"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

MEOS, I., doktor tekhn. nauk; VOL'F, L.A., kand. khim. nauk; LEPIN, A.E., red.

[New synthetic fibers; production of fibers from polyvinyl alcohol] Novye sinteticheskie volokna; proizvodstvo volokon iz polivinilovogo spirta. Leningrad, Lenizdat, 1965. 50 p. (MIRA 18:9)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

BAGRYANTSEV, Vasiliy Vasil'yevich, novator khimicheskogo pro-
izvodstva, uchastnik kommunisticheskogo truda; [illegible],
Mikhail Serafimovich, [illegible]; [illegible],
red.

[Miraculous polymers; our experience in mastering the production of epoxy resins] Chudesnye polimery; nash opyt osvoeniia proizvodstva epoksidnykh smol. Leningrad, Lenizdat, 1965. 97 p. (MIRA 18:9)

1. Tsekh epoksidnykh smol Okhtinskogo khimicheskogo kombinata (for Berekhvatov, Bagryantsev).

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, A. YA.

LEPIN, A. YA. -"Solution of the Mixed Problem for Hyperbolic Systems on a Plane Using the Grid Method." Belorussian State U imeni V. I. Lenin, Minsk, 1955 (Dissertations for the Degree of Candidate of Physicomathematical Sciences)

SO: Knizhnaya Letopis No. 26, June 1955, Moscow

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

Call Nr: AF 1108425

Transactions of the Third All-union Mathematical Congress, Moscow, Jun-Jul '56, Trudy '56, V. 1, Sect. Rpts., Izdatel'stvo An SSSR, Moscow, 1956, 237 pp.

Myshkis, A. D. (Minsk), Abolinya, V. E. (Riga), Zhdanovich, V. F. (Minsk), Kostyukovich, Ye. Kh. (Minsk), Lepin, A. Ye. (Minsk), Kharitonenko, P. I. (Minsk) and Shlopak, A. S. (Moscow). Mixed Problem for Linear Hyperbolic Systems in a Plane. 61-63

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

Call Nr: AF 110[illegible]25

LEPIN, A. YA.

Transactions of the Third All-union Mathematical Congress, Moscow, Jun-Jul '56, Trudy '56, V. 1, Sect. Rpts., Izdatel'stvo AN SSSR, Moscow, 1956, 237 pp.

Myshkis, A. D. (Minsk), Vigant, Ye. I., (Riga), Lepin, A. Ya. (Minsk), Improper Integrals in η-space. 91-92

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

MYSHKIS, A.D.; LEPIN, A.Ya.

Existence of an invariant set consisting of two points in connection with continuous mappings of a segment onto itself. Uch.zap.BGU no.32:29-32 '57. (MIRA 11:12)
(Functional analysis)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, A. Ya

AUTHOR: MYSHKIS, A.D. (Khar'kov) and Lepin, A.Ya. (Minsk) 39-3-3/6

TITLE: On the Definition of the Generalized Functions (Ob opredelenii obobshchennykh funktsiy)

PERIODICAL: Matematicheskiy Sbornik, 1957, Vol.43, Nr 3, pp.323-340 (USSR)

ABSTRACT: Starting from Likusinski's definition [Ref.4] the authors want to give a general definition of different classes of generalized function (in dependence on their behavior at infinity). Thereby it becomes possible to develop a general method for the introduction of new spaces of primitive functions (by this introduction there arose from Sobolev's original generalized functions [Ref. 1] the distributions of Schwartz [Ref. 2] and the gereralized functions of Gel'fand and Shilov [Ref. 3]). The authors' paper is not only of interest from the methodical point of view, but moreover some well-known older results can be seen in a new light. The paper consists of 5 paragraphs.

§ 1. Classes of estimation. An arbitrary family $\mathfrak{M}$ of non-negative functions which satisfies the following conditions is denoted as an estimation class :

1. From $0 \leq m_1(x) \leq m(x) \in \mathfrak{M}$ it follows $m_1(x) \in \mathfrak{M}$; 2. From $m_1(x) \in \mathfrak{M}$ and $m_2(x) \in \mathfrak{M}$ it follows $m_1(x)+m_2(x) \in \mathfrak{M}$; 3. $1 \in \mathfrak{M}$;

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4. From $m(x) \in \mathfrak{M}$ it follows $\max_{0 \leq t \leq 1} m(tx) \in \mathfrak{M}$; 5. From $m(x) \in \mathfrak{M}$ it follows $x_1 m(x) \in \mathfrak{M}$.
The minimum class (contained in all others) is $\mathfrak{M}^0$, the class of the nonnegative functions which for $x \to \infty$ do not increase quicker than a certain power of $|x|$. The maximum class $\mathfrak{M}^1$ comprises all nonnegative functions.
Now the authors consider a series of properties of the estimation classes $\mathfrak{M}$, e.g. that from $m(x) \in \mathfrak{M}$ it follows that

$$\int_a^x m(s)ds \in \mathfrak{M} .$$

§ 2. Generalized functions according to Mikusinski. These are defined in such a way that the definition for $\mathfrak{M} = \mathfrak{M}^1$ passes over into Mikusinski's definition [Ref.4]. Definition: The sequence of functions $F_n(x)$ converges $\mathfrak{M}$-almost uniformly to $F(x)$ ($F_n(x) \xrightarrow{\mathfrak{M}} F(x)$), if on each finite interval it converges uniformly to $F(x)$ and if it is $\sup_n |F_n(x)| \in \mathfrak{M}$. Definition: The sequence $f = \{f_n(x)\}$ is denoted $\mathfrak{M}$-fundamental, if there exists an integer $k \geq 0$ and

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On the Definition of the Generalized Functions 29-3-1/5

an $\mathfrak{M}$-almost uniformly convergent sequence of k-times continuously differentiable functions $F = \{F_n(x)\}$ for which it is $F_n^{(k)}(x) = f_n(x)$ $(n=1,2,\ldots)$. Definition: Two $\mathfrak{M}$-fundamental sequences f and φ are $\mathfrak{M}$-equivalent $(f \sim \varphi)$, if there is an integer $k > 0$ and sequences $F = \{F_n(x)\}$ and $\Phi = \{\Phi_n(x)\}$, so that $F^{(k)} = f$, $\Phi^{(k)} = \varphi$ and $F_n(x) - \Phi_n(x) \underset{\mathfrak{M}}{\to} 0$. Since the $\mathfrak{M}$-equivalence is symmetric, reflexive and transitive, the $\mathfrak{M}$-fundamental sequences are divided into $\mathfrak{M}$-equivalence classes, each of them is denoted now as an $\mathfrak{M}$-generalized function in Mikusinski's sense. Let the set of these $\mathfrak{M}$-generalized functions be $M_{\mathfrak{M}}$ (Mikusinski's real definition concerns the case $\mathfrak{M} \equiv \mathfrak{M}^1$). Now the properties of the $M_{\mathfrak{M}}$ are considered, among others the strong convergence in $M_{\mathfrak{M}}$ (also according to Mikusinski) is introduced.

§ 3. Dual space of primitive functions. Generalizing the definitions of Schwartz, Gel'fand and Shilov now the variety $\mathfrak{S}$, of the "$\mathfrak{M}$-primitive functions" $s(x)$ is introduced which are differentiable for infinitely many times, whereby $s^{(k)}(x) \cdot n(x)$

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39-3-3/8

On the Definition of the Generalized Functions

for $|x| \to \infty$ tends to 0 $(k = 0,1,\ldots)$ for each $m(x) \in \mathfrak{M}$. $O_{\mathfrak{M}}$ is a linear space, whereby from $s(x) \in O_{\mathfrak{M}}$ it follows: $s'(x) \in O_{\mathfrak{M}}$. In the case $\mathfrak{M} = \mathfrak{M}^1$ the variety of the finite primitive functions arises. In the case $\mathfrak{M} = \mathfrak{M}^0$ $O_{\mathfrak{M}}$ was already considered by Schwartz, lateron by Gel'fand and Shilov. The convergence in $O_{\mathfrak{M}}$ is introduced $(s_n(x) \xrightarrow{\mathfrak{M}} s(x))$ representing a weak convergence with regard to the scalar product $(s,\bar{f})$. The scalar product $(s,\bar{f})$ then allows the introduction of the weak convergence in $M_{\mathfrak{M}}$ for $\bar{f}_n \in M_{\mathfrak{M}}$ $(n=1,2,\ldots)$, $\bar{f} \in M_{\mathfrak{M}}$ it holds $\bar{f}_n \xrightarrow[\text{weak}]{} \bar{f}$, if for each $s(x) \in O_{\mathfrak{M}}$ it holds: $(s,\bar{f}_n) \to (s,\bar{f})$. Theorem: from $\bar{f}_n \xrightarrow[\text{weak}]{} \bar{f}$ and $\bar{f}_n \xrightarrow[\text{weak}]{} \bar{f}$ it follows: $\bar{f} = \bar{f}$.

§ 4. The general form of a linear continuous functional in the space $M_{\mathfrak{M}}$. Theorem: Each linear functional $K(\bar{f})$, $\bar{f} \in M_{\mathfrak{M}}$ which is continuous with respect to the strong convergence can be represented with the aid of a uniquely determined function $s(x) \in O_{\mathfrak{M}}$ in the form of a scalar product $(s,\bar{f})$.

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On the Definition of the Generalized Functions 39-3-3/8

§ 5. The Schwartz space. The Schwartz space $S_{\mathfrak{M}}$ denotes the totality of the linear continuous functionals T in the $C_{\mathfrak{M}}$, whereby ordinary linear operations, differentation $T'(s) = -T(s')$ $(s(x) \in 0_{\mathfrak{M}})$ and weak convergence are introduced. For $\mathfrak{M} = \mathfrak{M}^1$ the usual Schwartz space is obtained. Definition: $\mathfrak{M}$ possesses a denumerable basis, if there exists such a sequence $m_i(x) \in \mathfrak{M}$ $(i=1,2,\ldots)$, that for a certain $i=1,2,\ldots$ an arbitrary estimation function $m(x) \in \mathfrak{M}$ for all x $(-\infty < x < +\infty)$ is not higher than $m_i(x)$. E.g. $\mathfrak{M}^0$ has has the denumerable basis $\{i + |x|^i\}$. Without denumerable basis is the set of the $m(x) \geqslant 0$ for which for $|x| \to \infty$ and $n=1,2,\ldots$ the expression $m(x)\, e^{-|x|}\, |x|^n$ tends to zero. The statement seems to be of interest that the complicatedness of the usual Schwartz space (functionals of infinite order) consists in the fact that the corresponding class estimation $\mathfrak{M}^1$ is very complicated in spite of the simplicity of its definition : it possesses no denumerable basis in the sense mentioned above. 1 Soviet and 7 foreign references are quoted.

Card 5/5

SUBMITTED: 23 May 1956

AVAILABLE: Library of Congress

1. Functions-Theory 2. Functions-Definition

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, A. YA.

AUTHOR: MYSHKIS, A.D., LEPIN, A.Ya. (Kharkov) 20-2-4/50

TITLE: On the Definition of the Generalized Functions (Ob opredelenii obobshchennykh funktsiy).

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol.116, Nr 2, pp.177-180(USSR)

ABSTRACT: In the present paper the authors apply the definition of Mikusinski - Korevaar (see J.Korevaar [9]) in order to give a generalized definition of different classes of the generalized functions introduced for the first time by Sobolev. The authors replace the set of all non-negative functions by the set of those negative functions which satisfy certain additional conditions (class of estimation $\mathfrak{M}$).

ASSOCIATION: Kharkov Institute for Aviation (Khar'kovskiy aviatsionnyy institut).

SUBMITTED: October 27, 1956

AVAILABLE: Library of Congress

CARD 1/1

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, A.Ya.

One method of generating a convex shell. Uch. zap. BGU no.1: 27-30 '59. (MIRA 12:11)

(Topology)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

ACCESSION NR: AR4039849 S/0044/64/000/004/B132/B132

SOURCE: Ref. zh. Matematika, Abs. 4B590

AUTHOR: Lepin, A. Ya.

TITLE: Estimate of the error in the method of nets for the equation $U_t' = \lambda u_x' + f$.

CITED SOURCE: Uch. zap. Latv. un-t, v. 47, 1963, 125-139

TOPIC TAGS: error estimate, method of nets, difference scheme, modulus of continuity, quasi linear system

TRANSLATION: Estimates are made for the solution of the equation under consideration by the use of the difference scheme $U_{i+1,j} = a_{ij}U_{ij} + b_{ij}\Delta_{ij}U_{ij} + kf_{ij}$,

where $a_{ij} = 1 - kh^{-1}|\lambda_{ij}|$, $b_{ij} = kh^{-1}|\lambda_{ij}|$, $\Delta_{ij}U_{ij} = U_{i,j+s}$ and $s = \operatorname{sign}\lambda_{ij}$. The error estimate is obtained in terms of the modulus of continuity of the coefficients of the equation and of the initial function. The results are extended to the case of a quasi-linear system

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ACCESSION NR: AR4039849

$$U'_t(t, x) = \Lambda(t, x) U'_x(t, x) + F(t, x, u),$$

where Λ (t,x) is a diagonal matrix. N. Bakhvalov

DATE ACQ: 15May64 SUB CODE: MA ENCL: 00

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, A.Ya.

Method of nets as applied to a hyperbolic system of quasilinear equations on a plane. Dokl.AN SSSR 149 no.3:516-517 Mr '63. (MIRA 16:4)

1. Predstavleno akademikom S.L.Sobolevym.
(Differential equations, Linear)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

MYSHKIS, A. D.; LEPIN, A. Ya.

"Condition for Boundedness of the Derivatives of Differential Equations."

paper presented at the 3rd Conf on Nonlinear Oscillations, E. Berlin, 25-30 May 64.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, A.Ya.; MYSHKIS, A.D.

Conditions of boundedness of the derivatives of bounded solutions to ordinary differential equations. Dif. urav. 1 no.9:1260-1263 S '65. (MIRA 18:10)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

SOCHILIN, Boris Georgiyevich; LEPIN, E.A., red.

[Every enterprise should have a permanent labor force] Kazhdomu predpriiatiiu - stabil'nye kadry. Leningrad, Lenizdat, 1964. 65 p. (MIRA 18:4)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

SOV/124-58-7-8285 D

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 7, p 131 (USSR)

AUTHOR: Lepin, G.F.

TITLE: An Investigation of Some of the Laws Governing the Relationship Between Creep and Stress Relaxation in Metals (Issledovaniye nekotorykh zakonomernostey svyazi yavleniy polzuchesti i relaksatsii napryazheniy v metallakh)

ABSTRACT: Bibliographic entry on the author's dissertation for the degree of Candidate of Technical Sciences, presented to the In-t metallurgii AN SSSR (Institute of Metallurgy, Academy of Sciences, USSR), Moscow, 1957

ASSOCIATION: In-t metallurgii AN SSSR (Institute of Metallurgy, Academy of Sciences, USSR), Moscow

1. Metals--Mechanical properties

Card 1/1

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, G.F

AUTHOR: Lepin, G.F. (Moscow) 24-9-23/33

TITLE: On the statistical theory of creep and relaxation. (K statisticheskoy teorii polzuchesti i relaksatsii).

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1957, No.9, pp. 134-136 (USSR)

ABSTRACT: An attempt is made to derive a general deformation equation from the point of view of the dislocation theory and on the basis of statistical relations and to derive, as particular cases, equations for creep and relaxation. The work was carried out under the leadership of I. A. Oding. The conclusions are based on the assumptions of the dislocation theory expressed by Reed, Mott and Orowan, i.e. that the polycrystalline specimen contains a certain quantity of imperfections and also sources of dislocation which obey a certain distribution law. The strain is the result of displacement of dislocations which are activated by applying stresses or thermal fluctuations. The speed of deformation should be proportional to the probability of existence in the specimens of dislocations with minimum energy and the probability of occurring in the specimens of thermal fluctuations. The instant of stress application may be accompanied by a sudden plastic deformation. It can easily

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On the statistical theory of creep and relaxation. 24-9-23/33

be proved that the dislocation distribution curve as a function of the activation stress can be expressed with an accuracy up to a constant factor by a curve of the dependence of the sudden plastic deformation ε on the stress σ; this dependence was experimentally determined for Armco iron at 20, 100, 280 and 350°C and was found to be an exponential curve expressed by eq.(1). The following final equations were derived: eq.(11) for the creep and eq.(13) for the relaxation. Danilovskaya, V. I., Ivanova, G. M., Rabotnov, Yu. N. (Ref.7) obtained similar formulae starting from completely different assumptions and they showed that the results obtained by means of this equation are in good agreement with experimental data measured for the Steel 30XMA. There are 1 figure and seven references, 1 of which is Slavic.

SUBMITTED: January 3, 1957.

AVAILABLE: Library of Congress.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, G. F.

24-1-17/26

AUTHOR: Lepin, G. F. (Moscow).

TITLE: On the statistical theory of creep and relaxation of stresses (experimental results). (K statisticheskoy teorii polzuchesti i relaksatsii napryazheniy (rezul'taty eksperimenta)).

PERIODICAL: Izvestiya Akademii Nauk, Otdeleniye Tekhnicheskikh Nauk, 1958, No.1, pp. 123-124 (USSR).

ABSTRACT: In an earlier paper (Ref.1) the author derived a general equation of deformation and, as particular cases, he derived equations of the damping creep and relaxation. The derived equations contain only coefficients which are common for both types of tests. This permits calculation of the relaxation curves from experimentally determined creep curves and vice versa and also obtaining of creep and relaxation curves for various stresses from curves obtained experimentally for other stresses. Experimental verification of the equations was effected on armco iron at 280°C and on steel ЭИ-257 at 600°C using the ring method of I. A. Oding (Ref.2). The stresses were determined by the method described in earlier work (Refs.2 and 3). For verifying the equations, the results were also used of tests on steel 30ХМА at 500°C

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

24-1-17/26

On the statistical theory of creep and relaxation of stresses (experimental results).

published by Danilovskaya et alii (Ref.4). In Fig.1 the experimental values of the creep of ЭИ257 steel are graphed (continuous line curves) and also the creep curves (dotted line curves) which were calculated from relaxation tests. In Fig.2 the experimental curves are graphed of the relaxation of the same steel and also the relaxation curves calculated from creep tests. It can be seen from Figs.1 and 2 that the experimental curves and the curves calculated from the creep and relaxation equations (Ref.1) are similar in character. The obtained correspondence between these curves can be considered fully satisfactory. Such correspondence was also obtained for armco iron and 30ХМА steel. Consequently, the equations derived in the earlier paper (Ref.1) describe satisfactorily the behaviour of steels of these grades under creep and relaxation conditions.
There are 2 figures and 4 references, all of which are Russian.
(Note: This is a complete translation).

Card 2/2

SUBMITTED: February 25, 1957.
AVAILABLE: Library of Congress.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

SOV/32-24-7-30/65

AUTHORS: Oding, I. A., Lepin, G. F.

TITLE: The Effective Stress Computation on Toroidal Samples at Creep and Relaxation (Raschet deystvuyushchikh napryazheniy v kol'-tsevom obraztse pri polzuchesti i relaksatsii)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol. 24, Nr 7, pp. 845 - 848 (USSR)

ABSTRACT: A number of papers have hitherto dealt with the method developed by Oding (Refs 1,2); this problem has, however, not yet been solved completely. From a figure showing the distribution of forces in the toroidal sample it may be seen that the test part has a rectangular cross-section with a linear distribution of force. The analytical results which are represented graphically and are given according to S.I.Yatskevich (Ref 3), that of polarization-optical determinations of the stress distribution which are given according to M.M.Saverin (Ref 4) and N.I.Pri-gorovskiy et al.(Ref 5) agree well with each other. In the de-formation process in the toroidal sample the strain in the surface layers does not remain constant under a constant flexure

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

The Effective Stress Computation on Toroidal Samples at Creep and Relaxation 307/32-24-7-39/65

load. It decreases at an increase of deformation and tends towards an asymmetrical minimum. The stress distribution across the sample varies considerably. It is assumed that in the relaxation as in creeping the stress distribution changes from a triangular to a trapezoidal one (in first approximation). A somewhat modified shape of the sample is given in a diagram in the chapter dealing with the creeping. Making reference to the paper by G.F.Lepin (Ref 8) it is stated that the equations used and the computations made are correct, as the results coincide with the experimental curves, as well as with the relaxation and creeping tests. There are 7 figures and 8 references, which are Soviet.

ASSOCIATION: Institut metallurgii im. A.A.Baykova Akademii nauk SSSR (Institute of Metallurgy imeni A.A.Baykov, AS USSR)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

SOV/32-24-7-31/65

AUTHOR: Lepin, G. F.

TITLE: The Localization of the Course Taken by Plastic Deformation in Toroidal Samples (Lokal'nost' protekaniya plasticheskoy deformatsii v kol'tsevom obraztse)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol. ~~1958~~ 24, Nr 7, pp. 849 - 850 (USSR)

ABSTRACT: In recent years a number of rules governing the course taken by small plastic deformations and the degree of heterogeneity in cylindrical samples were found. A comparatively widely used method of investigation in this field is that according to I.A.Oding (Ref 1) which is applied in investigations of the creeping and the relaxation in toroidal samples. In this investigation marks were applied along the total test segment of the toroidal sample with a diamond. Thus the segment is divided into sections about 5 mm long. Thus, load conditions are correlated to the relaxation conditions for a step-wise increase of load. The deformation of each section of the toroidal sample was measured with a comparator. As may be seen from the results

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

The Localization of the Course Taken by Plastic Deformation in Toroidal Samples SOV/32-24-7-31/65

of the experiments given in graphs the magnitude of plastic deformation along the test segment takes a sharply heterogeneous course. When the sections were reduced to 0,5 mm the same picture was obtained. The localization of the plastic deformation is determined by the nature of the polycrystalline material, that is to say by the considerable differences of the physical and mechanical properties varying from one grain to another, or from volume element to volume element, respectively. It was found that the mean deformation at the inner circumference is by about 20% greater than at the outer circumference. The results show that the method of toroidal samples can be applied to investigations of the deformation properties of metallic materials under the conditions of creeping and of relaxation. There are 3 figures and 1 reference, which is Soviet.

ASSOCIATION: Institut metallurgii im.A.A.Baykova Akademii nauk SSSR (Institute of Metallurgy imeni A.A.Baykov, AS USSR)

Card 2/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

AUTHORS: Corresponding Member Ac.Sc. USSR I.A. Oding, Candidate of Technical Sciences G.F. Lepin

SOV/129-59-4-1/17

TITLE: Determination of the Characteristics of Deformation from Creep and Stress Relaxation Curves (Opredeleniye kharakteristik deformatsii po krivym polzuchesti i relaksatsii napryazheniy)

PERIODICAL: Metallovedeniye i Termicheskaya Obrabotka Metallov, 1959, Nr 4, pp 2-8 (USSR)

ABSTRACT: On the basis of present-day concepts of the dislocation theory on the character of processes taking place in polycrystalline materials during deformation, G.F. Lepin (Ref 1) arrived at the following general differential equation for deformation:

$$d\varepsilon_x/dt = mb\varepsilon_1^{a/b}\,\varepsilon_x^{1-a/b}\,e^{-a\varphi(\varepsilon_x,\,t)} \qquad (1)$$

where ε_x is deformation in % during the time t; ε_1 is sudden deformation during loading or heating; a is a coefficient characterising the "fluctuation" property of the given material; m is the proportionality coefficient; b is the coefficient of the dependence on the stresses

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Determination of the Characteristics of Deformation from Creep and Stress Relaxation Curves

of the sudden plastic deformation in the following equation:

$$\varepsilon = 0.1\, e^{-b(c-\sigma)} \qquad (2)$$

The coefficient b characterises the distribution of the dislocations as a function of the activation stresses; the function $\varphi(\varepsilon_x, t)$ determines the conditions of operation of a given specimen or component. If various relations of the variation in the function $\varphi(\varepsilon_x, t)$ as a function of the deformation and time are given, it is possible to obtain from Eq (1) the deformation equations for various methods of testing (creep, relaxation, tension etc.). Thereby the type of a given function is determined directly from the conditions of loading of a given specimen or component. In this paper the authors investigate only equations of attenuated creep and relaxation. One of the conditions of attenuated creep is that the stresses applied to the specimens are maintained constant. In ordinary creep tests it can be assumed that the stress will be maintained constant only at relatively small values of stress and deformations

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Determination of the Characteristics of Deformation from Creep and Stress Relaxation Curves

when the decrease in the transverse cross sections and the formation of internal defects do not play an appreciable role. Therefore the condition for attenuated creep will be $\varphi(\varepsilon_x, t) = 0$.

By integrating Eq (1) for this condition the following equation is obtained for attenuated creep:

$$\varepsilon_x = \varepsilon_1 (1 + m \alpha t)^{b/\alpha} .$$

The relaxation equation can be written thus:

$$t = \frac{1}{L} \int_{\alpha M \varepsilon_1}^{\alpha M \varepsilon_x} x^{\alpha/b - 1} e^x \, dx, \qquad (4)$$

where $L = mb (\alpha M \varepsilon_1)^{\alpha/b} e^{\alpha M \varepsilon_1}$, (5)

and $M = E/100$, E being the modulus of elasticity. In creep or relaxation tests, only two coefficients, α and M, are determined, which can be referred to as the characteristics of deformation since they represent the behaviour of the material under various conditions of

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SOV/129-59-4-1/17

Determination of the Characteristics of Deformation from Creep and Stress Relaxation Curves

loading. In this paper the technique is described of determining characteristics of deformation on the basis of creep curves as well as on the basis of relaxation curves, and also a technique of plotting calculated creep and relaxation curves on the basis of known deformation characteristics. A simple method is described which permits determining, with an accuracy adequate for practical purposes, the deformation characteristics on the basis of creep curves as well as on the basis of relaxation curves. Characteristics derived from creep tests can be applied for plotting relaxation curves and vice versa, and also for plotting similar curves for other stress values. The here-described technique was applied and verified for commercial iron at 280°C and for the steel EI-257 at 600°C. The creep and relaxation tests were carried out in accordance with a method described in earlier work of one of the authors (Ref 2). For verifying the derived equations (3) and (4) and the here proposed technique on cylindrical specimens, the creep and relaxation curves published by Danilovskaya

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SOV/129-59-4-1/17

Determination of the Characteristics of Deformation from Creep and Stress Relaxation Curves

et alii (Ref 3) for the steel 30 KhMA tested at 500°C were used. Results of comparative creep and relaxation tests were considered in an earlier work of one of the authors (Ref 4), in which good agreement was found to exist between the experimental results and those calculated on the basis of Eqs (3) and (4). There are 8 figures and 4 Soviet references.

ASSOCIATION: Institut Metallurgii AN SSSR imeni A.A. Baykova (Institute of Metallurgy, Ac.Sc. USSR, imeni A.A. Baykov)

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S/554/61/000/001/005/007
I007/I207

AUTHOR: Lepin, G.F.

TITLE: The theory of metal deformation at high temperatures

SOURCE: Kramatorsk. Nauchno-issledovatel'skiy i proyektno-tekhnologicheskiy institut mashinostroyeniya. Konstruirovaniye i tekhnologiya mashinostroyeniya. no. 1, Moscow, 1961, 220-242

TEXT: The ever-increasing use of new alloys requires a general theory of metal deformation capable of explaining metal behavior under stresses as a function of time and applied load. This paper attempts to establish, on the basis of the dislocation theory, the interdependence between the processes of plastic deformation, and to formulate common criteria for heat resistance

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S/654/61/000/001/005/007
I007/I207

The theory of metal....

of metals. The fundamentals of the dislocation theory and a mechanism of metal deformation under various loads are outlined. The fact that deformation of metals under varying consitions of stress are intimately interconnected and obey common laws was confirmed experimentally. The deformation parameters m (proportionality factor) and α (a coefficient characterizing the creep capacity of the metal at a given temperature) may be used as criteria for evaluating metal behavior at high temperatures. Important English-language references are: 19). Mott, N.F., Mechanical Strength and creep in Metals. Imperfections is Nearly Perfect Crystals", London, 1952: 20). Mott, N.F. "A theory of Work-hardening of Metals", Philos Mg., 44, 1953; 27). Laks, H., Wiseman, C.D., Sherby, O.D.,Dorn, I.E. "Effect of Stress on Creep at high temperatures", Paper A.S.M.E. no. A-55, 1956.

Card 2/2

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, G.F.; BUZUNOV, V.N.; TSEYTLIN, M.A.; BUGAY, N.V.

Increase in the operational reliability of the fastening devices of electric power systems operating under high pressures. Energ. i elektrotekh. prom. no.2:59-64 Ap-Je '62. (MIRA 15:6)

1. Krivorozhskiy vechernyy industrial'nyy institut (for Lepin, Buzunov). 2. Glavnoye upravleniye energeticheskogo khozyaystva Donetskogo basseyna (for TSeytlin, Bugay).
(Steam power plants)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, G.F.; VISHNEVSKIY, A.V.; LI SI-CHAN [Li Hsi-ch'ang]; BUDNEVSKIY, A.M.; BORODULINA, R.I.; VERTEBNYY, P.Ya.; REVEL'SKIY, I.A.

Exchange of experience. Zav.lab. 28 no.6:753-755 '62. (MIRA 15:5)

1. Kramatorskiy nauchno-issledovatel'skiy i proyektno-tekhnologicheskiy institut mashinostroyeniya (for Lepin, Vishnevskiy).
2. Institut metallurgii imeni A.A. Baykova (for Li Si-chan, Budnevskiy).

(Metallurgical analysis)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, G.F. (Kramatorsk); TOPTUNOVA, L.M. (Kramatorsk)

A dependence for creep. Izv. AN SSSR. Mekh. no.5:134-135 S-O '65. (MIRA 18:10)

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L 10881-65 EWT(m)/EWA(d)/EWP(t)/EWP(k)/EWP(b) Pf-4 ASD(f)-2 JD/HW
ACCESSION NR: AR4046549 S/0058/64/000/008/E086/E086

SOURCE: Ref. zh. Fizika, Abs. 8E664

AUTHORS: Lepin, G. F.; Toptunova, L. M.

TITLE: Investigation of the laws of stress relaxation

CITED SOURCE: Sb. Relaksats. yavleniya v met. i splavakh. M., Metallurgizdat, 1963, 290-293

TOPIC TAGS: plastic deformation, stress relaxation, steel

TRANSLATION: An equation derived earlier (RZhFiz, 1958, No. 6, 13263) and suitable, in the author's opinion, for the description of all types of plastic deformations of metals, is used to describe the relaxation of stresses in steel. In view of the presence of a large number of empirical constants in the equation and in view of the relative [illegible] of the investigated stress interval, the

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L 10881-65

ACCESSION NR: AR4046549

authors have succeeded, judging from the presented illustrations, in obtaining good agreement between the experimental and calculated curves. O. Sosnin.

SUB CODE: MM ENCL: 00

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27 7

Sensitive platinum resistance thermometer. G. B. Lapp

and I. R. Lepin. U.S.S.R. 101,198, Nov. 30, 1955.

M. H.

Mfra 4

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

BRAGIN, B.K.; LAPP, G.B.; LEPIN, I.R.

Effect of the annealing on the thermoelectromotive force of thermoelectrode platinrhodium. Trudy inst.Kom.stand.mer i izm. prib. no.71:220-222 '63. (MIRA 17:9)

1. Sverdlovskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta metrologii im. D.I. Mendeleyeva.

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L 32261-65 EWT(m)/EWA(d)/EWP(t)/EWP(b) IJP(c) JD/JG

ACCESSION NR: AT4045676 S/2680/64/000/022/0143/0158

26
19
B+1

AUTHOR: Aleksakhin, I. A.; Lepin, I. R.; Lapp, G. B.; Bragin, B. K.

TITLE: Problems involved in the quest for thermoelectrode oxidation-resistant alloys at service temperatures up to 2000 C

SOURCE: Moscow. Gosudarstvenny*y nauchno-issledovatel'skiy i proyektny*y institut splavov i obrabotki tsvetny*kh metallov. Trudy*, no. 22, 1964. Issledovaniye splavov dlya termopar (Studying alloys for thermocouples), 143-158

TOPIC TAGS: rare earth metal, oxidation, thermoelectromotive force

27

ABSTRACT: The data dealing with Ir thermocouple containing 40% Rh are scarce. Conversely, there is ample literature both in the Soviet Union and abroad on thermocouples with 60% Rh. The authors discuss foreign research in this field at great length and conclude that Soviet investigations stand in good agreement with foreign findings. However, the amount of Rh additions (40 or 60% Rh) remains a controversial subject. The investigations conducted by the Sverdlovsk branch of the

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ACCESSION NR: AT4045676

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All-Union Scientific Research Institute of Metrology show that after annealing at high temperatures the thermoelectromotive force increases with 60% Rh. The Ir60Rh/Ir thermocouple has a life span of about 100 hrs. at 1800 C. Another Soviet paper suggests the employment of such thermocouple in an oxidizing atmosphere at 2300 C. The authors recommend the employment of an Ir60Rh/Ir couple for a service period of 10 to 20 hours and at 2000 C. They point out such shortcomings as the ready evaporation of the Ir electrode and the non-stable character of the electromotive force under the effect of oxidation. The possibilities of increasing the life span of an Ir60Rh/Ir couple along with the search for more stable alloys should be considered and Ir-Rh, Ir-Pt, Ir-Pd and Ir-Au investigated for that purpose. Furthermore, a beneficial effect may possibly be achieved by the addition of base metals. Orig. art. has: 9 figures and 4 tables.

ASSOCIATION: Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut splavov i obrabotki tsvetnykh metallov, Moscow (State Scientific Research and Design Institute for Alloys and Processing of Nonferrous Metals)

SUBMITTED: 00 ENCL: 00 SUB CODE: MM
NO REF SOV: 012 OTHER: 028

Card 2/2

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2

Adsorption of chlorine contained in a current of air. N. A. Shilov, L. K. Lepin and S. A. Vozzhennikov. *J. Russ. Phys.-Chem. Soc.* 61, 1107-23; *Kolloid Z.* 49, 284-96 (1929).—Passing a current of air contg. Cl over a layer of activated C the authors detd. (1) the distribution of Cl remaining at various points of the system, (2) the residual concn. of Cl at definite moments of the expt. in different parts of the system, (3) the time of the gradual termination of the protective action along the adsorbing layer, (4) the quantities of Cl adsorbed in the various parts of the adsorbing layer. All detns were effected with different velocities of current. Cl concns. and charcoals. To this end the C layer was divided into layers between which measuring app. was installed so that any layer could be excluded without interrupting the current as a whole. Indicator papers were placed between the various layers to reveal the first appearance of the gas in each part of the adsorbent. To characterize the action of the protective layer 2 empirical magnitudes are introduced which permit calcn. of the relation between the length of the protective layer and the time of its protective action. These magnitudes are: θ—coeff. of the protective action, and τ—initial loss of time of the protective action. Meckenburg's (*C. A.* 20, 531) idea of the "dead layer," which is only a math. function, is given a definite physical sense and rendered concrete by the introduction of the notion of τ which is the length of an imaginary layer corresponding to the experimentally observed initial loss of protective action. The results of these expts. are applicable to many technical problems such as filtration, washing, absorption by the soil and, generally, interaction between a solid and a liquid or gas current.

Bernard Nelson

ASM SLA METALLURGICAL LITERATURE CLASSIFICATION

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

Absorption of a gas from a current of air. L. K. Lapin and S. A. Voznesenskii. *J. Gen. Chem.* (U. S. S. R.) 1, 233-4(1931).—The authors reply to Mecklenburg (*C. A.* 24, 4561). Cf. Shilov, L. and V. (*C. A.* 24, 766). S. L. Madorsky

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, L.K.

A-1

METALLURGICAL LITERATURE CLASSIFICATION

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

CA

2

The surface oxides of charcoal and the adsorption of electrolytes. L. Lepin. *Physik. Z. Sowjetunion* 4, 292-94(1933). —Three surface oxides of charcoal are postulated having 1, 2 and 3 valences, resp., of the surface C atoms attached to O. These react with water to form hydroxides, the first 2 being basic and the last acidic. L. E. S.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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CA

LEPIN, L. K.

2

Effect of temperature on the adsorption of electrolytes on charcoal. L. K. Lepin and G. V. Strakhova. *Colloid J.* (U. S. S. R.) 1, 239-46(1935); cf. *C. A.* 29, 5718[8]. Adsorption isotherms at from 0° to 100° are given for HCOOH, HOAc, HCl and H_2SO_4. The small endothermic thermal effect for HCl and H_2SO_4 indicates that the adsorption process is complex. For weak acids the thermal effect indicates an exothermic process.

F. H. Rathmann

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LEPIN, L.K.

Passivity of metals and surface-compound formation. L. K. Lepin. *Uspekhi Khim.* 7, 485 (1938).—A review of the non-Russian literature. L. points to the great importance of Faraday's theory of surface-compound formation.

F. H. Rathmann

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1ST AND 2ND ORDER

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDER

M

***Passivity of Metals and Surface Compounds.** *L. Lepin (*Acta Physicochimica U.R.S.S.*, 1938, 8, (5), 659-668).—[In English.] Faraday's oxide film theory of passivity of metals is extended, and it is shown that the passivity and indifference of the noble metals to oxidation are really due to the formation of high-valency surface oxides. The tendency of the metal to form surface compounds depends on the position of the metal in the periodic system. The denser the space lattice of the metal, *i.e.* the less the atomic radius of the metal, the less able is the metal to take part in ordinary volume reactions and the greater is its tendency to participate in surface actions.

J. S. G. T.

COMMON ELEMENTS

MATERIALS INDEX

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1ST AND 2ND ORDER

PROCESSES AND PROPERTIES INDEX

LEPIN, L. K.

BC

a-1

Influence of electrolytes on formation of silver chloride sols. I. Coagulating effect of excess of chlorides and their mixtures. L. K. Lepin and A. V. Bromberg (J. Phys. Chem. Russ., 1938, 12, 609—618).—$AgNO_3$ solutions were mixed with chloride solutions, and the concn. of the chloride giving the least turbid sol was determined. For MCl_2 this concn. is ~4·2 of that for MCl, whilst the respective coagulating concns. are in the ratio 1 : 50—1 : 100. Mixtures of MCl and MCl_2 usually possess a smaller coagulating power than does either separately. This antagonistic action of uni- and bi-valent cations is even more pronounced in AgI sols. J. J. B.

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PROCESSES AND PROPERTIES INDEX

a-1

Br

Coagulation of hydrophobic sols with mixed electrolytes. I. Coagulation of negative silver iodide sol with a mixture of salts of potassium and multivalent metals. II. Method of evaluating ion antagonism in coagulation. L. LEFIN and A. BROMBERG (Acta Physicochim. U.R.S.S., 1939, 10, 83—101, 102—120; cf. A., 1939, I, 469).—I. The coagulating effect of mixtures of K salts is approx. additive, irrespective of the valency of the anion; in all mixtures of K salts with those of metals having a valency >1 ion antagonism, increasing with the valency of the second metal, is observed. With mixtures of salts having cations of equal valency (>1), the degree of antagonism is determined by the valency of the anion which is present in excess, when the two anions differ; when they are the same

of the study of the Pd-D_2 system requires pretreatment of the Pd with H_2 to form the β-phase, owing to the reluctance of Pd to form the β-phase in presence of D_2. The isotherms of D_2 on pretreated Pd are reproducible. Under similar conditions the adsorption of D_2 is < that of H_2, and the D_2 isotherms are horizontal at pressures ~2·4 times those of the corresponding H_2 horizontals. The crit. solution temp. for Pd-D_2 is 276°, the crit. pressure 35 atm., and the crit. composition 0·25 atom D per atom Pd. The heat of dissolution per mol. D_2 increases with increasing [D_2], and is 7760 g.-cal. per mol. for the conversion of the first into the second solid phase. The shape of the phase diagram indicates no Pd deuterides above 200°.

W. R. A.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, L.K.

PROCESSES AND PROPERTIES INDEX

Surface reactions. II. The action of neutral salt solutions on ash-free charcoal. L. K. Lepin and G. Strakhova. *Acta Physicochim. U. R. S. S.* 10, 175-86 (1939)(In German); cf. *C. A.* 30, 6619[9].—Measurements were made on the adsorption and desorption (by dilu.) of the separate ions of neutral KCl salt solns. by detg. the changes in the concen. of the Cl^- and K^+ components of the salt and of the H^+ and OH^- concens. In a second series of measurements, just enough HCl was added during adsorption and KOH during desorption to keep the soln. neutral. The data show that the surface exchange reaction $>C{-}OH + K^+ + Cl^- \rightleftharpoons >C{-}Cl + K^+ + OH^-$ takes place, and that it obeys the mass action law with $K_w = 0.0060$. In the case of $BaCl_2$, complications arise owing to $BaCO_3$ formation, but when exact neutralization by addn. of HCl or $Ba(OH)_2$, resp., is carried out, the adsorption and desorption curves coincide.

P. H. Rathmann

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

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

Coagulation of hydrophobic sols by mixtures of electrolytes. III. Effect of the properties of univalent cations. L. Lepin and A. Brumberg. *Acta Physicochim. U. R. S. S.* 11, 899-911(1939)(in German); cf. *C. A.* 33, 6148[1].—On the basis of exptl. data on the coagulation of neg. AgI sols by mixts. of K, Na, Li and NH_4 nitrates, sulfates and chlorides mixed with similar Be, Sr, Cd, Mg, Be, La, Ce, Co and Gd salts, the observed deviations from additivity are found to obey the exponential equation $\gamma/\gamma_0 = \exp.[K_s z^2(\sqrt{I} - \sqrt{I_0})]$ where the I's are the ionic strengths, z is the valence of the multivalent cation, and K_s is a const. depending chiefly on the nature of the multivalent ion. The values of γ/γ_0 decrease in the order K > Na > Li. Owing to differences of behavior of the K, Na and Li ions in the diffuse layers, the micelles are less stable with respect to the coagulating cation in the presence of Li than in the presence of Na or K ions. F. H. R.

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN' L. K., and BROMBERG, A. V.

"The Coagulation of Hydrophobic Sols with Mixtures of Electrolytes—1. The Coagulation of a Negative Sol AgJ with Mixtures of Potassium Salts and of Polyvalent Metals"; Zhur. Fiz. Khim., 12, No. 1, 1939. Received 27 May 1938

Report U-1613, 3 Jan. 1952.

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN' L. K., AND BROMBERG, A. V.

"The Coagulation of Hydrophobic Sols with Mixtures of Electrolytes--II. A new method of Evaluating the Antagonism of Ions during Coagualtion".; Zhur Fiz. Khim., 12, No. 1, 1939. Received 27 May 1938.

Report U-1613, 3 Jan. 1952.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

BC

A-1

Surface reactions. II. Effect of solutions of neutral salts on ash-free charcoal. L. Lerew and G. Strachova (J. Phys. Chem. Russ., 1939, 13, 216—223).—If charcoal is kept in a solution of KCl or $BaCl_2$ the concn. of which is gradually raised and then lowered, the amount of Cl adsorbed increases since the acidity of the solution changes. Only when the acidity changes are eliminated is a reversible adsorption isotherm obtained. J. J. B.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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1ST AND 2ND ORDERS

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3RD AND 4TH ORDERS

2

ca

Surface compounds and surface chemical reactions. L. K. Lepin. *Uspekhi Khim.* 9, 433-49(1940).—Review. Van der Waals adsorption, chem. adsorption, at. vols. and their relation to adsorption, especially with reference to compds. formed on charcoal and graphite surfaces during adsorption, and the accompanying changes of the surface are discussed. F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN', L. K.; BROMBERG, A. V.

"The Coagulation of Hydrophobic Sols with Mixtures of Electrolytes"; Part III. "The Effect of the Nature of a Monovalent Cation".

Zhur. Fiz. Khim., Vol. 14, No. 1, 1940.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

BC

Coagulation of hydrophobic sols by electrolyte mixtures. IV. Electrophoretic mobility of the negative silver iodide sol in electrolyte mixtures. L. Lepin and A. Bromberg (*Acta Physicochim. U.R.S.S.*, 1940, 13, 139—158).—The cataphoretic mobility (U) of a dil. negative AgI sol in solutions of K_2SO_4, KNO_3, $MgSO_4$, $Mg(NO_3)_2$, $Ce_2(SO_4)_3$, and $[Co(NH_3)_6](NO_3)_3$, and their mixtures, has been studied. With increasing concn. of any one salt, U decreases smoothly, and more rapidly the greater is the valency of the cation. On the other hand, with a given cation the decrease of U is less rapid the greater is the valency of the anion. In mixtures, increasing concn. of a multivalent electrolyte in presence of a fixed concn. of K_2SO_4 causes a decrease of U which is less rapid the greater is $[K_2SO_4]$. These effects are parallel to those found in the coagulation of AgI sols by electrolytes (A., 1939, I, 563) and depend in the same way on the valency of the cation and on the ionic strength, except where [as with K_2SO_4 + $Ce_2(SO_4)_3$] complex formation occurs.

F. I. G.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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

C A

1

Coagulation of hydrophobic sols by electrolyte mixtures. V. Coagulation of a negative sol, silver iodide, by ions which react with the micelle, Hg^{++}. L. Legin and A. Bromberg. *J. Phys. Chem.* (U. S. S. R.) 15, 673-85 (1941); cf. *C. A.* 34, 6720.—The coagulation of a neg. sol, AgI, by mixts. of $Hg(NO_3)_2$ and $KNO_3(K_2SO_4)$ was studied. The normal antagonistic effect was not found, which is characteristic of mixts. that are indifferent in respect to the ion micelle; nor was additive action found. A more detailed study of the action of Hg ions (Hg^{++}) with AgI sol showed that the coagulating concn. of Hg^{++} depends upon the relation between the excess of the potential-detg. ions of I in soln. and the magnitude of the adsorbing surface of the disperse phase. By spectrophotometric measurements it was detd. that Hg^{++}, introduced into the sol by reaction with I^- with formation of complex ions HgI_4^{--}, produces on the surface of the particles a layer of Ag_2HgI_4 without lowering of sol stability. It is possible that this transformation may, under favorable conditions, proceed in deeper-lying layers of AgI crystals, because of the similarity between the space lattices of the 2 compds. A coagulation mechanism is proposed and it is shown that the coagulation does not begin until all excess I, except that used for formation of Ag_2HgI_4 in the deeper-lying layers, is bound in HgI_2.

O. M. Korolapoff

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LEPIN', L.; BROMBERG, A.

"The Coagulation of Hydrophobic Sols with Mixtures of Electrolytes--VI. The Theory of the Double Electric Layer", Zhur. Fiz. Khim., 16, Nos. 1-2, 1942. Received 18 December 1940.

Report U-1523, 24 October 1951.

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN', L. K.

Lomonosov Moscow State Univ., (-1946-).

"Surface Reactions. The Reaction between Solutions of Hydrolyzed Salts and Ash-free activated Charcoal."

Zhur. Fiz. Khim., No. 7, 1946.

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

CB

Surface reactions. III. Reaction between solutions of hydrolyzed salts and ash-free active carbons. L. Lepin and G. Strakhova (State Univ., Moscow). *J. Phys. Chem.* (U.S.S.R.) 20, 743-52(1946); cf. C.A. 33, 6112[9].—Adsorption of Cl^- from solns. of $AlCl_3$, $CuCl_2$, $FeCl_3$, and $PbCl_2$ by ash-free carbon is greater than from solns. of KCl or $BaCl_2$. Addn. of HCl increases the adsorption of Cl^- from KCl, $BaCl_2$, or $AlCl_3$ solns. because H^+ neutralizes the OH^- ions leaving the carbon. Addn. of HCl lowers the adsorption of Cl^- from $CuCl_2$, $FeCl_3$, and $PbCl_2$ solns. because of the formation of $[CuCl_4]$ and similar ions. In solns. of $CuCl_2$, $FeCl_3$, and $PbCl_2$ carbon gives rise to ppts. J. J. Bikerman

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, L.

PA 54129

USSR/Chemistry - Salts Nov/Dec 1946
Chemistry - Charcoal, Activated

"Surface Reactions: III, Interaction Between Solutions of Hydrolyzed Salts and Ashless Activated Charcoal," L. Lepin, G. Strakhova, Lomonosov Moscow State U, 16 pp

"Acta Physicochimica URSS" Vol XXI, No 6

Study of interaction of hydrolyzed salts: comparing and discerning differences between their interactions with ashless activated charcoal and those of neutral salts; dividing their interaction into two types; and discussing variance between the two. Received, 2 Aug 1945.

[redacted] 54129

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN', L.

35192. O Prilozhenii Pravila Fazi zakona Deystvuyushchikh Mass K Poverkhostnym Khimicheskim Reaktsiyam. Uchen. Zapiski (Latv.Gos. Un-T), Khim. Fak. T.1, 1949, s. 10-20. —NA Latysh. Yaz. — Rezyume Na Rus. Yaz.—Bibliogr: s. 19

SO: Letopis' Zhurnal'nykh Statey, Vol. 48, Moskva, 1949

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN', L.

35191. O Prilozhenii Pravila Fazi Zakona Deystvuyushchikh Mass K Molekulyarnoy Adsorbtsii. Uchen. Zapiski (Latv. Gos. Un-T), Khim. Fak. T.1, 1949, s. 21-26— Na Latysh. Yaz. — Rezyume Na Rus. Yaz.

SO: Letopis' Zhurnal'nykh Statey, Vol. 48, Moskva, 1949

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN' K.

1. ~~LIEPINA, L.~~; VAIVADE, A.

2. USSR (600)

4. Corrosion and Anticorrosives

7. Colloid-chemical phenomena on metal surfaces, and the inhibition of corrosion in salt solutions. Part 3. Latv. PSR Zin. Akad. Vestis 2, 1951

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

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

1. LIYEPINA, L.: ZAMUYELIS, Ye.

2. USSR (600)

4. Corrosion and Anticorrosives

7. Colloid-chemical phenomena on the surfaces of metals and inhibition of corrosion in salt sulutions. Latv.FSR Zin. Akad. Vestis, no. 7, 1951.

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

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

1. LIYEPINA, L.: OSE, Z.: STIPRAYS, A.: VAYVADE, A.

2. USSR (600)

4. Corrosion and Anticorrosives

7. Colloid-chemical phenomena on the surface of metals and inibition of corrosion in salt solutions. Latv.PSR Zin.Akad.Vestis, no. 8, 1951.

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

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

1. LIYEPINA, L.; SMITS, Arvids

2. USSR 600

4. Oxidation

7. Oxidation of colloidal metals in gels by atmospheric oxygen, Latv PSR Zin. Akad. Vestis, No. 8, 1951.

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

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

ŠMITS, A.; LIEPIŅA, L.K.

Determination of metallic aluminum in fine suspensions of aluminum. Latv. PSR Zin.Akad.Vēstis no.1:103-105 '52. (MLRA 6:6)

1. Institut khimii AN Latv.SSR. (Aluminum)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

SMITS, A.A., LIEPINA, L.K.

Stabilization of a suspension of aluminum. Latv.PSR Zin.Akad.Vestis no.1: 107-108 '52. (MLRA 6:6)

1. Institut khimii AN Latv. SSR. (Aluminum)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9"

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LIYEPINA, L.

USSR

*Colloid-Chemical Phenomena at Surfaces of Metals and Inhibition of Corrosion in Salt Solutions. I.—Distribution of Aluminium Corrosion in Potassium Salt Solutions. L. Liepina and Z. Otis (*Latvijas PSR Zinātnu Akad. Vēstis*, 1952, (8), 107–113; *C. Abs.*, 1954, 48, 13600).—[In Russian]. Vertically suspended Al samples were allowed to corrode in 0·001–2*N*-KCl, and the distribution of corrosion was studied microscopically. Four forms of corrosion products were observed: small hills or craters (I), glassy spherical accumulations (II), loose accumulations resembling waves (III), and thin adherent layers (IV). The number of I increased with KCl concentration, reaching a max. at 0·5–1*N*, and then decreased. A similar variation was observed in the pptn. of Cu on Al from $CuSO_4$ soln. The formation of the crater-like elevations is explained as follows: The highly polymerized forms of Al hydroxides are stabilized at the anodic region with Al^{+3} and similar positively charged ions; the positively charged particles move electrophoretically to the cathodes on the surface of the initial oxide film, meet OH^- there, and are partly dissolved with the formation of aluminates and partly recharged to become negative by adsorption on OH^-; the crater-like elevations around I arise from mutual coagulation of the negative and positive colloids. III are explained by hydrolysis of the aluminates, with the hydroxides first precipitating in amorphous forms, but then gradually transforming into bayerite and hydrargillite. The III have little effect on the rate of corrosion; most retardation is caused by the formation of I.

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LEPIN, L.K.

Chemical Abstracts
Vol. 48 No. 5
Mar. 10, 1954
Inorganic Chemistry

Basic salts of aluminum, according to data of potentiometric titration. [illegible] Valyano [illegible] Fiz. Khim. 27, 217-32 [illegible] of $AlCl_3$, $Al(NO_3)_3$, and $Al_2(SO_4)_3$ of various [illegible] titrated with KOH soln. at the time of prepn. and after periods of aging up to 15 days. The titration [illegible] for the chloride and nitrate solns. become more [illegible] while those for the sulfate do not [illegible] The changes are caused by formation of [illegible] and similar complexes.

J. W. Loveberg, Jr.

7-13-5[illegible]

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, L.; TETERE, A.; SHMIT, A.

Reaction of aluminum with water. Doklady Akad. Nauk S.S.S.R. 88, 871-4 '53. (MLRA 6:2)
(CA 47 no.22:11921 '53)

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, L.

...nal of Applied Chemistry
1954
...strial Inorganic Chemistry

Reaction between zinc and water. L. Lepin and A. Tetere (*Doklady Akad. Nauk SSSR*, 1953, 90, 413–416).—Studies of the rate of liberation of H_2 from Zn hydroxide show the sequence of reactions to be: (1) $2Zn + 2H_2O \rightarrow Zn(OH)_2 + ZnH_2$; (2) $ZnH_2 \rightarrow Zn + H_2$ (adsorbed); (3) H_2(adsorbed) $\rightarrow H_2$(solution) $\rightarrow H_2$(g); this is confirmed by the low energy of activation (15 kg-cal/mole) of the order expected for the Zn–H bond strength.

R. C. Murray

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LIEPINA, L.

Colloid-chemical phenomena on the surfaces of metals and retardation of corrosion in salt solutions. VIII. Corrosion of aluminum and iron as a function of the concentration of solution. L. Liepina, A. Vaivade, Z. Oŝis, and A. Stiprais (Inst. [redacted] Sci. Latv. S.S.R., Riga, Latvia). *Latvijas PSR Zinātņu Akad. Vēstis* 1954, No. 3 (Whole No. 80), 107-13 (in Russian); cf. *C.A.* 47, 11921b. —In 0.001-3*N* KCl at 20°, the long-range (50 days) corrosion rate of Al follows the equation $\Delta g = kc^{\alpha}$, where Δg is the wt. loss, c concn. of KCl, and k and α are consts., e.g. 0.8 and 0.43, resp. Similar relations hold for Al and K sulfate solns., but here the corrosion is slower. In shorter exposures, e.g. 15 days in KCl, this law is not obeyed and a max. corrosion rate is observed at 1*N* concn. An explanation for the equation is proposed: at higher concns. of Cl^-, the polyoxychlorides, formed probably through the intermediate steps of adsorption on the primary hydroxide (boehmite) and ion exchange, peptize the primary hydroxide deposits; in dil. solns., the primary boehmite passes into the less reaction-active bayerite and hydrargillite which block the surfaces and slow down the corrosion. Resemblance between the above equation and relations expected from the adsorption isotherm and mass-action law are pointed out. In the corrosion of Fe, the short-time corrosion is higher in the more dil. solns.; chlorides and sulfates of the alkali and alkaline earth metals were investigated. In long-time tests, the corrosion rate was max. in 0.1-0.001*N* solns. This is explained by blocking of the cathodic areas by an electrophoretic pptn. of the positively charged colloidal particles of the hydroxidic primary and secondary corrosion products. The irregularities are explained by changes in the rates of formation and aging of the secondary corrosion products such as magnetite. The relative amts. of the latter in the corrosion products increased with the diln. of the electrolyte. The magnetite forms by a reaction of the bivalent Fe ions with the secondarily formed (by oxidation) trivalent hydroxide lepidocrocite. Andrew Draynieks

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Preparation of colloidal aluminum and zinc. A. Tetere, A. Šmits, and L. Liepiņa (Inst. Chem., Acad. Sci. Latv. S.S.R., Riga, Latvia). *Latvijas P.S.R. Zinātņu Akad. Vēstis* 1954, No. 3(Whole No. 80), 120-3(Russian summary, 124).—Sols of Al and Zn were prepd. by the condensed-spark method with double-distd. water at 0° under pure H_2 atm. The disperse phase consisted of (Al) metals and hydroxides, the free metal comprising up to 61% to 88% (Zn) of the phase. The particles were positively charged and polydisperse. The sols were brownish-gray in transparent and gray in reflected light, with the Zn sol being darker. The sols reacted slowly with water and evolved H. The Al sol could be stabilized, by an adjustment of pH, for a period of yrs. (cf. Šmits and Liepiņa, *C.A.* 47, 9107c). Andrew Dravnieks

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LIYEPINA, L.

USSR

Colloid-chemical phenomena on surfaces of metals and retardation of corrosion in salt solutions. IX. Corrosion of lead in neutral solutions of potassium salts. A. Valvads and L. Liepiņa. *Latvijas PSR Zinātņu Akad. Vēstis* 1954, No. 5 (whole No. 85), 119-29 (in Russian; Latvian summary, 130); cf. *C.A.* 48, 9300f.—Corrosion of Pb was investigated in 0.0001-2*N* solns. of K salts at 20°. In KCl, the corrosion rate increased with concn. to a max. in 0.06*N* soln., decreased at a higher concn., and increased again in 2*N* soln. The first stage of corrosion was slow and proceeded with formation of adherent whitish films. After 1-3 days, cryst. and loosely attached products appeared, the adherence diminished, and the corrosion accelerated. The primary corrosion product was $PbCl_2$, while the secondary product was tentatively identified, by comparison with results of potentiometric titrations, as $PbCl_2.2Pb(OH)_2$. During corrosion, pH increased to a max. (9 in 2*N* KCl), then decreased to a steady value. In KBr, the adherence persisted through all expts., and the corrosion rate increased with concn. This is explained by anodic adsorption of negatively charged colloidal particles of $PbBr_2$, and negligible formation of secondary corrosion products, as evidenced by absence of a max. in the pH-time curve. In KI, corrosion at concns. up to 0.1*N* was very slow, but became fast in 2*N* soln., because films of the corrosion products were attacked with formation of sol. $KPbI_3$. The pH in dil. soln. stabilized at 6.5-6.6. In KNO_3, corrosiveness increased with concn. to a max. in 0.001*N* soln. Below this concn., the products were whitish and yellow, $Pb(OH)_2$, slowly changing to PbO at pH 10.5-10.8. These products adhered poorly to the surface of Pb.

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VAIVADS, A.

At higher concn., the yellow products were absent, the adherence was much better, and corrosion slower. Here, at pH 8.2-8.4, the product was $Pb(NO_3)_2.5Pb(OH)_2$. In K_2SO_4, corrosivity increased with concn. The first films of corrosion products were amorphous and adherent, but within several days cryst. products developed, destroying the continuity of the film. Duration of the first stage decreased with concn. The relative corrosivities were: below 0.05*N*, KNO_3 > KCl ≥ KBr ≥ K_2SO_4 > KI; above 0.05*N*, KI ≥ KNO_3 > KCl ≥ KBr ≥ K_2SO_4. In general, in corrosion of Pb as compared with Al and Fe in the same solns., first amorphous corrosion products transformed into the less dispersed cryst. form sooner.

Andrew Dravnieks

2/2

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LIEPINA, L.

USSR

Colloid-chemical phenomena at surfaces of metals and retardation of corrosion in salt solutions. XI. Kinetics of iron corrosion in solutions of chlorides and sulfates of alkali and alkaline earth metals under static conditions. L. Liepina and A. Valvads. *Latvijas PSR Zinātņu Akad. Vestis* [illegible], No. 10 (Whole No. 87), 129–41 (in Russian Latvian summary, 141–2); cf. *C.A.* 48, 9300*f*.—Corrosion of common steel immersed at 20° in H_2O and in 0.0001–2N solns. of several electrolytes was observed for periods of several weeks. Wt. losses and the amts. of products adhering (I) to the specimens were detd. The initial corrosion rate decreased after 1–2 days of corrosion, and remained const. for the rest of the tests. In KCl, NaCl, K_2SO_4, and $MgSO_4$, the rate decreased with increase in concn. In $MgCl_2$ and $CaCl_2$ the rate *vs.* concn. curve was observed in the range of 0.1–1.0*N* solns. The amt. of I decreased as the corrosion rate decreased with concn. The pH of solns. in all cases increased rapidly during the test by 0.5–1.0 pH units, and then stabilized at 6.6–7.0. However, in Mg and Ca salt solns. above 0.01*N*, pH decreased and stabilized at 6.0. In the products of corrosion, Fe_3O_4 (II) and γ-FeO(OH) (III) were found. Amts. of II in products decreased with concns. of electrolytes. The pH of the solns. during the corrosion corresponded to the stability region of III. Since III forms at some distance from the steel surface, the degree of retardation of corrosion by this product is relatively low. The adherent films of III are built up by electrophoresis of colloid particles of III; the particles are positively charged, as was shown by dyeing expts., and therefore they migrate towards and ppt. on cathodic areas. In concd. (>0.01*N*) $MgCl_2$, corrosion products contained $Mg(FeO_2)_2$. This may explain the peculiar pH change in corroding solns. of $MgCl_2$. Ca ferrite was not found in the products of corrosion in $CaCl_2$.

Andrew Dravnieks

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LIYEPINA, L.

CH
HG

Colloid-Chemical Phenomena at Surfaces of Metals and Refractories for Corrosion in Salt Solutions. X.—Chemical and Phase Composition of Products of Corrosion of Lead in Water and in Solutions of Potassium Chloride. Z. Osis and L. Liepina (*Latvijas PSR Zinātnu Akad. Vēstis*, 1954, (12), 125–132; *C. Abs.*, 1955, 49, 8079).—(In Russian). Cf. L. *et al.*, *ibid.*, (3), 107; *M.A.*, 22, 1175. The product of corrosion of *Pb* in distilled water exposed to the air was $2PbCO_3.Pb(OH)_2$ (*A*), and the *p*H of the water during the corrosion process was stabilized at 8·6. In soln. of KCl below 0·0001*N*, the corrosion product was also *A*. In 0·001*N*–0·5*N* soln., the products were *A* and an oxychloride tentatively identified as $2Pb(OH)_2.PbCl_2$ (*B*), but definitely not Pb(OH)Cl. Above 0·5*N*, the products were *A* and H_2O-soluble complex Pb chlorides (*C*). Below 0·5*N*, $PbCO_3$, resulting from interaction with CO_2 from the air, was also detected in the products. The max. in the corrosion rate/KCl concentration curve at 0·05*N* soln. is explained by the formation of coarse cryst. *B*, and another max. at concentrations above 2*N*, by the formation of *C*. In 0·5*N*–2·0*N*-$KHCO_3$, the corrosion product was $PbCO_3$.

Of ①

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LEPIN', L. K.

USSR/Chemistry

Card 1/1

Author : Lepin', L. K. and Vayvade, A. Ya.

Title : Dependence of the rate of iron corrosion upon the pH of the salt (KCl) solution

Periodical : Zhur. Fis. Khim. 28, Ed. 3, 435-439, March 1954

Abstract : The rate of iron corrosion in KCl solutions was investigated in static conditions at initial pH values of from 3.0 to 9.0. The rate of iron corrosion under such conditions and during a constant salt concentration is determined by the stationary pH value which in the solution. In all solutions with a pH_0 of 4-9 the pH value is everywhere 6.8 - 6.9 which corresponds to the region of stability of ferric hydroxide which is the basic product of iron corrosion. The rate of corrosion in such solutions is uniform. A reduction in the stationary pH value is followed by a change in rate of corrosion. Ten references; 1 English since 1924. Table, graph.

Institution : Acad. of Sc. Latvian-SSR, Institute of Chemistry, Riga

Submitted : June 1, 1953

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, L. K.

USSR/Chemistry - Physical chemistry

Card 1/1 Pub. 22 - 31/47

Authors : Lepin', L. K., Act. Member of Latv-Acad. of Sciences

Title : Reaction kinetics of metals with water

Periodical : Dok. AN SSSR 99/1, 117-120, Nov 1, 1954

Abstract : A study of the reaction kinetics of metal with water showed that the reaction is not a process of simple solution of the metal in water but a chemical reaction connected with the change in the energy state of the electrons in the surface layer and with the loss of a corresponding amount of electrons in the metal phase. It was established that the rate of reaction (metal + water) must be proportional to the existing mass of the metal because the latter determines not only the volume of the metal phase but also the total metal-water separation surface which decreases with the progress of reaction. The reaction and its relation to the number of electrons participating in the formation of a hydride bond, is explained. Four USSR references (1946-1953).

Institution : Academy of Sciences Latv-SSR, Institute of Chemistry

Submitted : June 12, 1954

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LIEPINA, L.

Influence of carbon [in steel] on the rate of steel corrosion in chloride solutions (KCl). L. Liepina and A. Lokenbacha (Inst. Chem., Acad. Latv. S.S.R., Riga). *Latvijas PSR Zinātnu Akad. Vēstis* 1955, No. 6 (Whole No. 95), 111-18(in Russian; Latvian summary).—In short expts. (15 days), the rate of corrosion of steels with 0.02-1.03% C was independent of concn. of KCl between 0.001*N* and *N* KCl at 20° at static conditions; the rate in distd. H_2O was slightly higher, but at higher KCl concn. it was slower. In long expts. (100 days), a weak max. in the rate *vs.* concn. curve was observed at approx. 0.1*N* KCl, mainly because the corrosion at higher dilns. slowed down slightly with time. The slowdown may be caused by a somewhat higher iron ferrite content in the reaction products, with the result that the deposits are dehydrated and densified faster, and block corrosion processes more efficiently. In 1.0*N* KCl, the corrosion rate increased moderately with increase in % C in the steels. At other concns. of KCl, the rate had a slight min. at 0.2%C and a slight max. in the eutectoid 0.9% C steel; the maximal rate differences were approx. 10%. The corrosion was approx. linear with time, except in 4.0*N* KCl, where it slowed down with time considerably. The corrosion rates were of order of 0.1-0.13 mg. Fe/sq. cm./day. Orange corrosion products, ferric hydroxide, were observed essentially only at 0.05-0.22% C. At higher percentage C, bluish and greenish yellow mixts. of Fe(II) and Fe(III) hydroxides were observed. Corrosion products on Armco iron were thin adherent bluish films and a black ppt., somewhat similar in appearance to the corrosion products on 0.89 and 1.03% C steels.

Andrew Dravnieks

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Liepina, L.

Colloid-chemical phenomena at surfaces of metals and retardation of corrosion in salt solutions. XIII. Chemical and phase composition of the oxidation products of iron in solutions of potassium bicarbonate and carbonate. Z. Olis and L. Liepina. *Latvijas PSR Zinātņu Akad. Vestis* 1955, No. 7, 119-23 (in Russian; Latvian summary, 125-6); cf. *C.A.* 49, 8079i.—Products of corrosion of iron obtained [illegible] days at 20° in 0.01M K_2CO_3 consisted of α-FeO(OH) [illegible] α-Fe_2O_3, and

Metal 3

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of both carbonates. [illegible] may occur by blocking is partial, and localized pitting may occur by intensification of the anodic activity in certain spots. In dil. soln. of these compds., as well as in pure H_2O, positively charged colloid of II cannot block the local anodes, and the corrosion is not retarded. Since $Fe(HCO_3)_2$ is more soluble than $FeCO_3$, the formation of colloids in $KHCO_3$ soln. is not as efficient and occurs farther from the metal surface than in K_2CO_3 soln. Therefore, a higher concn. of bicarbonate (>0.3N) is needed to arrest the corrosion. Actually, particles of I formed in $KHCO_3$ soln. are coarse enough to be visible. XIV. Corrosion of iron and its retardation in solutions of potassium phosphates (KH_2PO_4, K_2HPO_4,

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Ošis, Z., and Liepina, L. ...

K_3PO_4). L. Liepina and A. Vaigada. *Ibid.* 1956, No. 3, 115-22.—The corrosion rate of steel in aerated solns. of KH_2PO_4 (I), K_2HPO_4 (II), and K_3PO_4 (III) at 20° and concens. below 0.001 *N* proceeds with formation of positively charged colloidal α-FeO(OH) as the main corrosion

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LIEPINA L.

Preparation of aluminum and zinc hydrosols. A. Tetere, A. Smits, and L. Liepina. *Colloid J.* (U.S.S.R.) 17, 453-6(1955)(Eng[redacted]). See C.A. 50, 4587e.

B. M. R.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

TETERE, A.; SMITS, A.; LÜMPINS, I.

Preparation of aluminum and zinc hydrosols. Koll.zhur.17 no.6: 468-470 N-D '55. (MLRA 9:4)

1. Institut khimii AN Latv.SSR, Riga.
(Aluminum) (Zinc) (Colloids)

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LEPIN', L.K.; VAYVADE, A.Ya.; OSHIS, Z.F.

Relation of the rate of corrosion of iron to the pH of the solution and the passivation of metals in alkali solutions. Zhur.fiz.khim. 29 no.2: 350-355 F '55. (MLRA 8:7)

1. Akademiya nauk Latviyskoy SSR, Institut khimii, Riga.
(Iron--Corrosion) (Passivity (Chemistry))

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LEPIN L.

USSR/Chemistry - Physical chemistry

Card 1/1 Pub. 22 - 27/47

Authors : Lepin', L., Act. Memb., Acad. of Sc., Latv. SSR; and Tetere, A.

Title : Reaction of Al with aqueous solutions of hydrochloric and sulfuric acids

Periodical : Dok. AN SSSR 101/6, 1079 - 1082, Apr. 21, 1955

Abstract : The kinetics of reaction processes between metal (Al) and aqueous acid solutions were investigated. The effect of gradual increase of hydrogen ion concentration on the reaction is explained. It was established that the reaction between the metal and acid, which in the first stage, leads to the formation of two metal compounds (hydroxide and hydride), i. e., separation of bonds in the water molecule and formation of two new chemical bonds, requires a definite orientation of the water molecules on the phase separation boundary. It was observed that if the water molecules are turned toward the surface of the metal with their oxygen or hydrogen tips only, the reaction between the metal and the aqueous acid solutions will not take place. Seven references: 6 USSR and 1 English (1927-1954). Graphs.

Institution : Acad. of Sc., Latv. SSR, Inst. of Chem.

Submitted : January 13, 1955

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN, L. K.

"Superficial Combinations and Reactions", a report presented at the 5th Conference on Chemical Physics, Paris, 1956.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN', L.K.

USSR/Corrosion - Protection From Corrosion J.

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 14092

Author : Purin B.A., Lepin' L.K.
Inst : Academy of Sciences Latvian SSR
Title : Concerning Electrochemical and Corrosion Behavior of Iron in Aqueous Solutions of Electrolytes. I. Electrode Potential and Corrosion Rate of Iron in Aqueous Solutions of Chlorides of Alkali and Alkaline Earth Metals.

Orig Pub : Izv. AN LatvSSR, 1956, No 5, 83-92

Abstract : On the basis of determinations of electrode potentials E and rate of corrosion v, of Fe in solutions of chlorides of K, Na, Mg, Ca from 0.001 N to the concentration of a saturated solution, an analysis is made of the mechanism of corrosion of Fe in neutral salt solution. Velocity of cathodic reaction under stationary conditions, according to the authors' assumption, is arrested as a result of electrophoresis of colloidal

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

LEPIN', L.K.

J.

USSR/Corrosion - Protection From Corrosion.

Abs Jour : Referat Zhur - Khimiya, No 9, 1957, 33150

Author : Purin, B.A., Lepin', L.K.

Inst : Academy of Sciences Latvian SSR

Title : Electrochemical and Corrosive Behavior of Iron in Aqueous Solutions of Electrolytes. II. Electrode Potential and Rate of Corrosion of Iron in Aqueous Solutions of Sulfates of a Number of Metals (K, Mg, Ca, Al, Mn).

Orig Pub : Latv. PSR zinatnu Akad. Vestis, Izv. AN LatvSSR, 1956, No 7, 107-114

Abstract : [illegible] of a common nature take place [illegible] solutions [illegible] line earth metals. This is explained by [illegible] ditions of the occurence of the corrosion process.

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"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320007-9

USSR/Corrosion - Protection From Corrosion. J.

Abs Jour : Ref Zhur - Khimiya, No 9, 1957, 33150

The dependence is considered, of the steady state potential and rate of Fe corrosion, on the concentration of $Al_2(SO_4)_3$ solutions. In that instance, unlike in the case of solutions of sulfates and chlorides of alkali and alkaline earth metals, inhibition of the cathodic process does not occur. Electrochemical behavior of Fe in solutions of $MnSO_4$ constitutes an intermediate region between the behavior of Fe in solutions of chlorides and sulfates of alkali and alkaline earth metals, and the behavior of Fe in solutions of $Al_2(SO_4)_3$. This proposition is confirmed by a comparison of pH values of the solutions of electrolytes in which the corrosion was investigated. Communication I see RZhKhim, 1957, 14092.

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LIYEPINA, L.

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Chem

Colloid-chemical phenomena at metal surfaces, and retardation of corrosion in salt solutions. XV. Chemical and phase composition of corrosion products of iron in solutions of potassium phosphates (KH_2PO_4, K_2HPO_4, K_3PO_4). Z. Oŝis and L. Liepina. *Latvijas PSR Zinātņu Akad. Vēstis* 1956, No. 7, 115-27 (in Russian) (Latvian summary).—X-ray, thermograms, and other methods were used to establish the nature of corrosion products (I) of steel at 20° in stagnant aerated 0.0001-2N K phosphate solns. In 1-2N KH_2PO_4, I were x-ray-amorphous, but became cryst. at heating and were identified as $FePO_4.2H_2O$ (II); in 0.01N-2N soln., fine crystals of vivianite $Fe_3(PO_4)_2.8H_2O$ were also detectable in the deposit adhering to the metal surface; the [illegible] (III). In K_2HPO_4 solns. above 1N, passivity existed; at lower concn., I contained III, except in 0.01N soln., where II was also present. In K_3PO_4, passivity existed above 0.1N in 0.01N soln., I was x-ray-amorphous II, with the colloid particles charged negatively; in more dil. soln., only III was formed. The charge of I in 0.0001N K_3PO_4 was neg. next to steel surface, while the outer layers of I were positively charged. After 10 months in 0.5-2N K_3PO_4, the surface film (n = 1.639) contained Fe^{++}, Fe^{+++}, and PO_4^{---}, had an x-ray pattern which could not be identified, and was charged negatively. In 0.01N K_3PO_4 and K_2HPO_4, corrosion decelerated rapidly with time and proceeded with considerable pitting. This is explained by electrophoretic blocking of anodic areas by negatively charged colloid particles of vivianite.

A. Dravnieks

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LIEPINA, L.

Colloid-chemical phenomena at surfaces of metals. XVI. Initial retardation of corrosion in salt solutions. XVI. Initial stage of corrosion process of iron in chloride solutions (KCl). L. Liepiņa and A. Lokenbachs. *Latvijas PSR Zinātnes Akad. Vēstis* 1956, No. 8, 131-40; cf. *C.A.* 50, 13702e.—Initial rates of corrosion (I) of steel (in %, C 0.22, Mn 0.46, P 0.027, S 0.019, Si trace) in unstirred aerated 0.001-4*N* KCl at 20° were detd. by analyses of Fe in soln., with correction for the adherent deposits, which were removed by 10-sec. pickling in inhibited 28% HCl. In all solns., and in H_2O, I was the highest in the 1st min., exceeding the long-term rates several times. The highest initial I was in 0.5*N* soln., the lowest in pure H_2O. During the next 4-5 min., the rate decreased rapidly, more rapidly in solns. in which the initial I was the highest. In solns. above 0.1*N*, the rate decreased for several hrs., until gradually a const. I established. In 0.01*N* and lower concn. solns., and in H_2O, I reached a min. at 15-20 min., and then gradually increased with time, again arriving at a const. I after several hrs. Only in pure H_2O the rate increase continued even after 24 hrs. The I finally established was highest for the more dil. solns., in reversal of the relations during the initial stage. The initial pH of solns. was 6, but in a few hrs. pH 6.8 was reached, corresponding to that of a soln. buffered by γ-FeOOH; stabilization of pH roughly correlated with stabilization of I. The corrosion products (II) were more disperse in solns. of higher KCl concn. The initial rapid corrosion is explained by a fast destruction of an "active" oxide film initially present, the later slowdown by electrophoretic blocking of cathodic areas by colloidal deposits. Part of the initial slowdown may be due also to a partial exhaustion of O in soln. until the O diffusion rate adjusts. Although film breakdown and the initial I are fastest in 0.5*N* KCl, the blocking by the deposits is also more pronounced in this soln., since the colloidal FeOOH has higher charge and is more disperse in solns. of higher ionic strength.

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L. Liepina and A. Lotkovskaya

By the same token, less blocking occurs in solns. of low KCl concn., and the long-range I are higher. From assumption that in the initial stage the rate varies inversely with the total accumulated deposit, the equation $\log g = \log k + 0.5 \log t$ is derived, where g = corrosion, k = const., t = time. A plot of exptl. data for the initial period in 0-2N KCl gave 0.46-0.6 as compared with 0.5 in the above equation. At higher concn., broken lines resulted. At later stages, this relation did not hold, since II, because of the vertical position of the specimen, ceased to accumulate on the specimen. In the later stage, deposits maintained const. diffusion resistance with respect to O and II, and const. I resulted.

A. Draynieks

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