotlib, Yu. Ya., Ptitsyn, O. B.

TITLE: Theory of glass fritting as a "cooperative process"

PERIODICAL: Fizika tverdogo tela, v. 3, no. 11, 1961, 3383-3388

TEXT: A more exact "cooperative theory" of glass fritting (cf. A. J. Kovacs, J. Polymer. Sci., 30, 131, 1958; Ye. V. Kuvshinskiy, A. V. Sidorovich, Vysokomolekulyarnyye soyedineniya, 1961; M. V. Vol'kenshteyn, Yu. A. Sharonov, Vysokomolekulyarnyye soyedineniya, 1961) is presented. This theory is based on the general method developed by M. V. Vol'kenshteyn, Yu. A. Gotlib, and O. B. Ptitsyn (FTT, 3, 420, 1961) for the study of the kinetics of "cooperative processes" with the aid of partial distribution functions. By substituting $K_m = K_o (1 + \alpha_1)^m$ (1) and $k_m = k_o(1 + \alpha_2)^m$ (2) into the kinetic equation

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Theory of glass fritting as a ...

$$\frac{dv}{dt} = \sum_{m=0}^{r} K_m \frac{z!}{m!(z-m)!} v^m (1-v)^{r+1-m} - \sum_{m=0}^{r} k_m \frac{z!}{m!(z-m)!} v^{m+1} (1-v)^{r-m}, \quad (5)$$

for the portion of empty cells in the surface layer one obtains

$$\frac{dv}{dt} = K_0 (1-v)[1+x_1 v]^r - k_0 v [1+x_2 v]^r. \quad (5)$$

In the absence of cooperativity ($x_1 = x_2 = 0$), the latter relation goes over into the usual first-order reaction equation $d\gamma/dt = -(1/\tau_0)(\gamma - \gamma_e)$ (6). The solution of Eq. (6) furnishes the exponential time function $\gamma - \gamma_e = (\gamma_0 - \gamma_e) e^{-(t-t_0)/\tau_0}$ (9) of the structural parameter γ. In the equations and formulas presented above, K_m denotes the "filling" constant, and k_m is the "evaporation" constant of a hole. The values of these constants, obtained in the absence of neighboring holes, are indicated by

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K_o and k_o, respectively; z is the coordination number, $\tau_o = 1/(K_o + k_o)$ (7) is the relaxation time of the system, and $\nu_e = K_o/(K_o + k_o)$ is the equilibrium value of ν. In the simplest case where cooperativity has no effect on the equilibrium properties of the system (i. e., on the difference in energy between an empty and a completely filled cell), Eq. (5) will go over into the equation $d\nu/dt = -(1/\tau(\nu))(\nu - \nu_e)$ (10)

with $\tau(\nu) = \tau_0 \frac{1}{(1+\nu)^2} = \tau_e(\frac{1+\nu_e}{1+\nu})^z$ (11). Then, $\gamma = -(dV/dt)/(V - V_e)$ will be only a function of temperature and will not be altered by isothermal annealing. If cooperativity does not vanish, γ will be an exponential function of time.

$$\log \frac{\tau}{\tau_e} \simeq -\frac{z\nu_e}{1+z\nu_e}\frac{V-V_e}{V_e}. \qquad (13)$$

is confirmed by experimental results of Ye. V. Kuvshinskiy, A. V. Sidorovich (Vysokomolekulyarnyye soyedineniya, 1961). The solution of Eq. (10) reads

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Theory of glass fritting as a ...

$$-\frac{t-t_0}{\tau_0}=Ei\left[-\left(z-\frac{1}{2}\right)\ln\frac{1+\varkappa v}{1+\varkappa v_0}\right]-Ei\left[-\frac{1}{2}\ln\frac{1+\varkappa v}{1+\varkappa v_0}\right]-$$
$$-Ei\left[-\left(z-\frac{1}{2}\right)\ln\frac{1+\varkappa v_0}{1+\varkappa v_0}\right]+Ei\left[-\frac{1}{2}\ln\frac{1+\varkappa v_0}{1+\varkappa v_0}\right]+\ln\frac{v-v_0}{v_0-v_0}\frac{1+\varkappa v_0}{1+\varkappa v}, \quad (17)$$

and the equation derived therefrom for $(v - v_0) \ll 1$:

$$-\frac{t-t_0}{\tau_0}=Ei\left[-\left(z-\frac{1}{2}\right)x(v-v_0)\right]-Ei\left[-\left(z-\frac{1}{2}\right)x(v_0-v_0)\right]+$$
$$+\frac{1}{2}x(v_0-v), \quad (18)$$

furnishes the non-exponential time dependence of the portion of empty cells and, accordingly, of the volume and enthalpy of the sample in question. For slight deviations from equilibrium the following equations are obtained from Eq. (18):

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Theory of glass fritting as a ...

$$\frac{v-v_0}{v_0-v_0}[1+zx(v_0-v)]=e^{-\frac{t-t_0}{\tau_0}} \qquad (19)$$

or

$$\frac{V-V_0}{V_0-V_0}\left[1+zx\frac{V_0-V}{V_0}\right]=e^{-\frac{t-t_0}{\tau_0}}. \qquad (20)$$

In the general case ($\varkappa_1 \neq \varkappa_2$) cooperativity manifests itself not only in the kinetic properties of the system but also in its equilibrium properties. In this case, the relaxation time will be a non-exponential function of the sample volume. There are 14 references: 7 Soviet and 7 non-Soviet. The three most recent references to English-language publications read as follows: G. Vineyard. Phys. Rev., 102, 981, 1956., A. J. Kovacs. J. Polymer. Sci., 30, 131, 1958., R. Kikuchi. Ann. Phys. (USA), 10, 127. 1960.

Card 5/6

S/181/61/003/011/022/056
B125/B104

Theory of glass fritting as a ...

ASSOCIATION: Institut vysokomolekulyarnykh soyedineniy AN SSSR Leningrad (Institute of High-molecular Compounds of the AS USSR, Leningrad)

SUBMITTED: June 13, 1961

Card 6/6

PTITSYN, O.B.; EYZNER, Yu.Ye.

Hydrodynamics of polymer solutions. Part 4: Diffusion and sedimentation of semirigid macromolecules. Vysokom.soed. 3 no.12:1863-1869 D '61. (MIRA 15:3)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.
(Macromolecular compounds) (Frictional resistance (Hydrodynamics))

BIRSHTEYN, T.M.; VOROB'YEV, V.I.; PTITSYN, O.B.

Theory of mechanochemical manifestations. Part 1: Close action in polyelectrolytes and mechanochemistry. Biofizika 6 no.5:524-533 '61. (MIRA 15:3)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR, Moskva i Institut tsitologii AN SSSR, Leningrad.
(MACROMOLECULAR COMPOUNDS)
(ELECTROLYTES)

BIRSHTEYN, T.M.; VOL'KENSHTEYN, M.V.; GOTLIB, Yu.Ya.; PTITSYN, O.B.

Approximate method for the calculation of the optical anisotropies of macromolecules. Vysokom.soed. 4 no.5:670-677 My '62. (MIRA 15:7)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.
(Macromolecular compounds--Optical properties)

S/190/62/004/009/014/014
B101/B144

AUTHOR: Ptitsyn, O. B.

TITLE: Estimation of the microtacticity of polymer chains from the temperature dependence of their dimensions

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 9, 1962, 1445-1446

TEXT: The theory of the dimensions and dipole moments of stereoregular $(-CH_2-CHR-)_n$ - type polymer chains, as developed by T. M. Birshteyn and the author, predicts different conformations of isotactic and syndiotactic molecules in the solution (Zh. tekhn. fiziki, 29, 1048, 1959; Vysokomolek. soyed., 2, 628, 1960; J. Polymer Sci., 52, 77, 1961). This does not contradict the similarity in dimensions of isotactic and atactic chains of polystyrene and polypropylene, but indicates a considerable difference in the temperature dependence of their macromolecular dimensions. The theoretical data for isotactic polystyrene show that $d \ln \overline{h_0^2}/d \ln T \simeq -1$, and for syndiotactic polystyrene $d \ln \overline{h_0^2}/d \ln T \simeq 0$. As the experimental data for atactic polystyrene show that $d \ln \overline{h_0^2}/d \ln T \simeq -0.5$ it follows that atactic polystyrene contains comparable numbers of isotactic and syndiotactic monomer units. This confirms the stereospecific effect due to the end of the growing chain according to J. Fordham (J. Polymer Sci., 39, 321, 1959).

SUBMITTED: January 29, 1962

S/190/62/004/011/011/014
B101/B144

AUTHORS: Eyzner, Yu. Ye., Ptitsyn, O. B.

TITLE: Hydrodynamics of polymer solutions. V. Intrinsic viscosity of semirigid macromolecules

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 11, 1962, 1725 - 1731

TEXT: On the basis of A. Peterlin's theory (International Congress, Les grosses molécules en solution (Paris, 1948); J. Polymer Sci., 5, 473, 1950 J. Chem. Phys., 33, 1799, 1960) and of the "worm-like" chain model, an equation for the intrinsic viscosity of polymers comprising semirigid macromolecules impermeable to the solvent was derived:

$$[\eta]=\Phi\frac{(6\overline{R^2})^{3/2}}{M}, \qquad (6)$$

$$\Phi=\frac{\Phi_0}{\left[\varphi(\lambda, n)+\frac{45}{32}\sqrt{\frac{2\pi}{3}}\frac{1}{3-\sqrt{2}}\frac{b}{r_0}\sqrt{\frac{\lambda}{n}}\right]\chi^{3/2}(n/\lambda)}, \qquad (7)$$

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$$\chi\left(\frac{n}{\lambda}\right)=\frac{3\overline{R}^2}{b^2\lambda n}=1-\frac{3}{(n/\lambda)^3}\left[\left(\frac{n}{\lambda}\right)^2-2\left(\frac{n}{\lambda}-1+e^{-n/\lambda}\right)\right], \tag{8}$$

$$\varphi(\lambda, n)=\sqrt{\frac{\pi}{3}}\cdot\frac{15}{4(3-\sqrt{2})}\cdot\frac{1}{\sqrt{\lambda}n^{3/4}}\left\{\sum_{k=1}^{n-1}\frac{(k^2+k-nk-2n)\psi(k/\lambda)}{\sqrt{(k/\lambda)-1+\exp(-k/\lambda)}}+\right.$$

$$\left.+\sum_{k=1}^{\frac{n}{2}-1}\frac{[(n^2/2)-2k^2+n]\psi(k/\lambda)}{\sqrt{(k/\lambda)-1+\exp(-k/\lambda)}}\right\}. \tag{9}$$

where $r_0=\zeta/6\pi\eta_0$ is the hydrodynamic radius of the monomer link. Hence

$$2^{3/4}\Phi_0\frac{b^3}{M_0}\cdot\frac{n}{[\eta]}\chi\left(\frac{n}{\lambda}\right)=\sqrt{\frac{2\pi}{3}}\frac{45}{32(3-\sqrt{2})}\cdot\frac{b}{\lambda r_0}+\frac{1}{\lambda^{3/4}}\cdot\varphi(\lambda, n)n^{1/4}. \tag{11}$$

follows for the Flory coefficient. The following suggestion is made for evaluating the experimental data:

The value $2^{3/2}\Phi_0(b^3/M_0)\cdot(n/[\eta])\chi(n/\lambda_{init})$ is represented graphically for an arbitrary λ_{init} as a function of $\varphi(\lambda_{init}, n)n^{1/2}$. The method of the least squares was used to find the position of the straight line in the spread field of the points measured; λ_{fin} was determined from the slope of this

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straight line. The true value of λ is then obtained from the intersection $\lambda_{init} = \lambda_{fin}$. The intersection of the straight line and the ordinate axis gives r_o. Thus, the values obtained for the molecular weight and the molecule radii of deoxyribonucleic acid and trinitrocellulose are in good agreement with the experimental values obtained from light scattering (DRA, numerous Western papers, the most recent reference: J. Eigner, Thesis, Harvard University, Cambridge, Massachusetts, 1960; Trinitrocellulose: G. Meyerhoff, J. Polymer Sci., 29, 399, 1958). With semi-rigid molecules impermeable to the solvent, Φ is much smaller than $\Phi_o = 2{,}86 \cdot 10^{23}$ while $\Phi^{1/3}P^{-1}$ differs little from $\Phi_o^{1/3}P^{-1} = 1.29 \cdot 10^{-7}$. There are 6 figures and 1 table.

ASSOCIATION: Institut vysokomolekulyarnykh soyedineniy AN SSSR (Institute of High-molecular Compounds AS USSR)

SUBMITTED: July 13, 1961

PTITSYN, O.B.

Theory of the helix-ball transition in biopolymers. Part 2: Role of long-range interactions in DNA denaturation. Biofizika 7 no.3: 257-262 '62. (MIRA 15:8)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad.
(MOLECULAR DYNAMICS) (NUCLEIC ACIDS)

BIRSHTEYN, T.M.; PTITSYN, O.B.

Effect of the interaction of adjacent charged groups on the properties of polyelectrolytes. Ukr.fiz.zhur. 7 no.7:697-702 Jl '62. (MIRA 15:12)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad.
(Electrolytes)

PTITSYN, O.B.

Theory of polyelectrolyte solutions. Ukr.fiz.zhur. 7 no.7:702-709 Jl '62. (MIRA 15:12)

1. Institut vysokomolekularnykh soyedineniy, g. Leningrad.
(Electrolytes)

PTITSYN, O.B.; EYZNER, Yu.Ye.

Hydrodynamic properties of semirigid macromolecules in solution. Dokl. AN SSSR 142 no.1:134-136 Ja '62. (MIRA 14:12)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR. Predstavleno akademikom V.A. Karginym.
(Macromolecular compounds) (Solution (Chemistry))

PTITSYN, O. B.

Dissertation defended for the degree of Doctor of Physicomathematical Sciences at the Institute of High-Molecular Compounds in 1962:

"Statistical Physics of Macromolecules."

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

BIRSHTAYR, T. M., PTITSYN, O. B.

"Statistic Theory of Near Order and Flexibility of Macromolecules."

report submitted for the Conference on Solid State Theory, held in Moscow, December 2-12, 1963, sponsored by the Soviet Academy of Sciences.

PTITSYN, O.B.; FEDOROV, B.A.

Small-angle X-ray scattering study of the structure of molecules of native RNA. TSitologiia 5 no.3:352-353 My-Je '63.
(MIRA 17:5)

1. Laboratoriya struktury polimerov Instituta vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad i kafedra fiziki polimerov Leningradskogo universiteta.

S/190/63/005/003/018/024
B101/B203

AUTHORS: Kron, A. K., Ptitsyn, O. B.

TITLE: Dimensions of branched macromolecules in good solvents

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 3, 1963, 397-404

TEXT: The influence of steric effects on the dimensions of branched macromolecules is studied theoretically and the relationship between the swelling coefficient and the second virial coefficient is determined using theoretical data by W. Stockmayer, M. Fixman (Ann. N. Y. Acad. Sci., 57, 334, 1953), M. Fixman (J. Chem. Phys., 23, 1656, 1955), A. Albrecht (J. Chem. Phys., 27, 1002, 1957), and others. The following has been found for chains with m branching points, where m = 1,2,3, and f branches departing from a point:

$$g_0^2 = \begin{cases} \dfrac{3f-2}{f^2} & (m=1) \\ \dfrac{18f^2-28f+11}{(2f-1)^2} & (m=2) \\ \dfrac{51f^2-90f+40}{(3f-2)^2} & (m=3) \end{cases} \qquad (9)$$

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Dimensions of branched...

$$\varkappa = \begin{cases} \dfrac{1{,}01f^3 + 1{,}63f - 1{,}64}{\sqrt{f}\,(3f-2)} \\ \dfrac{1{,}02f^4 + 5{,}51f^3 + 3{,}21f^2 - 17{,}74f + 9{,}00}{\sqrt{2f-1}\,(18f^2 - 28f + 11)} \\ \dfrac{6{,}06f^4 + 19{,}76f^3 + 8{,}38f^2 - 57{,}32f + 34{,}13}{\sqrt{3f-2}\,(51f^2 - 90f + 40)} \end{cases} \quad (10)$$

From $A_2 = (N_A v N^2/2M^2)(1 - 2.865\lambda z + \ldots)$ the following is calculated:

$$\lambda = \begin{cases} \dfrac{0{,}0769f^3 + 0{,}184f + 0{,}739}{\sqrt{f}\,(3f-2)} & (m=1) \\ \dfrac{0{,}690f^4 - 0{,}0732f^3 + 2{,}64f^2 - 3{,}12f + 0{,}878}{(2f-1)^{3/2}} & (m=2) \\ \dfrac{2{,}51f^4 - 2{,}82f^3 + 7{,}73f^2 - 10{,}0f + 3{,}57}{(4f-2)^{3/2}} & (m=3) \end{cases} \quad (16).$$

Conclusions: In good solvents and with the same molecular weight, the ratio between the dimensions of branched and of linear macromolecules approaches a constant value with increasing number of branches. The

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dimensions are less affected by the degree of branching in good solvents than in θ-solvents. The second virial coefficient A_2 is smaller for a solution of branched macromolecules than for a solution of comparable linear macromolecules, but the difference is small. An experimental check of these theoretical data will be necessary. There are 5 figures.

ASSOCIATION: Institut vysokomolekulyarnykh soyedineniy AN SSSR (Institute of High-molecular Compounds AS USSR)

SUBMITTED: September 18, 1961

KRON, A.K.; PTITSYN, O.B.

Statistical theory of volume effects in macromol[redacted].soed.
5 no.3:412-416 Mr '63. (MIRA 16:3)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.
(Macromolecular compounds)

PTITSYN, O.B.

Internal rotation in polymer chains and their physical properties. Part 19: Rotational isomerization of polymer molecules during their stretching and method for its study. Vysokom.soed. 5 no.8: 1219-1227 Ag '63. (MIRA 16:9)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.
(Polymers) (Isomerization)

VOL'KENSHTEYN, M.V.; GODZHAYEV, N.M.; GOTLIB, Yu.A.; PTITSYN, O.B.

Kinetics of biosynthesis. Biofizika 8 no.1:3-8 '63.
(MIRA 17:8)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad.

PTITSYN, O.B.; FEDOROV, B.A.

Determination of flexibility of DNA molecules with the aid of light disseminated at large angles. Biofizika 8 no.6:659-663 '63. (MIRA 17:7)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad.

FEDOROV, B.A.; PTITSYN, O.B.

Determination of the transverse sizes of macromolecules by means of X rays scattered at small angles. Dokl. AN SSSR 153 no.4:882-885 D '63. (MIRA 17:1)

1. Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova i Institut vysokomolekulyarnykh soyedineniy AN SSSR. Predstavleno akademikom V.A. Karginym.

BIRSHTEYN, T.M.; PTITSYN, O.B.; SOKOLOVA, Ye.A.

Theory of polyelectrolyte solutions. Part 5:Short range interaction of charged groups in stereoregular polyelectrolytes. Vysokom. soed. 6 no.1:158-164 Ja'64. (MIRA 17:5)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.

S/0190/64/006/002/0224/0226

ACCESSION NR: AP4017632

AUTHORS: Birshteyn, T. M.; Ptitsy*n, O. B.

TITLE: Stereospecific effect of growing chain end upon polymerization of charged monomers

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 6, no. 2, 1964, 224-226

TOPIC TAGS: syndiotactic addition, monomeric unit, stereospecific effect, isotactic addition

ABSTRACT: The probability of iso- and syndiotactic additions of a charged monomeric unit to the end of a charged chain of the type $(-CH_2-CHR-)_n$ has been calculated on the basis of the hypothesis of Fox, Good, and Fordham which states that the probability of iso- and syndiotactic addition of the monomeric unit to the end of a growing chain is determined by the free energies of the resultant chain on corresponding addition of the last monomeric unit. The calculations were performed using previously made evaluations of the interaction energies of adjacent and near adjacent charged groups in chains of the type $(-CH_2-CHR-)_n$. The results show that the isotactic addition is energetically more advantageous so that polymerization of dissociated electrolytes (e.g., alkali acrylates) should lead to considerable shift

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ACCESSION NR: AP4017632

in equilibrium in the direction of isotactic addition of neighboring monomeric units. "The author is grateful to Ye. A. Sokolov for his help." Orig. art. has: 5 formulas and 1 table.

ASSOCIATION: Institut vy*sokomolekulyarny*kh soyedineniy AN SSSR (Institute of High-Molecular-Weight Compounds AN SSSR)

SUBMITTED: 050ct62 DATE ACQ: 23Mar64 ENCL: 00

SUB CODE: CH NO REF SOV: 005 OTHER: 006

Card 2/2

EYZNER, Yu.Ye.; PTITSYN, O.B.

Hydrodynamics of polymer solutions. Part 7. Effect of long range interaction on the intrinsic viscosity of macromolecules near the θ-point. Vysokom.soed. 6 no. 5:777-781 My '64. (MIRA 17:6)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.

[redacted], A.[redacted], [redacted], V.B.

Calculation of volume effects in linear polymer chains by the Monte-Carlo method. Vysokom.soed. A [illegible] 8:862-867 My '66. (MIRA 17:7)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.

YEL'YASHEVICH, A.M.; PTITSYN, O.B.

Contribution to the theory of the configuration properties of polyelectrolyte molecules. Dokl. AN SSSR 156 no. 5:1154-1155 Je '64. (MIRA 17:6)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR. Predstavleno akademikom V.A.Karginym.

BIRSHTEYN, T.M.; ANUFRIYEVA, Ye.V.; NEKRASOVA, T.N.; PTITSYN, O.B.; SHEVELEVA, T.V.

Hydrophobic interaction and conformation transition in polymethacrylic acid. Vysokom. soed. 7 no.2:372-373 F '65. (MIRA 18:3)

L 40782-65 EWA(j)/EWT(m)/EPF(c)/EWP(j)/EWA(h)=2/T Pc-4/Pr-4 RM
ACCESSION NR: AP5005997 S/0217/65/010/001/0003/0006

27
28
B

AUTHOR: Ptitsyn, O. B.; Eyzner, Yu. Ye.

TITLE: A theory of the globule-clump transformation in macromolecules

SOURCE: Biofizika, v. 10, no. 1, 1965, 3-6

TOPIC TAGS: macromolecule, globule, polymer chain, polymer swelling

ABSTRACT: The author presents a mathematical study of macromolecule forms. The presence of cooperative transformation of a globule into a clump and of the reverse phenomenon of the globularization of polymer chains is thought to follow under certain conditions from very general considerations of the physics of macromolecules; and, in contrast to the transformation of a spiral into a globule, globularization of macromolecules is a true phase transition of the first order of the gas liquefaction type. The presence of a critical point for the transformation of a globule into a clump in which there are large fluctuations in volume can lead to the phenomenon of intramolecular critical opalescence. It is possible that the presence of a critical point is related to the mechanism of enzymatic catalysis which, according to the hypothesis of Linderstrøm-Lang is associated with fluctuations in the structure of the protein molecule. The joining of the molecules of

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L 40782-65
ACCESSION NR: AP5005997

the substrate to the enzyme molecule may transfer it into a critical state in which structural fluctuations are especially great. Orig. art. has: 2 figures, 7 formulas.

ASSOCIATION: Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad (Institute of High Molecular Weight Compounds, AN SSSR)

SUBMITTED: 19Dec63 ENCL: 0 SUB CODE: LS, OC

NO REF SOV: 002 OTHER: 007

Card 2/2

PTITSYN, O.B.; EYZNER, Yu.Ye.

Theory of globule-coil transitions in macromolecules. Biofizika 10 no.1:3-6 '65. (MIRA 18:5)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad.

ANUFRIYEVA, Ye.V.; VOLCHEK, B.Z.; ILLARIONOVA, N.G.; KALIKHEVICH, V.N.; KOROTKINA, O.Z.; MITIN, Yu.V.; PTITSYN, O.B.; PURKINA, A.V.; ESKIN, V.Ye.

Synthesis of poly-S-carbobenzoxymethyl-L-cysteine and the study of its structure. Biofizika 10 no.2:346-347 '65. (MIRA 18:7)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad.

VOROB'YEV, V.I.; PTITSYN, O.B.

Physical methods of studying the structure of proteins and nucleic acids; school in Dubna. Vest.AN SSSR 35 no.6:122-123 Je '65.
(MIRA 18:8)

PTITSYN, O.B.; SKVORTSOV, A.M.

Theory of helix-coil transitions in biopolymers. Report No.5. Method of determining the cooperation of helix-coil transition in polypeptide chains by changing macromolecule size in the transition region. Biofizika 10 no.6:909-917 '65.
(MIRA 19:1)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad, i Kafedra fiziki polimerov Leningradskogo gosudarstvennogo universiteta imeni Zhdanova. Submitted February 27, 1965.

ANUFRIYEVA, Ye.V.; BOLOTINA, I.A.; VOLCHEK, B.Z.; ILLARIONOVA, N.G.; KALIKHEVICH, V.I.; KOROTKINA, O.Z.; MITIN, Yu.V.; PTITSYN, O.B.; PURKINA, A.V.; [illegible], V.Ye.

Study of synthetic polypeptides. Report No.1. Transitions-intramolecular β-strucutre-coil in poly-S-carbobenzoxymethyl-L-cysteine. Biofizika 10 no.6:918-928 '65. (MIRA 19:1)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad.
Submitted April 22, 1965.

OKUN', G.S.; PTITSYN, S.D.; CHIZHIKOV, A.G.; UL'RIKH, N.N., kand. sel'khoz. nauk, red.; SPICHKIN, I.M., red.; PEVZNER, V.I., tekhn. red.; KOPNINA, N.N., tekhn. red.

[Devices for drying grain abroad; a survey of the foreign literature] Ustanovka dlia sushki zerna za rubezhom; obzor zarubezhnoi literatury. Moskva, Sel'khozizdat, 1963. 254 p. (MIRA 17:1)

BAUM, Aleksandr Yefimovich, kand. tekhn. nauk; GERZHOY, A.P., laureat Gosudarstvennoy premii, kand. tekhn. nauk, spets. red.; PTITSYN, S.D., kand. tekhn. nauk, retsenzent; ARKHANGORODSKIY, L.A., inzh., red.; VOLKOV, P.N., red.

[Grain drying] Sushka zerna. Izd.3., perer. i dop. Moskva, TsINTI, 1963. 267 p. (MIRA 17:11)

PTITSYN, S.D., kand.tekhn.nauk

Principle parameters in the convective method of drying. Mekh. i elek. sots. sel'khoz. 19 no.4:20-23 '61. (MIRA 14:11)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut mekhanizatsii sel'skogo khozyaystva.
(Grain--Drying)

PTITSYN, S.D., kand.tekhn.nauk

Drying seed grain in France. Mekh. i elek. sots. sel'khoz. 16 no.4:56-57 '58. (MIRA 11:10)
(France--Grain--Drying)

PTITSYN, S.D., kandidat tekhnicheskikh nauk.

Drying peanuts. Nauka i pered. op. v sel'khoz. 7 no.5:21-22 My '57.
(Peanuts--Drying) (MLRA 10:6)

PTITSYN, S.D.; UVAROV, A.M., kand. tekhn. nauk, retsenzent; ZHURAVLEVA, M.N., red.izd-va; EL'KIND, V.D., tekhn. red.; MAKAROVA, L.A., tekhn. red.

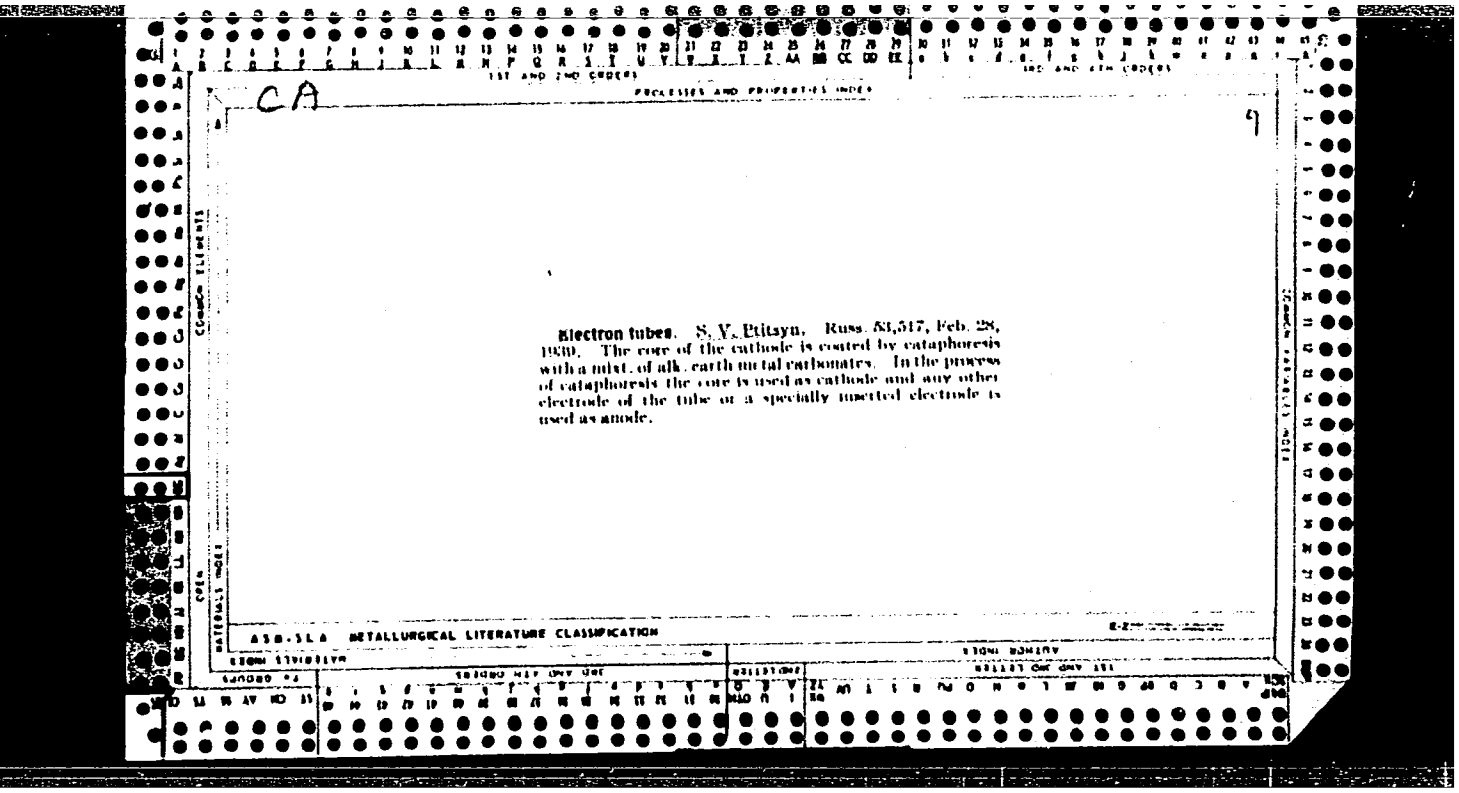
[Grain dryers]Zernosushilki. Moskva, Mashgiz, 1962. 179 p. (MIRA 16:3)

(Grain—Drying)

PTITSYN, Sergey Grigor'yevich

Trikhinellez (trichinosis?) of Man (Clinics, Functional Pathology, and Therapeutics)

Dissertation for candidate of a Medical Science degree, Chair of Hospital Therapeutics (head, Prof. L.S. Shwarts), Saratov Medical Institute, 1951


CA

Electron tubes. S. V. Ptitsyn. Russ. 81,517, Feb. 28, 1950. The core of the cathode is coated by cataphoresis with a mixt. of alk.-earth metal carbonates. In the process of cataphoresis the core is used as cathode and any other electrode of the tube or a specially inserted electrode is used as anode.

W. E.

621.385.1.032.216 : 537.533.8 **1826**

Emission from an Oxide Cathode.—S. V. Ptitsyn. (*Zh. tekh. Fiz.*, 1947, Vol. 17, No. 9, pp. 965–982. In Russian.) Attempts to study the operation of oxide cathodes under pulse conditions have revealed the inadequacy of our knowledge of those physical processes in the cathodes which govern the emission of electrons.

Accordingly a detailed investigation of such cathodes was undertaken under the following headings:—(*a*) structure, (*b*) core, (*c*) semiconducting layer, (*d*) barrier layer, (*e*) emission properties, (*f*) operation under pulse conditions, (*g*) causes limiting emission under pulse conditions, and (*h*) poisoning of the cathode by current emission.

1948

APPROVED FOR RELEASE: 06/15/2000 CIA-RDP86-00513R001343520002-1"

1. PTITSIN, S. V.

2. USSR (600)

4. Physics and Mathematics

7. Physical Phenomena in an Oxidize Cathode, Ptitsin, S. V. (Contemporary Problems of Physics, Leningrad-Moscow State Technical Press, 1949). Reviewed by Morgulis, N. D., Sov. Kniga, No. 7, 1950)

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

PTITSYN, S. V. PA 152T99

USSR/Physics - Vacuum Pumps Dec 49

"Development of the Technology of Obtaining and Measuring a Vacuum," S. V. Ptitsyn, Leningrad Polytech Inst imeni Kalinin, 28 pp

"Zhur Tekh Fiz" Vol XIX, No 12

Surveys entire field of vacuum-producing techniques. Discusses prevacuum pumps, diffusion pumps, absorption of gases by getters, gaseous equilibrium in tubes, vacuum apparatus and installations, and measurement of gas pressure. Submitted 1 Aug 49.

[redacted] 152T99

PTITSYN, S.V.

U

EL

Relation between the photoeffect of an oxide cathode and the temperature. S. V. Ptitsyn and P. N. Pavlenov. *Trudy Soveshchaniya Kalod. Elektronike* 1951, *Izdat. Fiz. Akad. Nauk Ukr. S.S.R.* 1952/1953, 25-0; *Referat. Zhur., Fiz.* 1955, No. 8873.—Several researchers have noted a considerable increase in the photocurrent from semiconductors when heating took place up to the "beginning" of thermoelectronic emission. P. and P. have proved by exptl. means their hypothesis that this increase develops because of supplementary activation of the cathode by light. A sharp increase in the photocurrent of an oxide cathode at 600°K. was observed only in the case of const. illumination. By impulse illumination with a frequency of 1000 flashes/sec., only a smooth increase of the photocurrent with the temp. was observed. Thus, the sluggish nature of the phenomenon was demonstrated. Consequently, the supplementary electronic current from the oxide cathode was not the photocurrent. Neither can it be explained by excitation of electrons by light and their migration into the zone of cond., since this phenomenon would also not be sluggish. In the opinion of P. and P., illumination of the cathode causes decompn. of BaO and formation of free Ba atoms. This increases the concn. of donors in the surface layer and, consequently, thermoemission activity. After illumination has ceased, the donors scatter throughout the covering, and the emission current decreases to the original value. An increase in the level of low-frequency noise in the lamps during illumination is connected with the phenomenon just described.

Marjorie Kettner

(1)

ALEKSANDROV, D.D.; PTITSYN, S.V.

Measurement of gas pressure in apparatus with mercury. Izv. NIIPT no.1:60-66 '57.

Control of gas separation in the formation of high-voltage rectifiers. Ibid.:67-73 ' (MIRA 18:9)

27995
S/194/61/000/004/038/052
D201/D302

9,2150 (1020,1159,1331)

AUTHORS: Aleksandrov, D.D., Olendzkaya, N.F. and Ptitsin, S.V.

TITLE: The influence of intermediate electrodes on the electric strength of a high voltage rectifier

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 4, 1961, 30-31, abstract 4 G204 (Izv. N.-i. in-ta postoyan toka, 1960, vol. 5, 5-11)

TEXT: The static electric strength of a high voltage rectifier with no current drawn at Hg vapor pressure within the limits 1-2 microns Hg, is determined by the laws of breakdown in vacuo. When the rectifier is loaded, the pressure observed at the walls and side-regions of the anode structure is 3-4 microns Hg, so that mercury condensation may occur at surfaces having a temperature of 30-40°C. The condensate drops, falling on to the more heated parts, may introduce short duration (up to 1 sec) increases in pressure - up to 6-8 microns Hg at the anode end. In these conditions the breakdown

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The influence of intermediate...

is determined by the ignition of the working glow discharge. Investigations have shown that the presence of intermediate electrodes - inserts in the anode assembly increases the value of the breakdown voltage with increasing vapor densities. The effect becomes more pronounced with the decrease of the exposed surfaces of inserts and with the increase of their thickness. For a number of inserts greater than two, the breakdown voltage remains practically constant and independent of their numbers, provided their geometrical dimensions remain the same. In the presence of inserts the breakdown voltages for vapor of Hg, air and H_2 remain constant; in intervals, without the inserts, the breakdown voltages decrease with the experiment being repeated. Pre-ageing by means of a glow discharge in an inert gas seems to be the most effective method of cleaning the surfaces. The pre-ageing conditions are given together with the curves of breakdown voltage characterising a well pre-aged rectifier. 4 references. [Abstracter's note: Complete translation]

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S/196/62/000/004/010/023
E194/E155

AUTHORS: Volosevich, V.S., Matyashevich, V.V., and Ptitsyn, S.V.

TITLE: Measuring the mercury-vapour density in the anode spot of a high-voltage valve

PERIODICAL: Referativnyy zhurnal, Elektrotekhnika i energetika, no.4, 1962, 8, abstract 4 E47. (Izv. N.-i. in-ta postoyan. toka, no.7, 1961, 14-25).

TEXT: In high-voltage mercury valves intended for transmitting d.c. power there are considerable variations in the distribution of mercury-vapour density. The vapour density was measured in different parts of an operating valve by measuring voltage variations on a small probe. In its initial form this method was suitable only for measuring the density in the immediate neighbourhood of the main arc. However, it is of great interest to measure the vapour density in the trans-anode region which has an important influence on the electric strength of the valve. For such measurements, V.I. Yemel'yanov developed a small probe with local ionisation, with an incandescent cathode and an additional annular anode. The discharge current in the

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additional anode circuit was maintained at 70 ± 5 mA. At full load the vapour density in the trans-anode region was found to be 3.5 microns in valve type BP -9 (VR-9) and 4.1 microns in valve type BPN -58 (VRN-58) instead of the value of 1.2 microns which corresponds to the cooling oil temperature. The high vapour-density is apparently associated with the circumstance that the discharge is accompanied by longitudinal and transverse pressure gradients. The cathode chamber walls being at comparatively low temperature, large drops of mercury condense on them. On falling, these drops can lead to a temporary rise in the vapour density and to reduction in the electric strength of the valve. The reliability of high-voltage valves should be increased by raising the wall temperature of the anode spot as compared with existing designs, for example, by additional external heating.

[Abstractor's note: Complete translation.]

PTITSYN, Sergey Dmitriyevich; TOCHILINA, L.V., red.; TOKER, A.M., tekhn. red.

[Grain drying] Sushka zerna. Moskva, Proftekhizdat, 1963. 77 p. (MIRA 16:12)
(Grain—Drying)

IORISH, Aleksandr Yevgen'yevich; KATSMAN, Yakov Abramovich; PTITSYN, Sergey Vladimirovich; OBOLENSKIY, S.A., red.; ZHITNIKOVA, O.S., tekhn. red.

[Ptinciples of the manufacturing technology of electric vacuum devices] Osnovy tekhnologii proizvodstva elektrovakuumnykh priborov. Moskva, Gos. energ. izd-vo, 1961. 515 p. (MIRA 15:2)

(Electron tubes)

ALEKSANDROV, D.D.; OLENDZKAYA, N.F.; PTITSYN, S.V.

Effect of intermediate electrodes on the electric strength of a high-voltage rectifier. Izv. VIIPT no.5:5-11 '60. (MIRA 14:1)
(Mercury-arc rectifiers--Cooling)

SOV/109-4-8-9/35

AUTHORS: Ptitsyn, S.V., Aleksandrov, D.D. and Olendzkaya, N.F.

TITLE: Influence of the Intermediate Electrodes on the Ignition Voltage of a Self-sustaining Discharge in a High-voltage Mercury Rectifier

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 8, pp 1278 - 1283 (USSR)

ABSTRACT: Investigation of the influence of the intermediate electrodes on the ignition of gas discharges (mercury discharge, in particular) was carried out by means of the rectifier shown in Figure 1. The anode input of this tube is surrounded (see the figure) by the concentric cylinders of a capacitive voltage divider, the inter-cylinder insulators being made of steatite. The intermediate transverse electrodes or so-called "inserts", in the form of discs provided with ring slots and circular holes in the middle, were attached to the end of the concentric cylinders. All the components of the rectifier, except the insulators, were made of high-quality steel, the principal insulator being of porcelain.

Cardl/3

Full details of this tube can be found in the authors' earlier work (Ref 1). The Paschen curves for mercury vapour and various gases were taken at a voltage of 300 kV. The measurements were first carried out while the tube contained four transverse electrodes or inserts. The inserts were then taken out and the sharp ends of the capacity-divider cylinders were provided with ring flanges. The results of the measurements are shown in Figures 2 and 3, where the ignition voltage U_s is plotted as a function of $P_o d$ where P_o is the gas pressure referred to 0 °C and d is the distance between the grid and the anode (this was equal to 15 cm). Figure 2 shows the curves for the case of mercury vapour, while those of Figure 3 are for the rectifier filled with air. Curves 1 of Figures 2 and 3 were taken for a discharge gap without the intermediate electrodes, while Curves 2 were measured in the presence of the inserts. It is seen that in the latter case, the curves are shifted to the right,

Influence of the Intermediate Electrodes on the Ignition Voltage of a Self-sustaining Discharge in a High-voltage Mercury Rectifier

relatively to the curves of a "free" gap. At a mercury vapour pressure of 4×10^{-3} mm Hg, the breakdown voltage of a rectifier without inserts is about 70 kV, while in the presence of the inserts, it is about 250 kV. The effect of the geometrical dimensions on the inserts was also investigated: this is illustrated in Figures 3, where Curve 3 was taken for the tube with one insert, whose thickness was 1.5 cm; Curve 4 was taken when the insert had a thickness of 3 cm. It is seen that by increasing the thickness of an insert, the Paschen curves are again shifted to the right. There are 6 figures and 6 Soviet references.

SUBMITTED: March 5, 1959

Card 3/3

PTITSYN, S.V.

66702

24.2120 SOV/109-4-8-22/35

AUTHORS: Granovskiy, V.L., Luk'yanov, S.Yu., Spivak, G.V. and Sirotenko, I.G.

TITLE: Report on the Second All-Union Conference on Gas Electronics

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 8, pp 1339 - 1358 (USSR)

ABSTRACT: The conference was organised by the Ac.Sc.USSR, the Ministry of Higher Education and Moscow State University. It was opened by the chairman of the organising committee, M.A. Leontovich, Academician. During the plenary sessions of the conference, a number of survey papers were delivered. L.A. Artsimovich read a paper on "Production of Ultra-high Temperatures in Plasma".
A survey of the optical method of measurements was given in the papers by V.A. Fabrikant and S.E. Frish.
S. Brown of the Massachusetts Institute of Technology gave a survey of the high-frequency methods of the investigation of stationary and non-stationary plasma (see p 1244 in this issue of the journal).
N.V. Fedorenko read a paper entitled "Ionisation and Inelastic Scattering During Atomic Collisions".

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L.A. Sena and Yu.M. Kagan deal with "Elementary Processes of Determining the Motion of Ions in Gas".
A paper by Ye. Bedereu (Rumania) dealt with "The Role of Resonance-recharging in the Kinetics of Ions".
I.S. Stekol'nikov considered the initial stages of the development of sparks (corona-leader, main channel and the final channel).
B.N. Klyarfel'd gave a survey of the ignition processes of the discharges in highly rarified gases.
The mechanism of the breakdown of a high-vacuum gap was elucidated in a paper by V.L. Granovskiy.
L. Tonks (USA) expounded a theory of the motion of electrons in a magnetic trap (see p 1316 of this journal).
Academician R. Rompe (Eastern Germany) described a number of experiments on non-stationary plasma conducted by himself.
M. Stenbeck (Eastern Germany) gave a generalised theory of plasma. The conference was divided into six sections.
The first section was presided over by L.A. Sena and was concerned with the elementary processes in gas discharges.
The following papers were read in this section:
Ya.M. Fogel' - "Transformation of Positive Ions Into Negative Ones in Rarified Gases".
Ya. M. Fogel' with V.A. Ankudinov and D.V. Pilipenko - "Capture and Loss of Electrons During the Collision of Fast Atoms of Carbon and Hydrogen with the Molecules of Gases".
N.V. Fedorenko et al. - "Dissociation of Molecular Ions of Hydrogen During Collisions in Gas".
I.P. Flaks and Ye.S. Solov'yev - "Capture Cross-sections of Electrons in Multicharge Ions in Inert Gases".
R.N. Kushnir et al. - "Experimental Investigation of the Resonance Recharging in Certain Single-atom Gases and Metal Vapours".
O.B. Firsov - "Qualitative Investigation of Inelastic Collisions of Atoms".
L.M. Volkova - "Effective Excitation Cross-sections of the Spectral Lines of Potassium and Argon".

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I.P. Zapesochnyy and S.M. Kishko "Some Results of the Investigation of the Optical Functions of the Excitation Bands of a Negative System".
A.A. Vorob'yev and A.G. Vlasov - "Investigation of the Scattering of the Electrons In a Betatron Chamber".
The second section was presided over by B.N. Klyarfel'd and was devoted to the problems of the electrical breakdown in rarified gases and in high vacuum. The following papers were read in this section:
G.Ya. Makar-Limanov and Yu.A. Metlitskiy - "Electrostatic Control of the Ignition of Glow-discharge Tubes" (see p 1274 of the journal).
S.V. Ptitsyn et al. were concerned with the breakdown in a high-voltage mercury rectifier (see p 1278 of the journal).
L.G. Guseva "Ignition of the Discharge in Non-uniform Fields at low Gas Pressures" (see p 1260 of the journal).
A.S. Soboleva and B.N. Klyarfel'd - "The Discharge Phenomena Between a Point and a Plane at Gas Pressures of 10^{-3} - 1 mm Hg".

ALEKSANDROV, D.D; OLENDZSKAYA, N.F.; PTITSYN, S.V.

Investigating the electric strength of high-voltage mercury rectifiers. Izv.NIIPT no.3:5-19 '58. (MIRA 12:1)
(Mercury-arc rectifiers)

PTITSYN, S.V.

8(3) PHASE I BOOK EXPLOITATION SOV/1386

Moscow. Nauchno-issledovatel'skiy institut postoyannogo toka

Peredacha energii postoyannym i peremennym tokom (Power Transmission by Direct and Alternating Current) Moscow, Gosenergoizdat, 1958. 334 p. (Series: Its: Izvestiya, sb. 3) 3,350 copies printed.

Ed.: Pintsov, A.M.; Tech. Ed.: Voronetskaya, L.V.; Editorial Board: Shchedrin, N.N., Doctor of Technical Sciences, Corresponding Member, Uzbek SSR Academy of Sciences, Professor (Chief Ed.); Gertsik, A.K., Engineer; Yemel'yanov, V.I., Candidate of Technical Sciences; Pimenov, V.P., Candidate of Technical Sciences; Posse, A.V., Candidate of Technical Sciences; Pintsov, A.K., Candidate of Technical Sciences; Sena, L.A., Doctor of Physical and Mathematical Sciences, Professor; Sonin, M.R., Engineer; Shekhtman, M.G., Candidate of Technical Sciences.

PURPOSE: This collection of articles, issued by the USSR Ministry of Electric Power Stations, is intended for scientists, engineers and designers of high-voltage overhead transmission lines.

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COVERAGE: The collection covers various problems connected with d-c and a-c high-voltage transmission lines, gives theoretical fundamentals of these problems and describes experimental investigations and practical conclusions. References appear separately after each article.

TABLE OF CONTENTS:

SECTION I. DIRECT CURRENT

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Investigations carried out by V.D. Andreyev and B.G. Mendelev in 1949-1950 at VEI on voltage distribution in the plate circuit of a type V-1(VR-50/120) mercury rectifier showed considerable unevenness of distribution. The recommendation was to increase the power of the plate voltage divider. In 1953 at the Electrovacuum Laboratory of NIIPT a series of measurements was completed by V.A. Dolgikh, I.G. Goloshchekin and N.I. Lavrov (and in 1954 V.A. Ivanchenko) on the dependence of voltage distribution on operating conditions. The measurement method was developed by L.N. Volkov and D.D. Knyazev and was based on the use of an oscillograph and a capacitive voltage-divider. In conclusion, the authors recommend some changes in operating practice and in design. There are 3 tables of oscillograms, 4 diagrams and 5 Soviet references.

Gertsik, A.K. Ionization Characteristics of Paper-Oil Capacitor Insulation During Application of Voltage With a Distorted Wave Form 62

The above characteristics were obtained as a result of experimental investigation carried out in NIIPT laboratories by the author and junior scientists V.P. Matveyev and D.S. Lavrov. There are 13 diagrams and drawings and 14 references, of which 7 are Soviet and 7

up to 600 kv, it is necessary to employ a cascade connection of bridge rectifiers, with one or several rectifiers in the arm of each bridge. The best combination of the number of bridges and the number of rectifiersin the arm of each bridge has not yet been definitely chosen. The difficult problems connected with this choice were investigated by NIIPT in the Kashira-Moscow h-v d-c transmission line. This article gives the results of investigation and makes recommendations. There are 2 tables, 7 oscillograms, 1 diagram and 3 references, of which 2 are Soviet and 1 German.

Shekhtman, M.G. and N.A. Shipulina. Parameters of Equipment of Conversion Substations in the Kashira-Moscow D-C Transmission Line 129

Firing of mercury rectifiers causes current oscillations in a tens and hundreds kc/sec frequency range. Study of this source of radio interference requires exact knowledge of equipment parameters for frequencies up to 1 Mc. The authors describe methods of measuring parameters and discuss the results obtained in the experimental Kashira-Moscow d-c transmission line. The three data tables are recommended for practical use for those working in radio interference sup- [illegible] 6 diagrams and no references.

Kuchinskiy, G.S. The Possibility of Using Cable Paper in the Manufacture of Power Capacitors For D-C Transmission Lines 282

The author describes a method of reducing the cost of capacitor batteries operating in ripple voltage circuits by using cable paper in their manufacture. Cable paper costs 10 times less than conventional capacitor paper but its electric strength also is less and therefore its thickness must be greater. In determining the cost of Kva capacitors the author draws on the experience of the high-voltage laboratory of LPI (Leningradskiy politekhnicheskiy institut) where cable-paper capacitors for d-c and ripple voltages have been produced on a semi-industrial scale since 1938. The technical editor suggests that plants manufacturing capacitors consider the author's results when producing capacitors for the above-mentioned conditions. He notes, however, that the cost relationships advanced by the author cannot yet be considered justified owing to the lack of operating experience which would indicate a long service life of cable-paper capacitors in comparison with conventional capacitors. In his comparisons the author used 35-40 Kv/mm as the working voltage density. There are 2 diagrams and 4 Soviet references.

SECTION II. ALTERNATING CURRENT

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AUTHORS: Aleksandrov, D. D., Olendzkaya, N. F., Ptitsyn, S. V. 57-28-4-34/39

TITLE: The Electric Strength of a High-Voltage Valve (Elektricheskaya prochnost' vysokovol'tnogo ventilya)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 4, pp. 896-907 (USSR)

ABSTRACT: The electric strength of a standard valve in a static state without load current in dependence on the pressure of mercury-vapor, hydrogen, helium and air in the valve as well as on the interelectrode-distance was investigated here. It is shown that the electric strength of a high-voltage valve is determined by the rules governing the high-vacuum-breakdown. This law is observed in the case of an interelectrode-distance equal to 15 cm up to pressures of the order of magnitude $4-5.10^{-3}$ mm torr in the case of air and mercury-vapors, $7-8.10^{-3}$ mm torr in the case of hydrogen and $12-18.10^{-3}$ mm torr in the case of helium. The transition from the domain of the high-vacuum breakdown into that

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which follows Paschen's law takes place over a certain intermediate domain where the breakdown voltage decrease with a rise of pressure and with a reduction of the inter-electrode-distance. Under the conditions existing here the magnitude of the breakdown-voltage is influenced by the shape of the applied voltage. A pulsating voltage with a frequency of 50 cycles increases the value of its breakdown in the domain of the vacuum-breakdown, in comparison to the direct voltage, by almost 50%.
There are 10 figures and 13 references, 6 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy institut postoyannogo toka, Leningrad (Leningrad, Scientific Research Institute for Direct Current)

SUBMITTED: June 11, 1957

PTITSYN, S.V.

ALEKSANDROV, D.D.; OLENDZKAYA, N.F.; PTITSYN, S.V.

Electric strength of a high-voltage rectifier. Zhur. tekh. fiz. 28 no.4:896-907 Ap '58. (MIRA 11:4)

1. Nauchno-issledovatel'skiy institut postoyannogo toka, Leningrad.
(Electric current rectifiers)

PTITSYN, S.V.

Fizicheskie iavleniia v oksidnom katode. Leningrad, Gostekhizdat, 1949.
136 p., diagrs. (Sovremennye problemy fiziki)
Bibliography: p. 135-136
Title tr.: Physical phenomena in an oxide cathode.

TA455.V3P8

SO: Aeronautical Sciences and Aviation inthe Soviet Union,Library of Congress, 1955.

38180. PTITSYN, S. D.

Separatsiya zerna pri udare. Trudy Vsesoyuz. mauch.-issled. in-ta mekhanizatsii sel. khoz-va, t. XII, 1949, s. 79-94

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"Grading of Grain by Impact," Dok. v-s. Ak, Nauk, Selkhoz.
No. 3, 1948. Cand. Technical Sci.
All-Union Sci. Res. Inst. Mechanization & Electrification
Agriculture, -1948-.

1. [illegible], S.D.

2. USSR (600)

4. Grain - Drying

7. Determining the basic parameters of the cycle for drying seed grain, Mekh.ielek. sel'khoz. no. 3, 1953.

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

Q

USSR/Farm Animals - Cattle

Abs Jour : Ref Zhur - Biol., No 15, 1958, 69285

Author : Ptitsyn, V.

Inst : -

Title : Metabolism in Cows Fed Corn Silage with Clover Aftermath

Orig Pub : Molochn. i myasnoye zhivotnovodstvo, 1957, No 10, 46-50

Abstract : An experiment was carried out on two groups of lactating cows of the Kholmogory breed. The first group received in its daily ration an average of 25.5 kg of corn-clover silage, 3.1 kg of hay, 4 kg of oilcake and 19.3 kg of turnips; the second group was fed rations composed of 22.3 kg of all-corn silage, 3.9 kg of hay, 4.5 kg of oil-cake and 16 kg of turnips. Inclusion of corn-clover sila-ge into the rations aided better utilization of digestible nitrogen of the feeds (by 9.4$), Ca (by 9%), P (by 6.7%), and increased energy metabolism (by 3,376 kcal.).

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PTITSYN, V.

Legal status of the Antarctic waters and problems of ocean fisheries. Mor. flot 25 no.3:17-18 Mr '65. (MIRA 18:4)

1. Starshiy referent dogovornogo otdela Ministerstva inostrannykh del SSSR.

PTITSYN, V. G. Cand Agr Sci -- "Metabolism and energy exchange in dairy cows during feeding of rations containing corn silage enriched with clover-aftermath protein." Mos, 1957 (All-Union Sci Res Inst of Animal Husbandry. Department of Feeding of Agr Animals). (KL, 1-61, 202)