KOZLOVSKAYA, S.F.; KRASNOV, I.I.

Does peneplanation exist in the Central Siberian Plateau?
Izv. AN SSSR. Ser. geog. no.2:8-17 Mr-Ap '62. (MIRA 15:3)
(Central Siberian Plateau—Erosion)

VEREYSKIY, N.G.; GANESHIN, G.S.; KRASNOV, I.I.; CHEMEKOV, Yu.F.

Fourth Congress of the International Association on Quaternary Research (INQUA). Sov.geol. 5 no.5:160-165 My '62. (MIRA 15:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy geologicheskiy institut i Vsesoyuznyy nauchno-issledovatel'skiy institut gidrogeologii i inzhenernoy geologii.
(Geology, Stratigraphic--Congresses)

NALIVKIN, D.V., glav. red.; VERESHCHAGIN, V.N., zam. glav. red.; MENNER, V.V., zam. glav. red.; OVECHKIN, N.K., zam. glav. red.[deceased]; SOKOLOV, B.S., zam. glav. red.; SHANTSER, Ye.V., zam. glav. red.; KELLER, B.M., otv. red. toma ; MODZALEVSKAYA, Ye.A., red.; CHUGAYEVA, M.N., red.; GROSSGEYM, V.A., redaktor; KIPARISOVA, L.D., redaktor; KOROBKOV, M.A., red.; KRASNOV, I.I., red.; KRYMGOL'TS, T.Ya., red.; LIBROVICH, L.S., red.; LIKHAREV, B.K., red.; LUPPOV, N.P., red.; NIKIFOROVA, O.I., red.; OBRUCHEV, S.V., red.; POLKANOV, A.A., red.[deceased]; RENGARTEN, V.P., red.; STEPANOV, D.L., red.; CHERNYSHEVA, N.Ye., red.; SHATSKIY, N.S., red. [deceased]; EBERZIN, A.G., red.; GOROKHOVA, T.A., red.izd-va; GUROVA, O.A., tekhn. red.

[Stratigraphy of the U.S.S.R. in fourteen volumes] Stratigrafiia SSSR v chetyrnadtsati tomakh. Moskva, Gosgeoltekhizdat. Vol.2. [Upper Pre-Cambrian] Verkhnii dokembrii. Otv. red. B.M. Keller. 1963. 716 p. (MIRA 17:1)

1. Chlen-korrespondent AN SSSR (for Sokolov).

NALIVKIN, V.D.; RONOV, A.B.; KHAIN, V.Ye.; SOKOLOV, B.S.; DOMRACHEV, S.M.; TIKHIY, V.N.; POZNER, V.M., FORSH, N.N.; LYUTKEVICH, Ye.M.; SLAVIN, V.I.; SAZONOV, N.T.; SAZONOVA, I.G.; SHUTSKAYA, Ye.K.; KRASNOV, I.I.; KALENOVA, G.N.; VINOGRADOV, A.P., glav. red.;

[History of the geological development of the Russian Platform and its margins] Istoriia geologicheskogo razvitiia Russkoi platformy i ee obramleniia. Moskva, Nedra, 1964. 251 p. ___ [Maps] Karty. 981. (MIRA 18:4)

ZARRINA, Ye.P.; KAPLYANSKAYA, F.A.; KRASNOV, I.I.; MIKHANKOV, Yu.M.; TARNOGRADSKIY, V.D.

Periglacial formation in the West Siberian Plain. Mat. VSEGEI Chet. geol. i geomorf. no.4:54-104 '61.

(MIRA 17:5)

KRASNOV, I. I.

"Regional unified and correlative stratigraphic scheme of the Quaternary of the European part of the USSR."

report submitted for the 7th Intl Cong, Intl Assoc for Quaternary Research, Boulder & Denver, Colorado, 30 Aug-5 Sep 65.

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R000826120

[illegible]ESHIN, G.S.; KRASNOV, I.I.

International Map of the Quaternary Sediments of Europe made on a 1:2,500,000 scale. Biul. Kom. chetv. per. no.30:47-57 '65.
(MIRA 19:2)

L 36556-66 EWT(1) IJP(c)
ACC NR: AP6015763 (A,N) SOURCE CODE: UR/0048/66/030/005/0774/0777

AUTHOR: Stoyanov, P. A.; Moseyev, V. V.; Krasnov, I. V.

ORG: none

TITLE: Magnetic electrostatic deflecting system for an electron microscope illuminating assembly /Report, Fifth All-Union Conference on Electron Microscopy held in Sumy 6-8 July 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 5, 1966, 774-777

TOPIC TAGS: electron microscope, electric field, magnetic field, electron optics, prism, aberration

ABSTRACT: The aberrations of electrostatic and magnetic deflecting systems have been investigated experimentally in order to evaluate their possibilities for use as deflecting systems in high resolution electron microscopes. The experiments were performed by deflecting beams of small circular cross section through different angles up to about 3° and recording the cross section shape of the deflected beam. A number of photographs of the deflected beams are presented. Double deflecting systems (deflection of the beam first in one direction and then in the opposite direction) with total deflections up to about 1.5° were tested. The purely electrostatic systems had considerable astigmatism, but when one of the deflectors was a magnetic system with astigmatism corrected, as proposed by P.A.Stoyanov and V.V.Moseyev (Radiotekhnika i elek-

Card 1/2

L 36556-66

ACC NR: AP6015763

tronika, 8, No. 7, 1169 (1963)) and by P.A.Stoyanov (Izv. AN SSSR. Ser. fiz., 27, 1239 (1963)), the resultant astigmatism was small and could be corrected in the second condensing lens. Corrected magnetic deflectors were tested at deflection angles up to and slightly beyond 3°. The corrected systems showed practically no third order aberrations, although small fifth order aberrations were perceptible at the largest deflections. The magnetic deflectors showed considerable coma when they were mounted too close to the iron wall of the housing, but it proved to be possible to correct this. It is concluded that a corrected magnetic deflecting system can be employed to achieve dark field illumination without significant deterioration of the resolving power of the microscope. Orig. art. has: 3 figures.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 002/ OTH REF: 003

Card 2/2 MLP

KRASNOV, I. V. M.; STEPANOV, A. V.

Photoelasticity

Optical methods of investigating centers of disintegration. Zhur.eksp.i teor. fiz. 23 no. 2, 1952

Monthly List of Russian Accessions, Library of Congress, December 1952. UNCLASSIFIED

KALASHNIKOV, N.V.; KRASNOV, K.A.

[Automobile filling stations] Avtomobil'nye zapravochnye stantsii. Moskva, Izd-vo Ministerstva kommunal'nogo khoziaistva RSFSR, 1952. 187p.(MLRA 6:8)
(Automobiles--Service stations)

KLEYNERMAN, Yu.A., inzhener; KRASNOV, K.A., redaktor; SHELUKHIN, A.S., redaktor; KOGAN, F.L., tekhnicheskiy redaktor.

[Garage and repair equipment; catalog and manual] Garazhnoe i remontnoe oborudovanie; katalog-spravochnik. Moskva, Nauchno-tekhn. izd-vo avtotransp. lit-ry, 1955. 179 p. (MIRA 9:6)

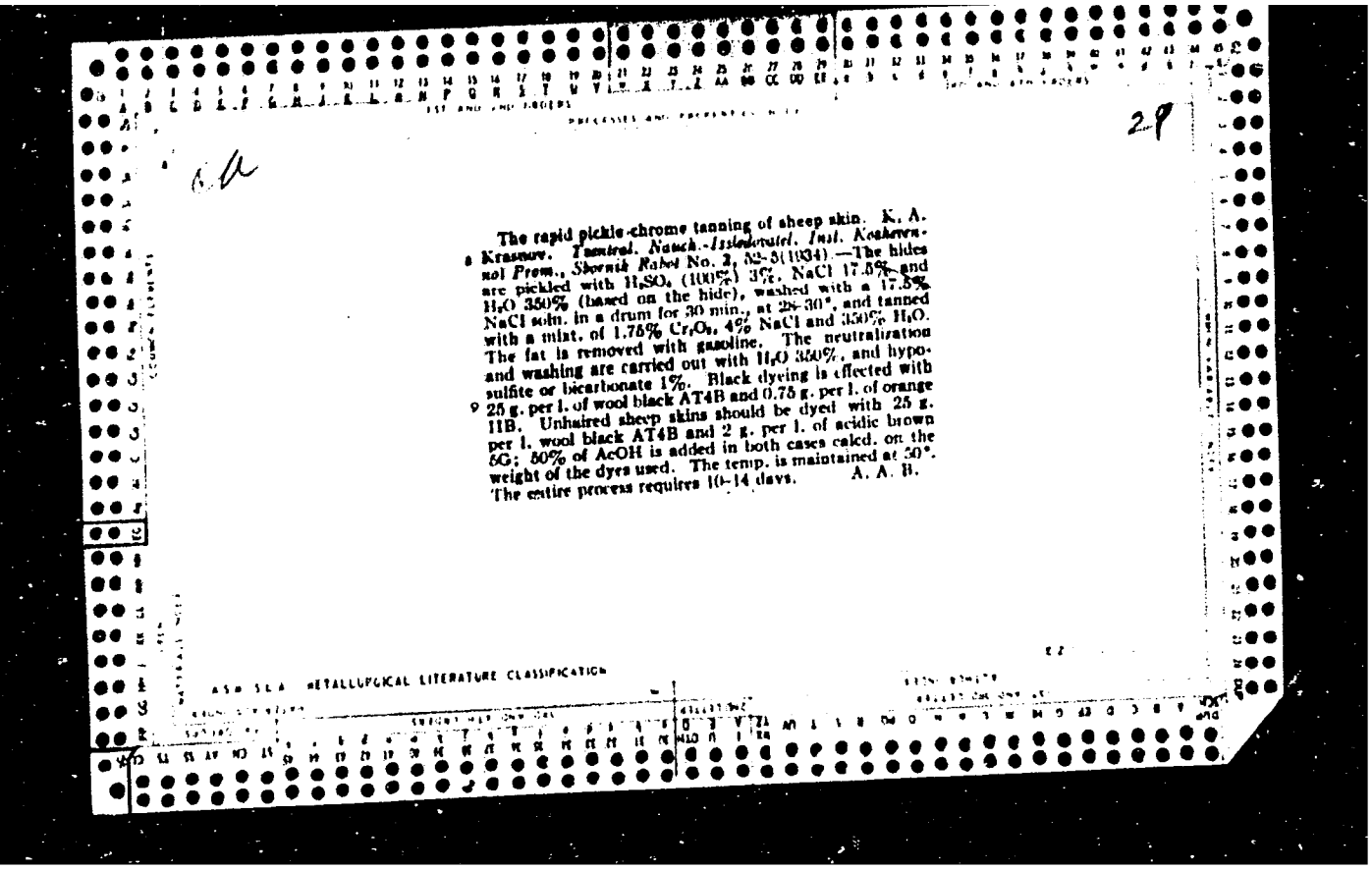
1.Glavnyy inzhener tresta po proizvodstvu garazhnogo oborudovanya (for Krasnov).
(Automobiles--Repairing) (Service stations)

BEREZKIN, Vasiliy Ivanovich; KRASNOV, Konstantin Alekseyevich; MARTENS, S.L., red.; MAL'KOVA, N.V., tekhn.red.

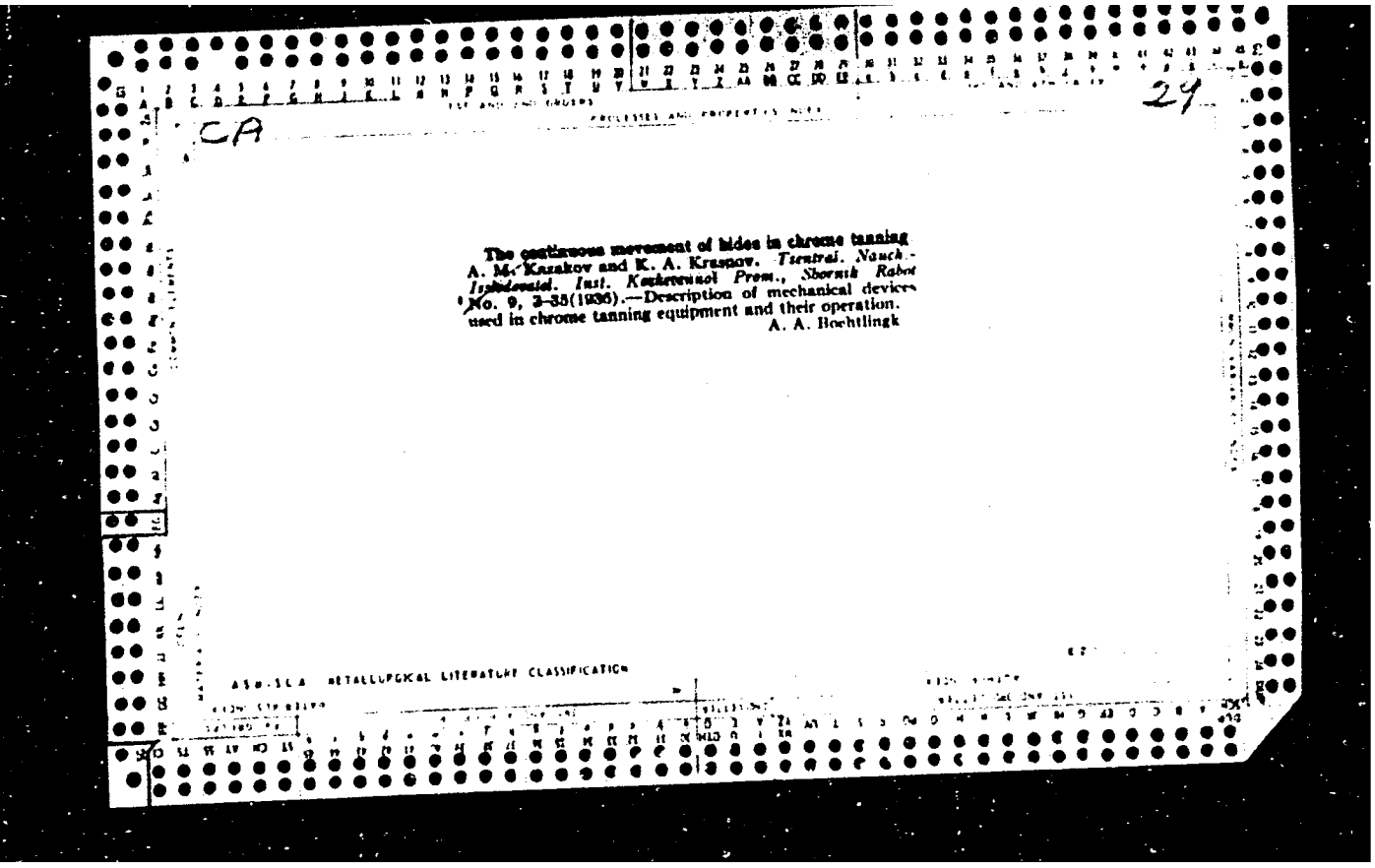
[Equipment for garages and stations servicing automobiles] Oborudovanie dlia garazhei i stantsii obsluzhivaniia avtomobilei. Moskva, Nauchno-tekhn.izd-vo M-va avtomobil'nogo transp. i shosseinykh dorog RSFSR, 1959. 273 p. (MIRA 12:5)
(Garages--Equipment and supplies)
(Service stations--Equipment and supplies)

BERECKIN, Vasiliy Ivanovich; KOLESOV, Konstantin Alekseyevich; YABLOKOV, V.I., red.

[Equipment for garages and service stations] Oborudovanie dlia garazhei i stantsii obsluzhivaniia avtomobilei. Izd.2., perer. i dop. Moskva, Transport, 1964. 404 p.
(MIRA 17:7)



The rapid pickle-chrome tanning of sheep skin. K. A. Krassuv. *Tanning. Nauch.-Issledovatel. Inst. Kozhevennol Prom., Sbornik Rabot* No. 2, 82-5(1934).—The hides are pickled with H_2SO_4 (100%) 3%, NaCl 17.5%, and H_2O 350% (based on the hide), washed with a 17.5% NaCl soln. in a drum for 30 min., at 28-30°, and tanned with a mixt. of 1.75% Cr_2O_3, 4% NaCl and 350% H_2O. The fat is removed with gasoline. The neutralization and washing are carried out with H_2O 350%, and hyposulfite or bicarbonate 1%. Black dyeing is effected with 25 g. per l. of wool black AT4B and 0.75 g. per l. of orange 11B. Unhaired sheep skins should be dyed with 25 g. per l. wool black AT4B and 2 g. per l. of acidic brown 6G; 50% of AcOH is added in both cases calcd. on the weight of the dyes used. The temp. is maintained at 50°. The entire process requires 10-14 days. A. A. B.

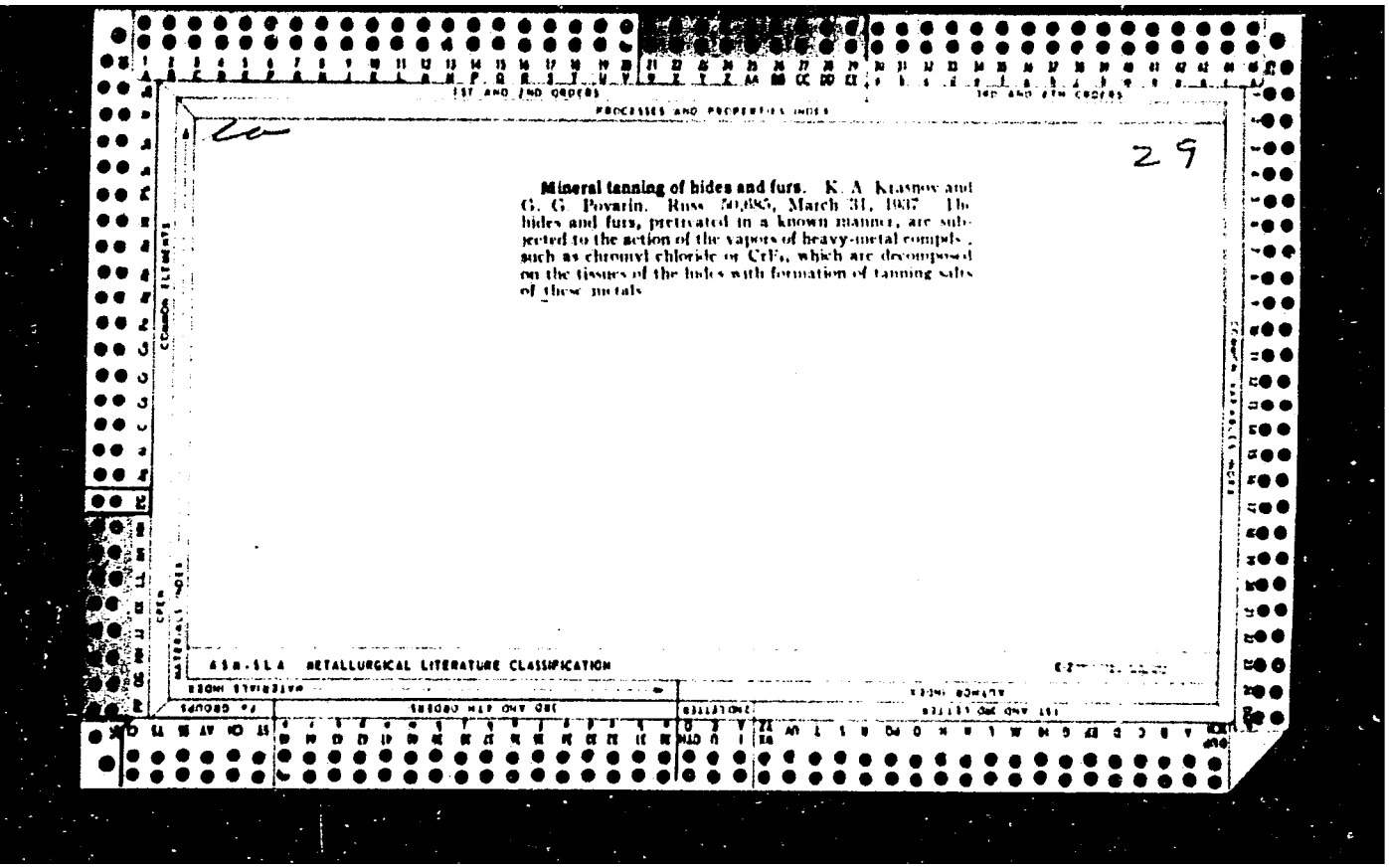


CA

29

The continuous movement of hides in chrome tanning. A. M. Kazakov and K. A. Krasnov. *Tsentral. Nauch.-Issledovatel. Inst. Kozhevennoi Prom., Sbornik Rabot* No. 9, 3–38(1936).—Description of mechanical devices used in chrome tanning equipment and their operation.
A. A. Boehtlingk

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

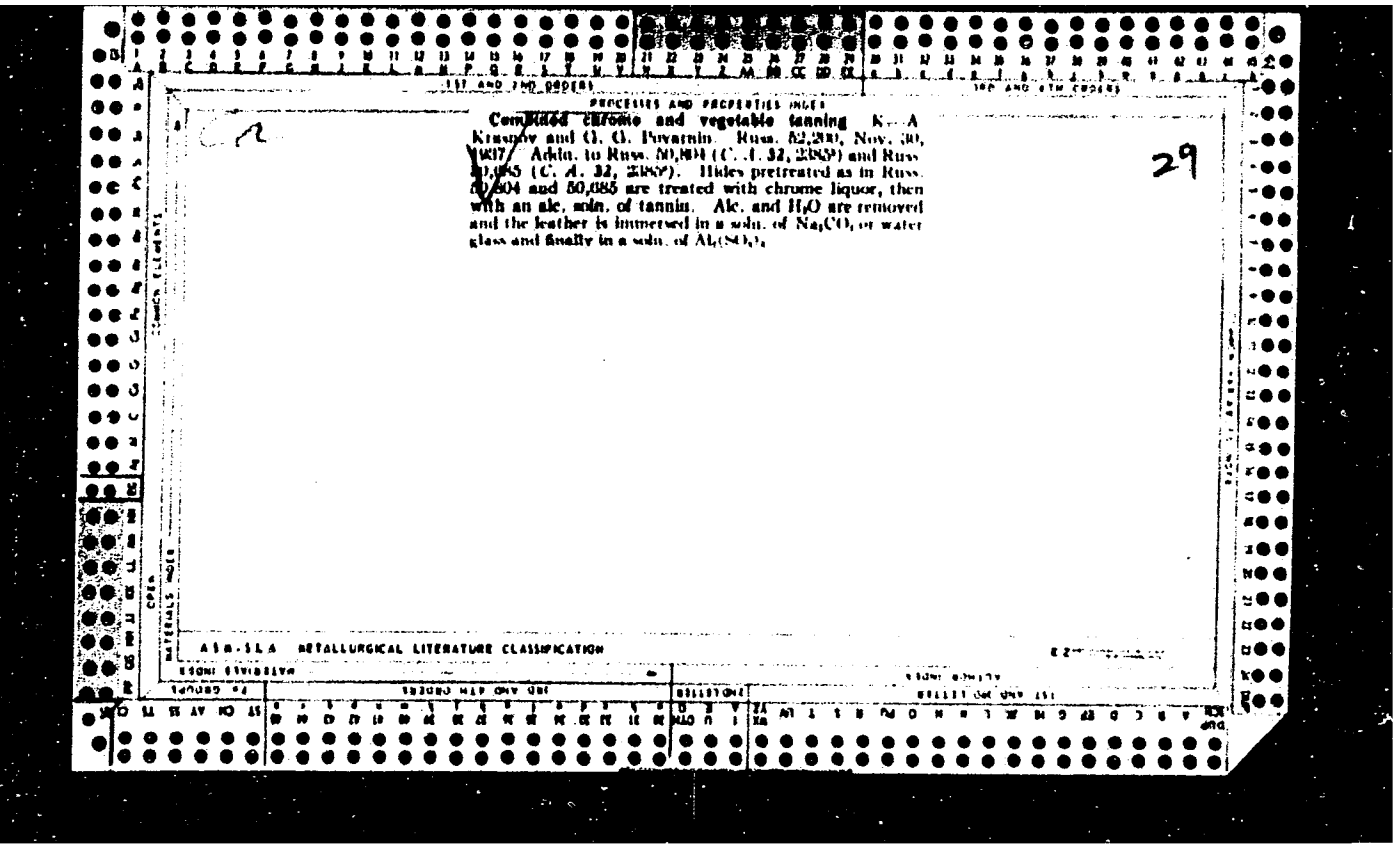


PROCESSES AND PROPERTIES INDEX

29

Mineral tanning of hides and furs. K. A. Krasnov and G. G. Povarin. Russ. 50,985, March 31, 1937. The hides and furs, pretreated in a known manner, are subjected to the action of the vapors of heavy-metal compds., such as chromyl chloride or CrO_2Cl_2, which are decomposed on the tissues of the hides with formation of tanning salts of these metals.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

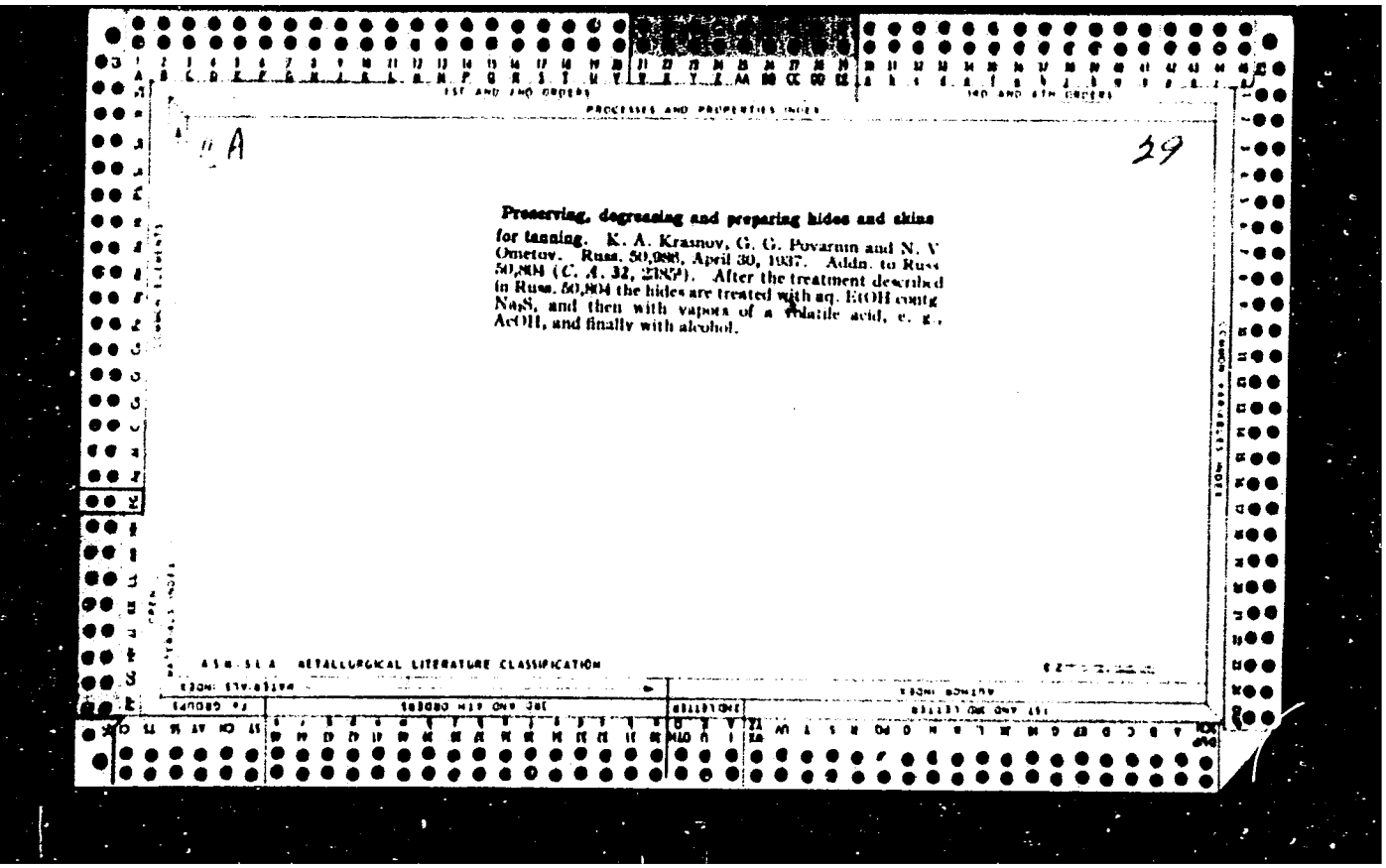


PROCESSES AND PROPERTIES INDEX

Combined chrome and vegetable tanning. K. A. Krasnov and G. G. Pivarnin. Russ. 52,280, Nov. 30, 1937. Addn. to Russ. 50,804 (C. A. 32, 2889) and Russ. 50,085 (C. A. 32, 2887). Hides pretreated as in Russ. 50,804 and 50,085 are treated with chrome liquor, then with an alc. soln. of tannin. Alc. and H_2O are removed and the leather is immersed in a soln. of Na_2CO_3 or water glass and finally in a soln. of $Al_2(SO_4)_3$.

29

A S M - S L A METALLURGICAL LITERATURE CLASSIFICATION

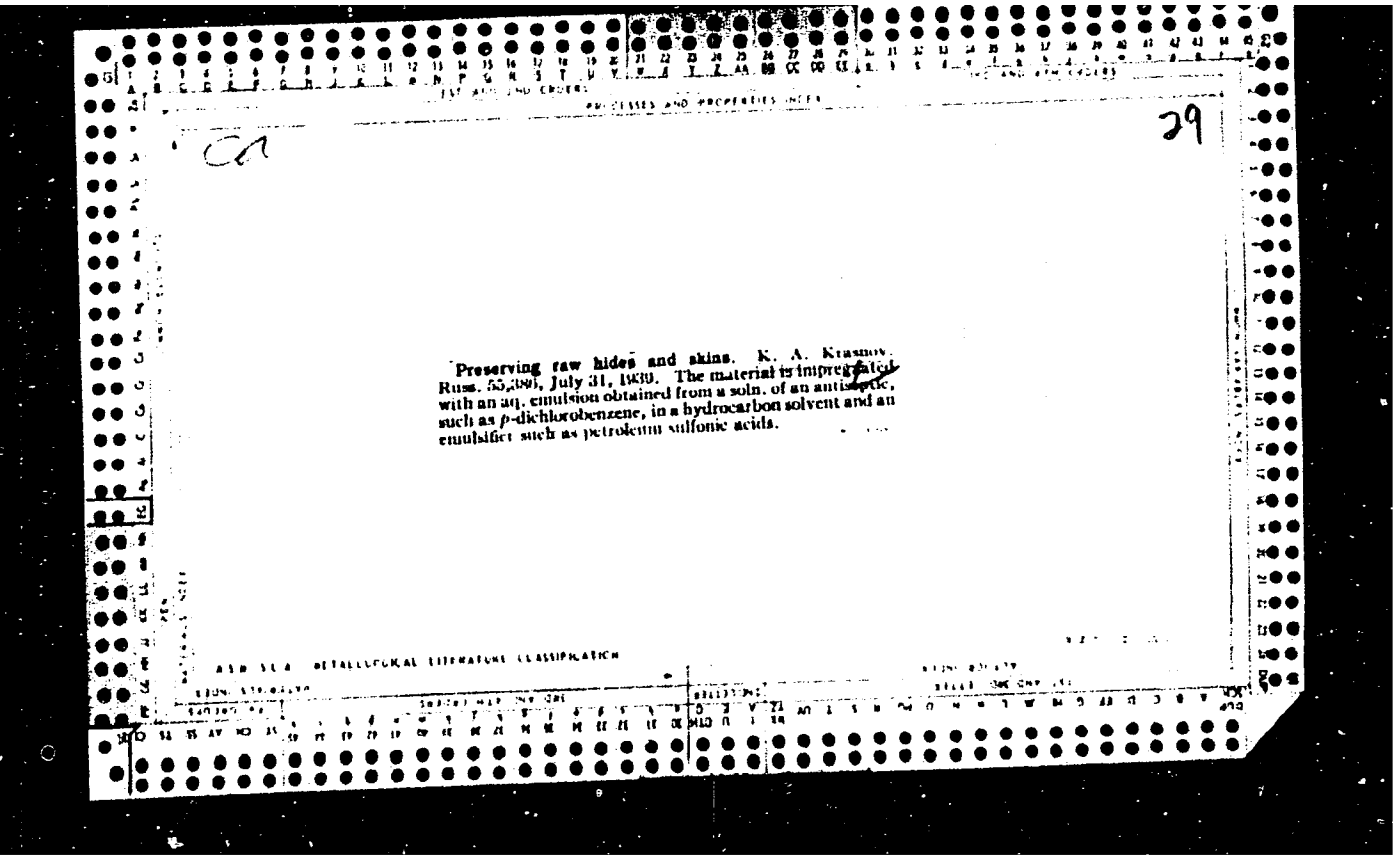


A

29

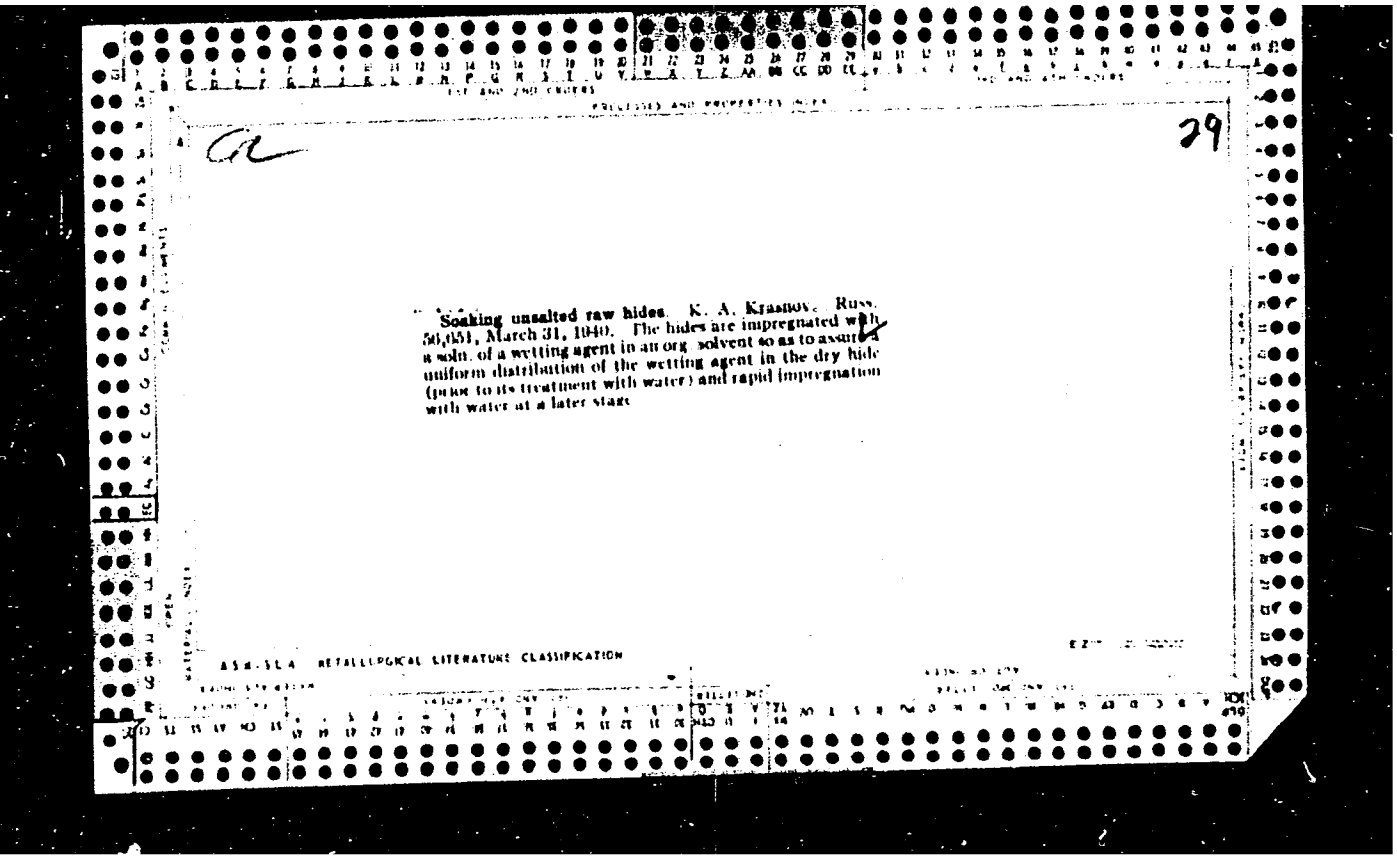
Preserving, degreasing and preparing hides and skins for tanning. K. A. Krasnov, G. G. Povarnin and N. V. Ometov. Russ. 50,988, April 30, 1937. Addn. to Russ. 50,804 (*C. A.* 32, 2185⁹). After the treatment described in Russ. 50,804 the hides are treated with aq. EtOH contg. Na_2S, and then with vapors of a volatile acid, e. g., AcOH, and finally with alcohol.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



29

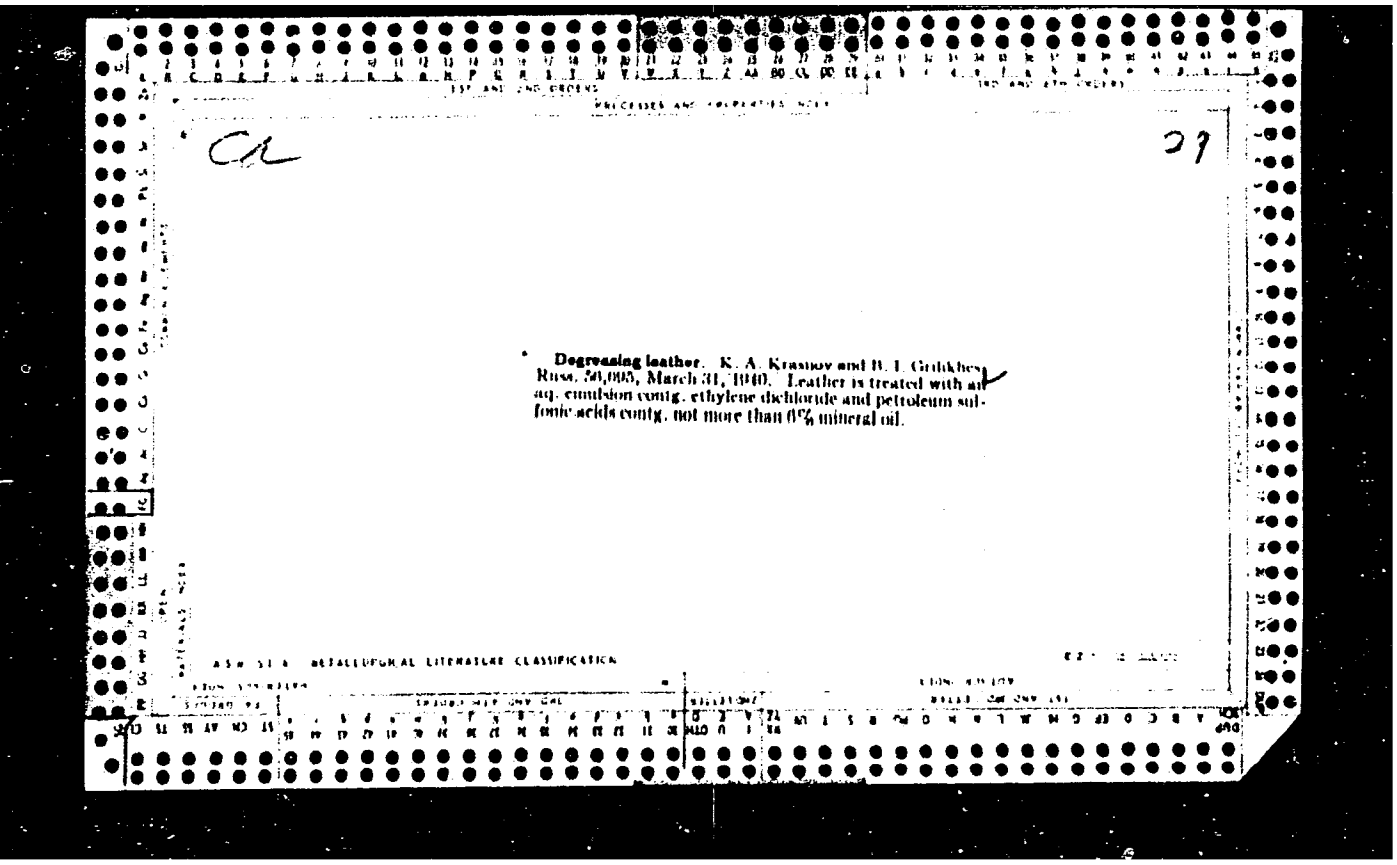
Preserving raw hides and skins. K. A. Krasnov. Russ. 55,580, July 31, 1939. The material is impregnated with an aq. emulsion obtained from a soln. of an antiseptic, such as *p*-dichlorobenzene, in a hydrocarbon solvent and an emulsifier such as petroleum sulfonic acids.



29

Soaking unsalted raw hides. K. A. Krasnov. Russ. 50,051, March 31, 1940. The hides are impregnated with a soln. of a wetting agent in an org. solvent so as to assure uniform distribution of the wetting agent in the dry hide (prior to its treatment with water) and rapid impregnation with water at a later stage.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



Degreasing leather. K. A. Krasnov and B. I. Gribkhes, Russ. 50,005, March 31, 1940. Leather is treated with an aq. emulsion contg. ethylene dichloride and petroleum sulfonic acids contg. not more than 6% mineral oil.

KRASNOV, K. A.

Wool Trade and Industry

Cleaning the woolly covering off sheared sheepskin. Leg. prom. 12 no. 5 (1952)

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

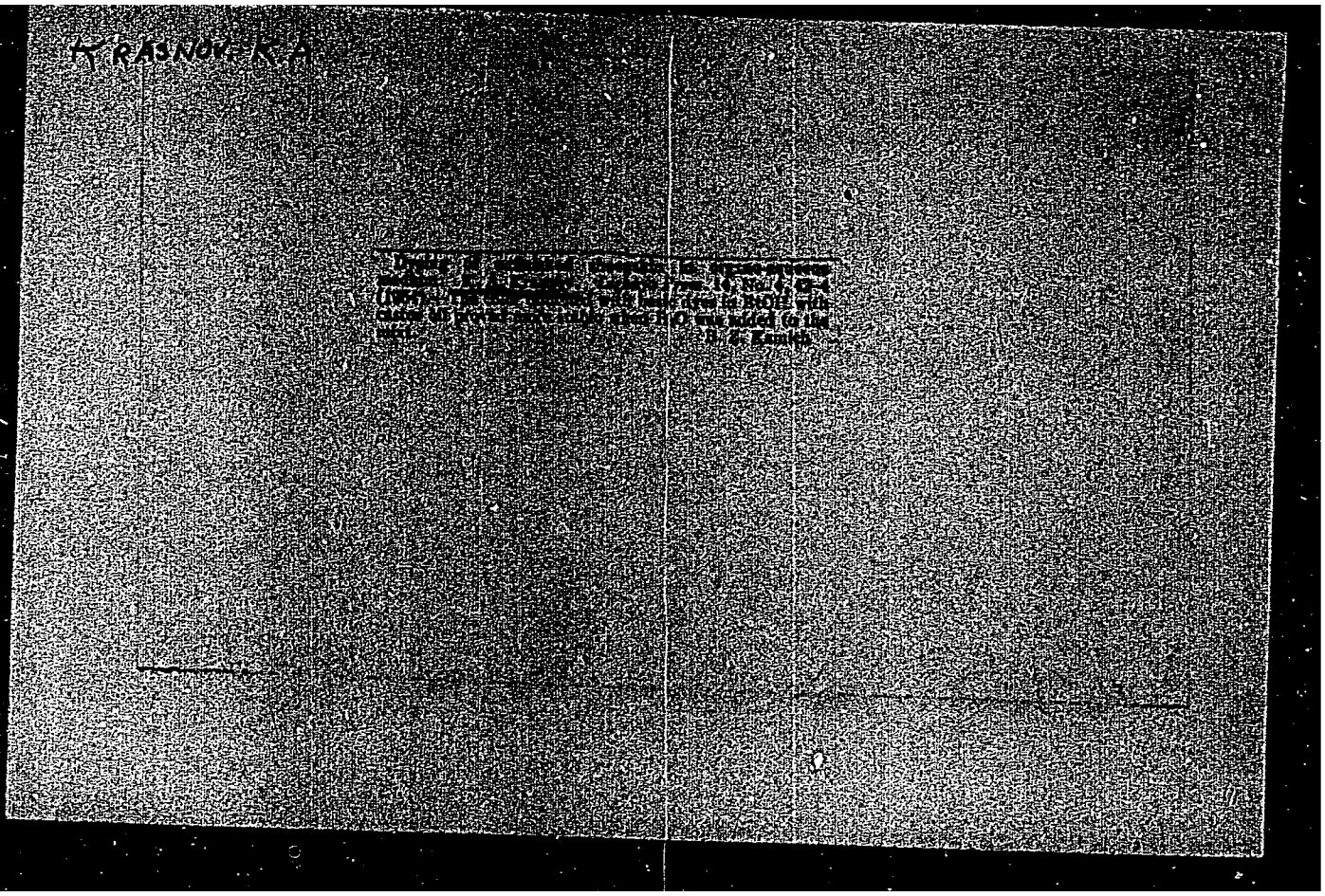
KRASNOV, K. A.

Leather

Improving sheepskins for fleece-lined garments. Leg.prom. 12 No. 6, 1952.

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

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R000826120



KRASNOV, K.A., kandidat tekhnicheskikh nauk

Method of degreasing sheep hides. Leg.prom. 15 no.5:36-37 My '55.
(Hides and skins)
(MIRA 8:7)

KRASNOV, K.A., kandidat tekhnicheskikh nauk.

Treatment of fur hides with formaldehyde fumes. Leg.prom. 15 no.9: 29-31 S '55. (MLRA 9:1)
(Hides and skins) (Formaldehyde)

KRASNOV, K.A., kandidat tekhnicheskikh nauk.

Ways of processing leather and fur. Leg.prom.16 no.2:37-38 F '56.
(Leather industry) (Fur)
(MLRA 9:7)

KRASNOV, K.A.

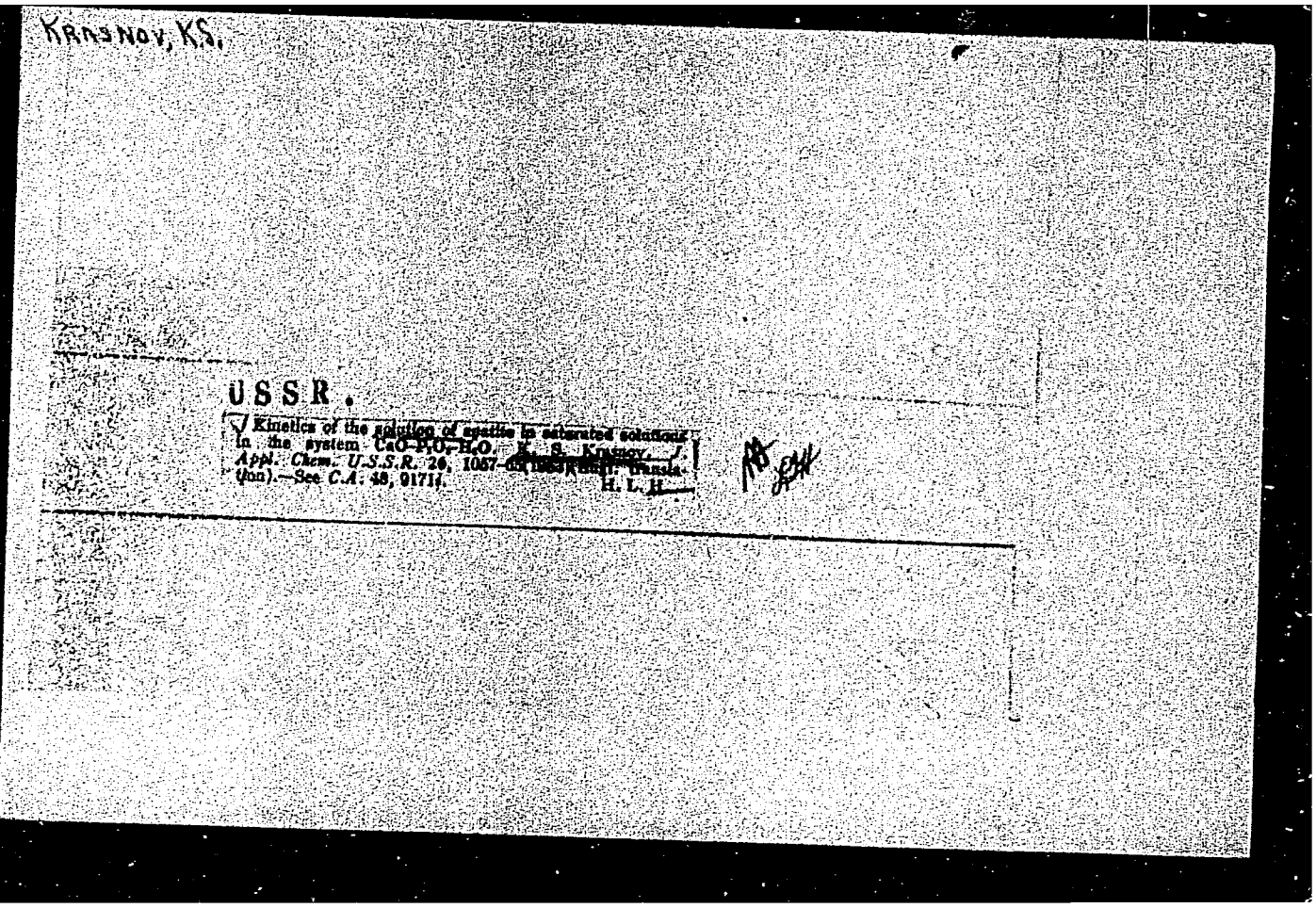
KRASNOV, K.A., kand.tekhn.nauk; SERGEYEVA, T.A., inzh.

Unjustified work duplication. Leg.prom. 16 no.10:47-48 O '56.
(MIRA 10:12)
(Leather--Testing)

KRASNOV, K.A., otv. za vypusk; YAHLOKOV, V.I., red.; BODANOVA, A.P., tekhn. red.

[Garage and repair equipment; catalog-handbook]Garazhnoe i remontnoe oborudovanie; katalog-spravochnik. Moskva, Avtotransizdat, 1962. 278 p. (MIRA 16:3)

1. GARO, trust, Moscow.
(Motorvehicles--Maintenance and repair)
(Garages--Equipment and supplies)

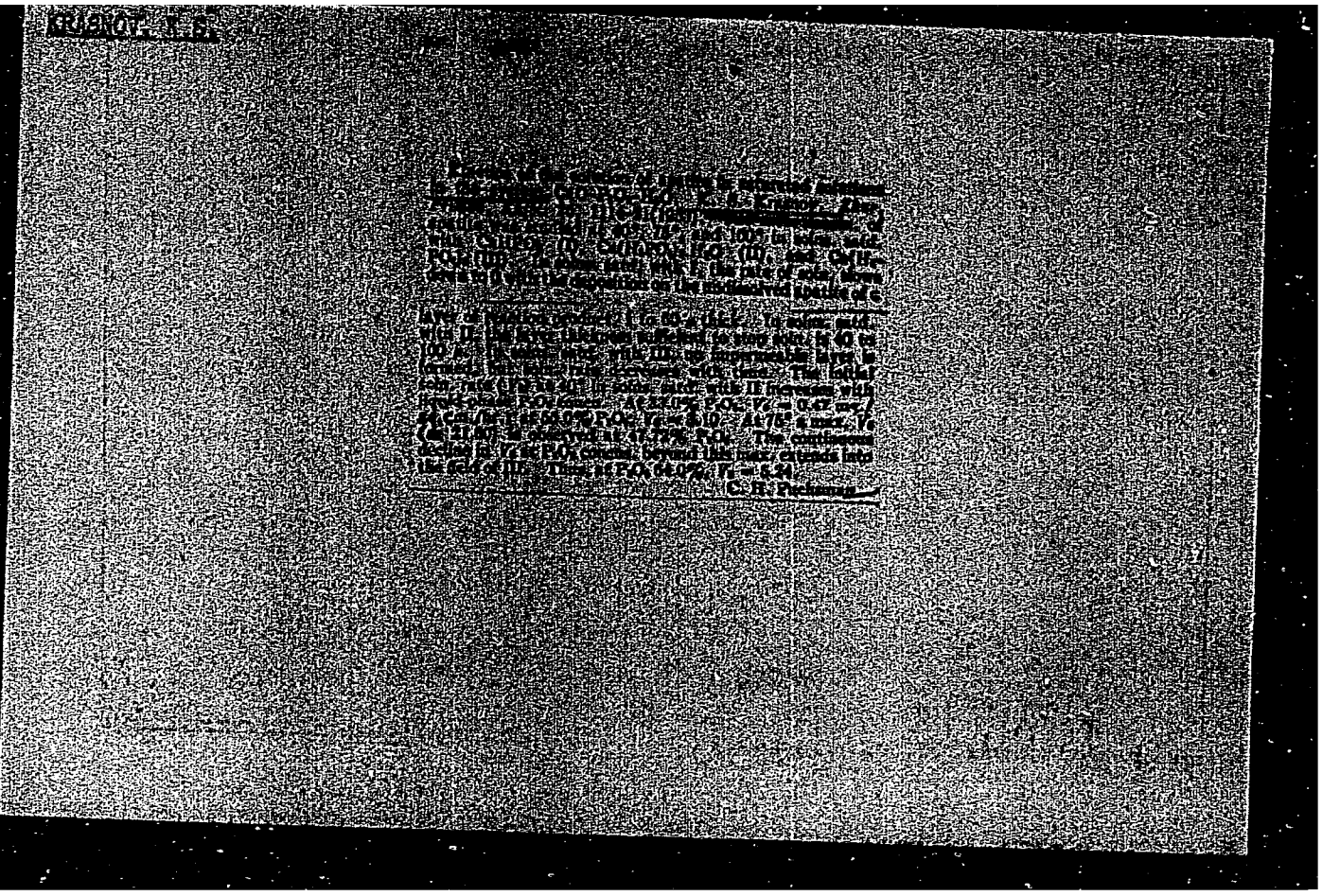


KRASNOV, K.S.

USSR.

Kinetics of the solution of apatite in saturated solutions in the system $CaO-P_2O_5-H_2O$. K. S. Krasnov. *J. Appl. Chem. U.S.S.R.* 26, 1067–[illegible] (Jan).—See *C.A.* 48, 9171i.

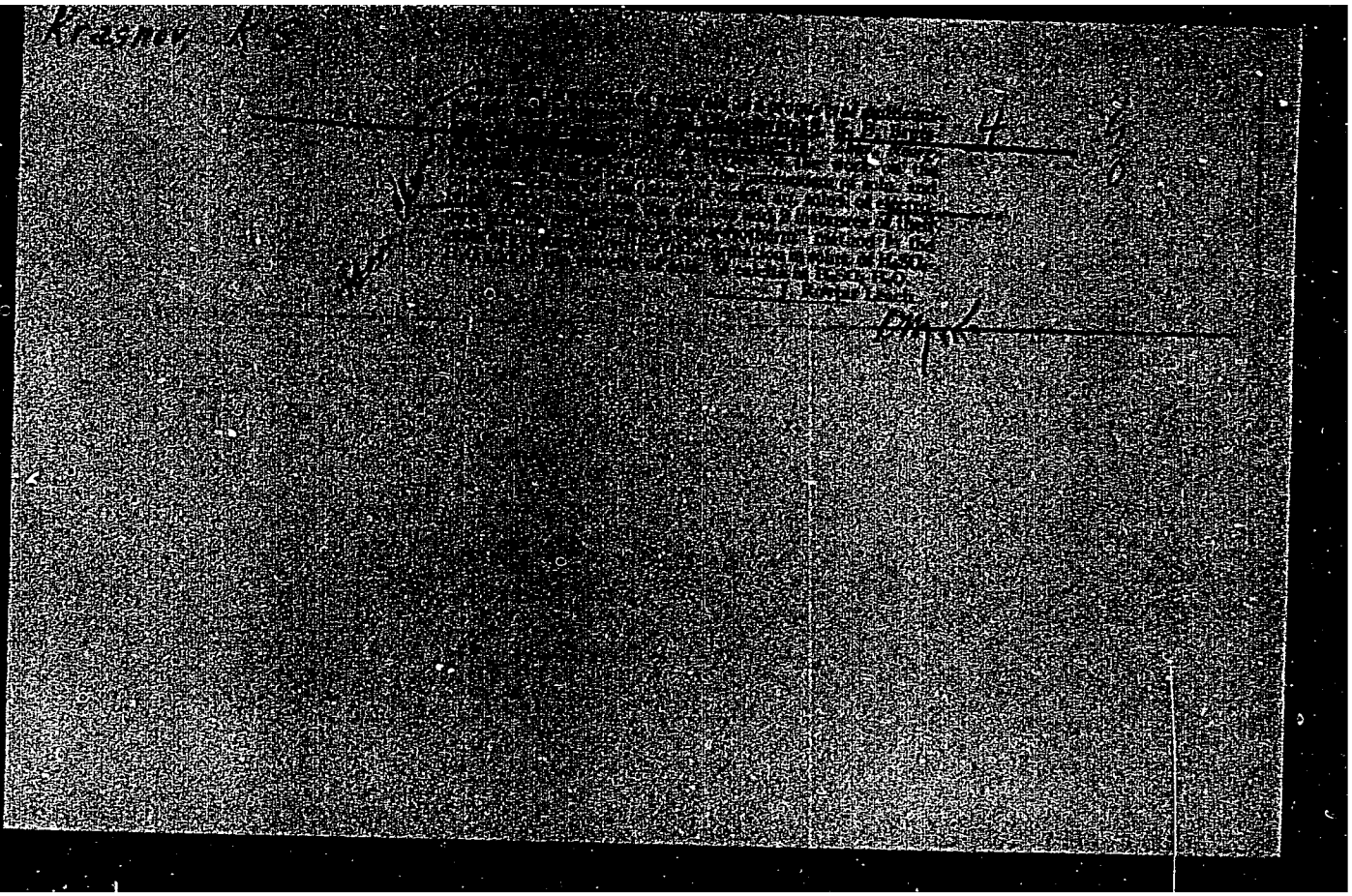
H. L. H.



KRASNOV, K.S.

Isotherms of the rate of dissolving apatite in saturated solutions of the ternary system: CaO -- P_2O_5 -- H_2O. Zhur.prikl.khim. 28 no.12:1275-1284 D '55. (MLRA 9:3)

1. Kafedra khimii Murmanskogo vysshego morekhodnogo uchilishcha.
(Apatite)



KRASNOV, K.S.

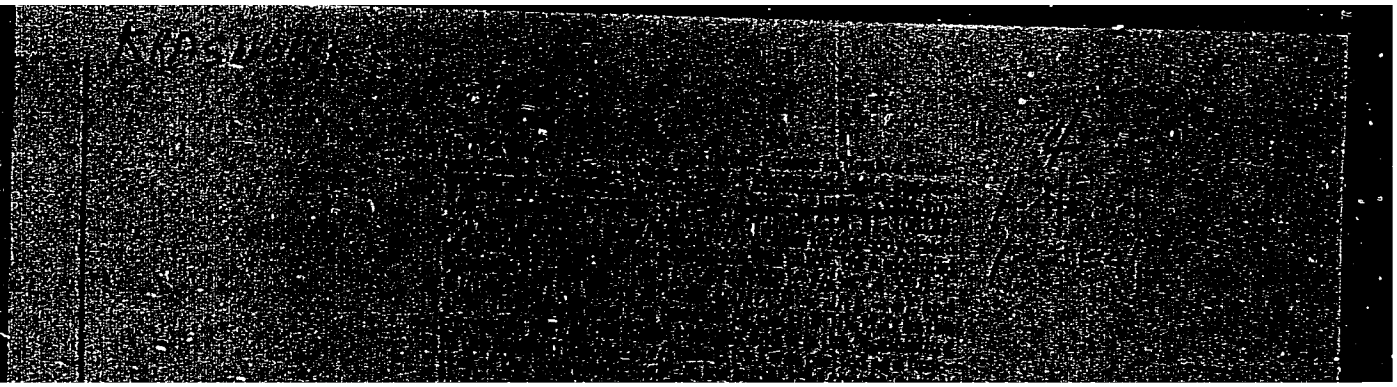
Interatomic distances in the molecules of alkaline halides. Zhur. neorg. khim. 2 no.8:1725-1732 Ag '57. (MIRA 11:3)

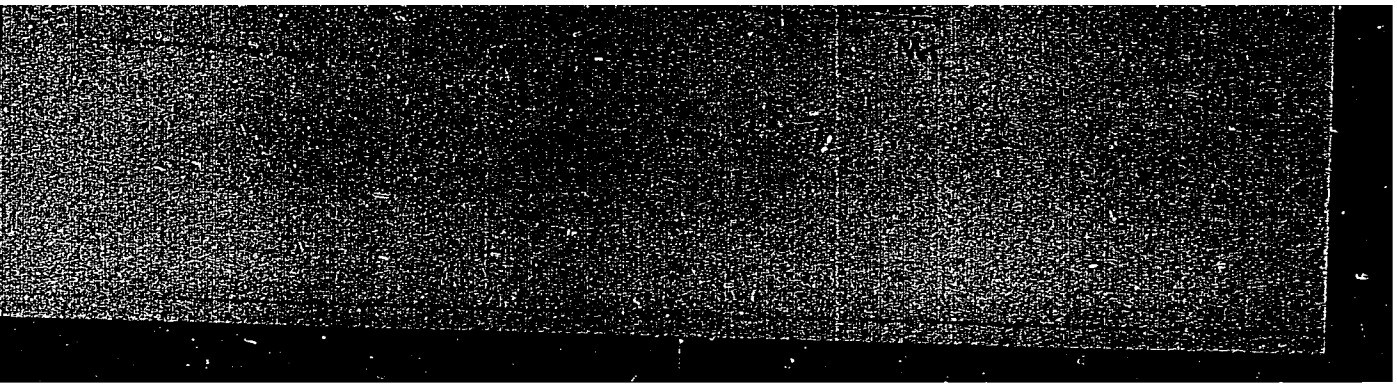
1. Ivanovskiy khimiko-tekhnologicheskiy institut.
(Halides) (Stereochemistry)

KRASNOV, K.S.

[redacted] and solubility data on apatite for computing optimum conditions for producing double superphosphate. Zhur.prikl.khim. 30 no.1:25-32 Ja '57. (MLRA 10:5)

1.Ivanovskiy khimiko-tekhnologicheskiy institut.
(Apatite) (Phosphates) (Systems (Chemistry))





APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R000826120

5(1)

AUTHOR: Krasnov, K. S. SOV/153-58-3-18/30

TITLE: Dissolution of Apatite in Phosphoric Acid Partly Neutralized With Magnesium. (Rastvoreniye apatita v fosfornoy kislote, chastichno neytralizovannoy magniyem) The Degree of Neutralization and the Dissolution Velocity (Stepen' neytralizatsii i skorost' rastvoreniya)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 3, pp 100 - 104 (USSR)

ABSTRACT: The phosphorites of the Kara-Tau contain larger amounts of dolomite. For this reason, magnesium sulfate is formed in the initial stage of sulfuric acid treatment to superphosphate. This magnesium sulfate becomes well soluble magnesium sulfate at a later stage (Ref 1). The liquid superphosphate phase therefore forms a buffer solution consisting of phosphoric acid and its mono-substituted magnesium salt with a considerably higher pH value than that of pure acid. In the next stage this mixture decomposes the rest of the not yet decomposed phosphorite fluoro apatite (or hydroxyl apatite). This decomposition takes place much more slowly in this liquid phase than in pure H_3PO_4, and this is the negative

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effect of $MgCO_3$ in the raw material (Ref 2). For this reason, at the NIUIF (Nauchnyy institut po udobreniyam i insekto-fungisidam im. Samoylova = Scientific Institute for Fertilizers and Insectofungicides imeni Samoylov) and at the laboratory of the author investigations were carried out concerning the problems mentioned in the title. The physical and chemical bases of the acid decomposition of minerals were investigated (Refs 5 - 7), and it was found that it is a typical case of a heterogeneous reaction limited by the diffusion and taking place according to the solution by Shchukarev-Nernst. Assuming that the rate of dissolution is limited towards the apatite surface by the diffusion of the hydrogen ions of the acid, the equation mentioned is transformed into:

$$v = [k\ H^+] \quad (1),$$

where v denotes the specific rate of dissolution, i.e. the amount of substance that passed into the solution from a surface unit within a unit of time. The equation (1) cannot be used for more concentrated solutions (Ref 3). Therefore

Dissolution of Apatite in Phosphoric Acid Partly Neutralized With Magnesium. The Degree of Neutralization and the Dissolution Velocity

SOV/153-58-3-18/30

the author suggested the empirical formula: $v = v_o \cdot e^{-\beta Z}$ (2) for the case of the Kara-Tau phosphorites (Ref 3), where v_o denotes the rate of dissolution in the pure acid with the same P_2O_5 content as the phosphorus magnesium mixture, Z the degree of neutralization of the first H^+ ion of the acid in the mixture and β a constant at the corresponding P_2O_5 content in the solution. The present paper is to prove the usefulness of the equation (2) for various temperatures. This was experimentally carried out at 50° with data of reference 4 being used (at 40 and 75°). The experimental part was carried out by the students L. N. Golubeva and A. I. Mitina. Conclusions: 1.-The exponential dependence of the rate of decomposition of apatite in a partly neutralized phosphoric acid (v) on the degree of neutralization of the acid (Z) was proved. The empiric formula (2) suggested is correct within a wide range of concentration (Z = 0 - 40%) and temperature (25 - 75°). The coefficient

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Dissolution of Apatite in Phosphoric Acid Partly Neutralized With Magnesium. The Degree of Neutralization and the Dissolution Velocity

SOV/153-58-3-18/30

β fluctuates at temperature changes within very narrow limits, and is on the average 0,047.-. There are 2 figures, 2 tables, and 8 Soviet references.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut (Ivanovo Institute of Chemical Technology) Kafedra fizicheskoy i kolloidnoy khimii (Chair of Physical and Colloid Chemistry)

SUBMITTED: September 10, 1957

Card 4/4

AUTHORS: Krasnov, K.S., Antoshkin, V.G. SOV/78-3-7-5/44

TITLE: I. The Repulsion Coefficient and the Degree of Ionization of Bonds in Alkali Halides (I. Koeffitsiyent ottalkivaniya i stepen' ionnogo kharaktera svyazi v galogenidakh shchelochnykh metallov)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol. 3, Nr 7, pp. 1490-1496 (USSR)

ABSTRACT: According to the formula developed by Rittner the repulsion coefficient ρ was determined on the basis of the most recent numerical data between the molecular distances and the number of oscillations in the molecules of the alkali halides. It was shown that the statements made by Rittner concerning the amount of ρ in molecules and crystals are wrong. The repulsion coefficient has the same value for all salts in the molecular and crystalline state. The amount for chlorides, fluorides, bromides, and iodides increases in the direction from chlorides to iodides. For fluorides the mean value of the repulsion coefficient ρ is given as amounting to 0.30 ± 0.01 Å, for chlorides to 0.310 ± 0.01 Å, for bromides to 0.335 ± 0.01 Å, and for iodides to 0.365 ± 0.01 Å.

Card 1/2

I. The Repulsion Coefficient and the Degree of Ionization of Bonds in Alkali Halides

307/78-3-7-5/44

The values for the repulsion coefficient ρ and the number of oscillations of the molecules ω_e in alkali halides are calculated. For several alkali salts ω_e was corrected. The mean value for the repulsion coefficient of molecules in alkali halides was determined as amounting to 0.33 ± 0.01 Å. There are 1 figure, 4 tables, and 17 references, 5 of which are Soviet.

SUBMITTED: June 28, 1957

1. Alkali halides--Analysis 2. Alkali halides--Ionization
3. Molecules--Vibrations 4. Mathematics--Applications

Card 2/2

SOV/78-3-9-1/38

AUTHOR: Krasnov, K. S.

TITLE: The Relationship Between the Radius of the Non-Deformed Gas Ions and Several Physico-Chemical Characteristics of the Ions (Svyaz' mezhdu radiusom nedeformirovannogo "gazovogo" iona i nekotorymi fiziko-khimicheskimi kharakteristikami iona)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol 3, Nr 9, pp 1993-1998 (USSR)

ABSTRACT: In the present paper the interdependence between the gas ion radii on the one hand and the ionization potential and the radius of the crystals of the ions on the other hand was investigated. The relation between the radii of the non-deformed gas ions and the crystallo-chemical radii as well as the relation between the radii of the non-deformed gas ions and the ionization potential were investigated. The results obtained give evidence of a functional interdependence existing between the radii of the ideal non-deformed gas ion r_o and the physico-chemical constants of the ion. There is a linear interdependence e. g. between the value $1/r_o$ and the ionization potential, between r_o and the crystallo-chemical radii, and between r_o and

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other constants that are functionally related to crystallo-chemical radii. The existing simple functional relation between r_o and the important physico-chemical constants confirms that r_o has to be regarded as a physico-chemical constant of the ideal non-deformed gas ions. The radii of the non-deformed gas ion r_{oFr^+} and the crystallo-chemical radii of this ion were computed and the intra-molecular distances of the halide salts of francium were determined. There are 2 figures, 5 tables, and 17 references, 9 of which are Soviet.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut (Ivanovo Chemical and Technological Institute)

SUBMITTED: June 28, 1957

KRASNOV, K.S.

Solubility of apatite in phosphoric acid partially neutralized by magnesium (in $MgO--P_2O_5--H_2O$ system solutions. Zhur.prikl. khim. 31 no.3:345-352 Mr '58. (MIRA 11:4)

1.Ivanovskiy khimiko-tekhnologicheskiy institut.
(Apatite) (Phosphoric acid)

67034

5.2600

SOV/153-2-5-10/31

5(4)

AUTHOR: Krasnov, K.S.

TITLE: The Ion Radii and the Nature of the Linkage in Molecules of Metal Salts of the 2nd Group in the Periodic System

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1959, Vol 2, Nr 5, pp 702-705 (USSR)

ABSTRACT: The interatomic distances in gaseous compounds in which the ion character of the linkage prevails can be approximately calculated as the sum of the ion radii in the molecules as it is done in the case of crystals (Refs 1-3). A similar calculation in more complicated molecules would be of interest. The correctness of a constructed ion model of the concerned molecule can be judged by comparison of a calculated and an experimentally determined interatomic distance. For this, of course, not empirically obtained radii (Ref 3) but, as it is done in crystal chemistry, - radii calculated on the basis of theoretical conceptions would be necessary (as in Ref 4). The author attempts to solve this task for the halogen compounds of the 2nd group of the periodic system; there is no uniform opinion on the nature of their linkage. As a standard for the calculation of the ion radii $r_{\pm}$, the author selected inter-

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atomic distances R in the molecules LiH (Ref 5), NaF (Ref 6), KCl, RbBr, and CsJ (Ref 2) which are built up of isoelectronic ions. For radii of several ions of the latter type, the relation

$$r_{\pm} = \frac{C}{Z^{*}} \quad (1)$$ is given in quantum mechanics

where C is the constant of the series, and Z^{*} the effective charge of the nucleus (Ref 7). From this, the author obtains for isoelectronic ions in the molecule

$$Me^{+}Hal^{-}: \quad \frac{r_{+}}{r_{-}} = \frac{Z_{-}^{*}}{Z_{+}^{*}} \quad (2).$$ After calculating the effective nuclear charges of the ions in the standard molecules based on the screening constant of L. Pauling (Ref 4), he obtains the values of the halogen radii in the molecules (Table 1, in which for comparison the radii from Refs 2 and 3 are also listed). The ion radii of the halogens were used for the calculation of the radii of the corresponding isoelectronic ions of the metals in the 2nd group (based on (1)) (Table 1). Table 2 lists the electronographically established values of

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the interatomic distances (Refs 8,9). They are compared with the values, calculated as the sum of the corresponding ion radii in the molecules. They are in accordance (within the range of the experimental error) with the experimentally calculated distances for salts of Be - Ba. For the compounds of the by-groups, excepting fluorides, there are large deviations (0.2 - 0.3 Å). This accordance may serve as one of the criteria to show that in molecules ionic linkage character prevails, especially in the halides of Be - Ba. Any system of ion radii in the molecule which is only based on the additivity principle is incomplete; such a system gives good results as long as the polarization effects in the ionic molecules are close to the same effect in the standard molecules. There are 2 tables and 11 references, 6 of which are Soviet.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut; Kafedra fizicheskoy khimii (Ivanovo Chemical-technological Institute; Chair of Physical Chemistry)

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The Ion Radii and the Nature of the Linkage in Molecules of Metal Salts of the 2nd Group in the Periodic System

SOV/153-2-5-10/31

SUBMITTED: June 21, 1958

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5(4)

SOV/78-4-3-7/34

AUTHOR: Krasnov, K. S.

TITLE: Internuclear Distances in Molecules of the Gaseous Halides of Alkali Metals and the System of Radii of Undeformed Gas Ions (Mezh"yadernyye rasstoyaniya v molekulakh gazoobraznykh galogenidov shchelochnykh metallov i sistema radiusov nedeformirovannykh gazovykh ionov)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 3, pp 530-534 (USSR)

ABSTRACT: The interatomic distances in alkali halides were calculated from data on the effective values of the ion radii. The experimentally obtained and calculated interatomic distances in the molecules of the gaseous alkali halides are given in table 3. The deviation from the additivity of the ion radii in this system is due to the mutual polarization of the ions in the molecules and varies between 0.01 and 0.03 Å. Equation (5) has been proposed for calculating the radii of the undeformed gas ions:

$$d = d_o - \frac{4(\alpha_1+\alpha_2)}{(n-1)d_o^2} = r_{o+} + r_{o-} - \frac{4(\alpha_1+\alpha_2)}{(n-1)d_o^2}$$

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SOV/78-4-3-7/34

Internuclear Distances in Molecules of the Gaseous Halides of Alkali Metals and the System of Radii of Undeformed Gas Ions

From the interatomic distance d the radii r_o of all alkali metal- and halide ions in some molecules can be calculated with the aid of equation (5). The calculated radii of the undeformed gas ions are: Li^+ = 0.756Å, Na^+ = 0.980Å, K^+ = 1,244Å, Rb^+ = 1.361Å, Cs^+ = 1.481Å, F^- = 1.112Å, Cl^- = 1.683Å, Br^- = 1.864Å, and J^- = 2.119Å. The internuclear distances in the molecules LiCl, LiF, NaF, KF and RbF were calculated with the aid of this system of radii. There are 5 tables and 12 references, 4 of which are Soviet.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut (Ivanovo Chemical Technological Institute)

SUBMITTED: March 29, 1957

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SOV/78-4-5-2/46

5(4)
AUTHORS: Krasnov, K. S., Shteyn, L. M.

TITLE: The Bond Energy in the Molecules of the Halides of Alkali Metals
(Energiya svyazi v molekulakh galogenidov shchelochnykh metallov)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 5, pp 963-968 (USSR)

ABSTRACT: The binding energy W in molecules of the halides of alkali metals was calculated at 0° according to the formula by Rittner (Ref 4):

$$W = \varphi + Ae^{-r/\varrho} - \frac{c}{r^6} + \frac{h\nu_o}{2}, \qquad (1)$$

$$\varphi = -\frac{e^2}{r} - \frac{e^2(a_1+a_2)}{2r^4} - \frac{2e^2a_1a_2}{r^7} \qquad (2)$$

where $Ae^{-r/\varrho}$ denotes the repulsion energy; $\frac{c}{r^6}$ - the energy

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The Bond Energy in the Molecules of the Halides of Alkali Metals

of dispersion interaction; $\frac{h\nu_0}{2}$ - zero point energy; a_1 and a_2 - polarizability of ions;

$c = \frac{3}{2} \cdot \frac{I_1 I_2 a_1 a_2}{I_1 + I_2}$; I_1 and I_2 - ionization potentials of the cation and anion respectively. The values W_1 and W_2 calculated by means of the formulas (1) and (2) were determined with W_T. The thermo-chemical values W_T were calculated according to formula 4: $-W_T = D_o + (I_o - E_o)$ (4)

In formula (4) D_o denotes the dissociation energy of the molecules into atoms in the ground state; I_o - ionization potential of the alkali metals; E_o - affinity of the halides to the electron at 0°K. The data W and W_T concerning fluorides

The Bond Energy in the Molecules of the Halides of Alkali Metals

are in good agreement. Bond energies of the alkali halides are given by table 1. The differences between theoretical and thermo-chemical values in the binding energy are discussed. The repulsion coefficients for chlorides and fluorides and the following average repulsion coefficients for all alkali halides were determined: NaCl - ϱ = 0.332; KCl - ϱ = 0.343; RbCl - ϱ = 0.355; CsCl - ϱ = 0.370; NaBr - ϱ = = 0.346; KBr - ϱ = 0.374 and NaJ - ϱ = 0.384. The coefficient ϱ increases from chloride to iodide and from sodium salt to cesium salt. The ϱ values found are higher than those calculated by Rice and Klemperer (Ref 13). There are 1 table and 13 references, 6 of which are Soviet.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut (Ivanovo Chemical-technological Institute)

KRASNOV, K.S.

Vibration frequencies of the TlI molecule. Opt. i spektr. 7 no. 6:843-844 D '59. (MIRA 14:2)
(Thallium iodide--Spectra)

5 (4)

AUTHOR: Krasnov, K. S.

SOV/20-128-2-29/59

TITLE: Energy Calculation of Molecules of the Alkaline Earth Halides on the Basis of an Ion Model

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 2, pp 326-328 (USSR)

ABSTRACT: Under the assumption of ionic linkage a formula for the linkage energy in MeX_2 molecules (Me - alkaline earth, X - halogen) is deduced. The energy, necessary to form a molecule from the cation Me^{++} and two anions X^- with the equilibrium distance Me-X equal r_o, if these ions are situated at an infinite distance, is defined as the energy of the molecule MeX_2 ($T = 0^\circ$ K). The deduction was made by means of the formula by C. I. F. Böttcher (Ref 5) for electrostatic interaction between two polarizable ions, resulting the formula (5):

$$U_o = \frac{-3.5}{r_o}\left(1 - \frac{\rho}{r_o}\right) - \frac{4\alpha_2 e^2}{r^4}\left(1 - \frac{4\rho}{r_o}\right) + \sum \frac{h\nu_o}{2} \cdot (\rho = 0.338 \text{ Å},$$

α_2 = polarization of anion, these values are taken from Landolt-Börnstein (Ref 8); $\frac{h\nu_o}{2}$ is the zero energy, which was

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neglected in the following calculation). The calculated amounts of U_0 are cited in table 1 and are compared to measurements by thermochemical means. Further the change ΔH_{298} of enthalpy was calculated on the basis of thermochemical data (Table 1). The differences of the calculated and the thermochemically determined values of U_0 vary between -33 kcal and zero. The discrepancies amount to an average of 3%. As all differences are negative a systematic error of calculation is suspected in connection with the determination of the distance Me-X at high temperatures which may be caused perhaps by a covalent component of the linkage. Larger differences may be expected for the same calculation of the molecule $HgCl_2$ because of stronger covalent linkage. The satisfactory agreement of calculated and thermochemically determined bond energy is therefore not casual but verifies the ionic linkage of MeX_2 molecules. There are 1 table and 10 references, 5 of which are Soviet.

Energy Calculation of Molecules of the Alkaline Earth Halides on the Basis of an Ion Model

SOV/20-128-2-29/59

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut (Ivanovo Chemical-technological Institute)

PRESENTED: May 11, 1959, by A. A. Grinberg, Academician

SUBMITTED: May 11, 1959

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KRASNOV, K.S.

Radii of ions present in molecules of gaseous inorganic compounds of elements in the main groups of the peroidic system. Zhur. struk. khim. 1 no.2:209-216 Jl-Ag '60. (MIRA 13:9)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.
(Ions) (Chemical bonds)

24084
S/186/60/002/006/006/026
A051/A129

21,4200

AUTHOR: Krasnov, K. S.

TITLE: Certain thermodynamic characteristics of gaseous francium halides.

PERIODICAL: Radiokhimiya, v. 2, no. 6., 1960, 668 - 670

TEXT: The article deals with the computation of certain thermodynamic characteristics of francium halides needed to evaluate the possibilities of separating francium from rubidium and cesium by the salt sublimation method. The heat of sublimation is calculated as the difference between the energy of the crystal lattice U and the energy of molecule formation FrG from gaseous ions W (called bond energy for short in the article). The bond energy W_0 at 0°K is calculated on the basis of an ionic model of a molecule according to Rittner's formula (Ref. 1: E. S. Rittner, J. Chem. Phys. 19, 1030, 1951):

$$W = \frac{e^2}{r} - \frac{e^2(\alpha_1 + \alpha_2)}{2r^4} - \frac{2e^2\alpha_1\alpha_2}{r^7} - \frac{C}{r^6} + Ae^{-\frac{r}{\rho}} + \frac{h\omega}{2} \qquad (1)$$

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Certain thermodynamic characteristics of ....

where r is the intermolecular distance, α_1 and α_2 the polarizability of the ions, C the constant of the dispersion interaction, ω the oscillation frquency, A and ρ constants in the repulsion energy expression. The values of r_e, interatomic distances in FrC molecules, were computed by the author (Ref. 6: K. S. Krasnov, ZhNKh, 3, 9, 1993, 1958). The Varshni formula is suggested for calculating the oscillation frequencies ω_e : $r_e = a + b \cdot k_e^{-\frac{1}{3}}$ (2), where the force constant $k_e = 4\pi^2\mu\omega_e^2$. The values obtained for the oscillation frequencies were found to correspond favorably with those computed by Maksimov (Ref. 7: K. S. Krasnov, A. I. Maksimov, Opt. i spektr. 8, 3, 403, 1960). μ is the true value of the given mass. A comparison of L^0_{298} of FrG with that of the Cs, Rb and K halides, showed that L^0_{298} of CsF and FrF are lower than those of the corresponding chlorides. This is thought to be the result of the polarization of the voluminous Cs^+ and Fr^+ cations by small F^- anion. This fact is confirmed by the comparison of the obtained heats of sublimation to the boiling points of cesium and rubidium halides. The values of the thermodynamic functions

$$S^0_{298}, -\frac{(Z^0 - H^0_0)}{T} \text{ and } \frac{(H^0 - P^0_0)}{T}$$ were computed according to the

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Certain thermodynamic characteristics of ...

statistical thermodynamics formulas. There are 2 tables and 15 references: 8 Soviet-bloc and 7 non-Soviet-bloc. The references to the four most recent English-language publications read as follows: A. Honig, M. Mandel, M. Stitch, C. Townes, Phys. Rev., 96, 3, 629, 1954; J. P. Varshni, Trans Farad. Soc., 53, 2, 132, 1957; Y. P. Varshni, J. Chem. Phys. 28, 6, 1081, 1958; H. O. Pritchard Chem. Rev., 52, 3, 528, 1953.

SUBMITTED: January 16, 1960

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21085
S/186/60/002/006/007/026
A051/A129

21.4200

AUTHORS: Krasnov, K. S., Krestov, G. A.

TITLE: The volatility of francium compounds

PERIODICAL: Radiokhimiya, v. 2, no.6, 1960, 671 - 674

TEXT: The authors calculated the pressure curves of sublimation for all the halide compounds of francium, in order to provide data for establishing the possibilities of sublimation methods. These calculations were based on the high volatility of micro-quantities of francium chloride at 900 - 1,000°K (Ref. 2: Yu. B. Gerlit, F. I. Pavlotskaya, S. S. Rodin, Khim. nauka i promysh. 4, 4, 465, 1959) and facilitated by the calculated series of thermodynamic characteristics of solid and gaseous compounds of francium. The authors also calculated the sublimation curves of rubidium and cesium halides to evaluate the possibilities of the method. The following equation was used for the calculations:

$$\Delta Z^{0}_{T} = \Delta H^{0}_{298} - T\Delta S^{0}_{298} - T\int_{298}^{T} \frac{dT}{T^{2}} \int_{298}^{T} \left[(C_p)_{gas} - (C_p)_{solid} \right] dT \qquad (1)$$

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The volatility of francium compounds

where ΔZ^0_T is the change of the isobar potential in the sublimation process, ΔH^0_{298} and ΔS^0_{298} the change of the standard enthalpies and entropies in the same process, C_p the thermal capacity at constant pressure. The entropy change in the sublimation process ΔS^0_{298} is determined as $(S^0_{298})_{gas} - (S^0_{298})_{solid}$.

The thermal capacity of the solid rubidium and cesium halides is expressed by the power series equation $C_p = a + bT$. The thermal capacity of the gaseous compounds was calculated from the quantum formula:

$$C_p = \frac{7}{2} R + C_E \left(\frac{\omega}{T}\right) \qquad (2).$$

where $C_E \left(\frac{\omega}{T}\right)$ is the thermal capacity of the linear harmonic oscillator. The ω values were determined from the infra-red and micro-wave spectra; for the francium halides they were calculated from the value of the given mass. The sublimation curves within the temperature range of 300 - 1,000°K were calculated from the relation

$$-\Delta Z^0_T = RT \ln P \qquad (3).$$

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The volatility of francium compounds

An analysis of these results showed that the sublimation pressure is very low at usual temperatures and increases considerably at high temperatures. The fluoride is considered to be the most volatile of all the francium halides and cesium compounds. No decomposition of francium iodide into elements is expected in sublimation since $\Delta Z \geq 0$ holds true for this process. Iodides are more convenient for separation by sublimation than fluorides. This conclusion refers to macro-quantities of substances and cannot be unconditionally applied to micro-quantities of compounds. There are 3 tables and 15 references: 8 Soviet-bloc and 7 non-Soviet-bloc. The references to the English language publications read as follows: A. Honig, M. Mandel, M. Stitch, C. Townes, Phys. Rev., 96, 3, 629, 1954; S. A. Rice, W. Klemperer, J. Chem Phys., 27, 2, 573, 1957; R. F. Barrow, A. D. Count, Proc. Roy. Soc., A,219, 120, 1953; S. A. Rice, W. Klemperer, J. Chem.Phys., 27, 3, 643, 1957.

SUBMITTED: February 11, 1960.

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KRASNOV, K.S.

Nature of the bond in the molecules of thallium monohalides.
Zhur. neorg. khim. 5 no.8:1658-1662 Ag '60. (MIRA 13:9)
(Thallium halides) (Chemical bonds)

KRASNOV, K.S.; MAKSIMOV, A.I.

Calculation of the vibration frequencies of diatomic molecules from their reduced mass. Opt. i spektr. 8 no.3:403-406 Mr '60.
(MIRA 14:5)

(Spectrum, Molecular)

KRASNOV, K.S.

Energy of repulsion in ionic molecules. Zhur. ob. khim. 30 no.11:3844-3845 N'60. (MIRA 13:11)
(Force and energy) (Alkali metal halides)

21123

S/153/61/004/001/002/009
B110/B203

5.4130 (1273, 1228, 1227)

AUTHOR: Krasnov, K. S.

TITLE: Bond energy of halogen compounds of the second group, and the ion model

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, v. 4, no. 1, 1961, 38-44

TEXT: For molecules with intermediate character of bond in which ionic interactions prevail, e.g., in $TlHal_3$, the use of the ion model to calculate the molecular bond energy yields satisfactory results. In this connection, the author had already studied subgroup II A of the periodic system (Ref. 2: K. S. Krasnov, Dokl. AN SSSR, 128, 326 (1959)). The applicability of this calculation method to both subgroups of group II is to be studied here with the use of new data of repulsion coefficients. Let U_o be the energy change in the formation of $MeHal_2$ at the equilibrium distance Me - Hal = r_o from the cation Me^{2+} and two anions Hal^- infinitely distant. The potential energy of the system $MeHal_2$ is obtained taking

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Bond energy of halogen compounds ...

account of: (1) Electrostatic interaction of Me^{2+} and 2 Hal^-: $W_1 = -2e^2/x - 2e^2/y - 2\alpha e^2/x^4 - 2\alpha e^2/y^4$, where α = polarizability; e = ionic charge; x, y = distances between anions and cation. (2) Electrostatic interaction of Hal^- between each other: $W_2 = e^2/d - \alpha e^2/[d^4(1 + 2\alpha/d^3)]$. (3) Repulsion of the central ion M^{2+} from the dipoles m mutually induced by the anions: $W_3 = \{2\alpha e^2/[d^2(1 + 2\alpha/d^3)]\} \cdot (1/x^2 + 1/y^2)$; d = distance of anions from each other. (4) Repulsion of two dipoles m_1 and m_2 induced by the metal ion in the anions: $W_4 = 8\alpha e^2/[x^2y^2(1 + 2\alpha/d^3)]$. (5) Repulsion of the completed electron shells of Me^{2+} and Hal^-: $W_5 = A \exp(-x/\rho) + A \exp(-y/\rho)$. (6) Van der Waals dispersing interaction: $W_6 = c/x^6 - c/y^6$; c = London's constant. (7) Difference of values of forward, rotary, and oscillating energies of molecule and free ions:

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Bond energy of halogen compounds ...

$W_7 = \sum[h\nu_o/2] + \sum\{h\nu_o/[\exp(h\nu_o/kT) - 1]\} - 2kT$. Neglecting deformations and asymmetric oscillations, the following is obtained:

$U_o = -3.5e^2/r_o(1-\rho/r_o) - \{[49\alpha e^2/16]/[r_o^4(1+\alpha/4r_o^3)]\} \cdot \{1 - [(4+\alpha/4r_o^3)\cdot\rho]/[(1+\alpha/4r_o^3)r_o]\} - (2c/r_o^6)\cdot(1-6\rho/r_o) + \sum h\nu_o/2$. According to E. S. Rittner, the repulsion coefficient ρ can be calculated from the power constants of stretching vibrations. In most cases, the power constants k are not known, however. Therefore, the author calculated, as in the case of the 2nd main group, also the ρ of the subgroup from the effective charges of ionic nuclei. He used Pauling's shielding constant and the ρ-values found for Ca^{2+}, Sr^{2+}, and Ba^{2+}, and obtained good agreement of his results with those found by Pearson. The change in enthalpy ΔH^o_{298} in the reaction $Me^{2+}_{(g)} + 2Hal^-_{(g)} = MeHal_{2(g)}$ is calculated from $\Delta H^o_{298} = \Delta H^o_{MeHal_2(m)} - \Delta H^o_{Me^{2+}(g)} - 2\Delta H^o_{Hal^-(g)} + \Delta H_s$, where ΔH^o = heat of formation at 298°K, ΔH_s = sublimation heat at 298°K. Then, it was converted to

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absolute zero according to Kirchhoff. Molecules with dependable thermochemical data (ΔH) were chosen for the conversion of sublimation, melting, and evaporation heats. The error of the approximation calculus was below 2-4 kcal. For 10 halides of the main group, the deviation ε of the calculated values U_o from the thermochemical values $U_{o\ therm}$ was 3 on an average, and 7% maximum, the degree of ionization of the bond calculated according to Gordi dropping below 65-70%, except for BeJ_2.

A comparison with thallium halides (degree of ionization = 70%, ε = 4%) suggests, in spite of contrary spectrum interpretations by Western researchers, that bonding ionization prevails up to about 70% and, therefore calculation by the ion model is permissible. The deviations ε are explained as follows: (1) The interatomic distances are measured by electron diffraction at high temperatures. Conversion to $0^{\circ}K$ gives smaller and, therefore, more accurate values. (2) It is possible that because of polarization of the gaseous phase, as is the case with alkali halides, also here the real distances measured radiospectroscopically are smaller than those measured by electron diffraction. (3) Influence exerted by the degree of the covalence of the binding. It should be expected in Be

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compounds in particular. Here, however, the ϵ-values are small, in $BeCl_2$ and $BeBr_2$ even positive. A. Unsöld had already shown that anionic polarization decreases at interatomic distances of nearly 1 A. If values of normal polarizations are used, one obtains good results and a positive deviation for $BeCl_2$ at r_o = 1.75 A and strong Cl^- polarization. The most important components of U_o are Coulombian and polarization interactions as well as quantum-mechanical repulsion. Polarization is between 7% (BaF_2) and 36% (BeJ_2) of the total electrostatic interaction. It increases with decreasing electronegativity difference and is related with many phenomena of covalent binding. Since polarization effect and quantum-mechanical repulsion are nearly equal in chlorides, the simple Coulomb formula $U_o = 3.5\ e^2/r_o$ gives good results. In the subgroup, only the values for $ZnCl_2$ and $CdCl_2$ correspond to the calculated quantities. Considerable deviations (10-20%) are due to mainly covalent binding. This is confirmed by the low equivalent electrical conductivities of the

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S/153/61/004/001/002/009
B110/B203

Bond energy of halogen compounds ...

melts ($HgCl_2$:$BeCl_2$ = 1 : 140). In the case of Zn^{2+}, Cd^{2+}, and Hg^{2+} with 18 electrons, the polarization fraction of the bond energy is larger than indicated in the formula derived. In metal halides with electronegativity below 1.3-1.5 ions, interactions take place, and calculation of energy is possible by the ion model. There are 1 table and 21 references: 10 Soviet-bloc and 11 non-Soviet-bloc. The two references to English-language publications read as follows: R. G. Pearson: J. Chem. Phys., 30, 1537 (1959). A. Büchler, W. Klemperer, J. Chem. Phys., 29, 121 (1958).

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut. Kafedra fizicheskoy i kolloidnoy khimii (Ivanovo Institute of Chemical Technology, Department of Physical and Colloid Chemistry)

SUBMITTED: January 19, 1959

Card 6/8

KRASNOV, K.S.; MAKSIMOV, A.I.

Use of an ionic model for calculating molecular vibrations of alkaline earth metal halides. Zhur.strukt.khim. 3 no.6:703-706 '62. (MIRA 15:12)

1. Ivanovskiy khimiko-tekhnologicheskiy institut.
(Alkaline earth halides) (Molecules--Models)

KRASNOV, K.S.; KASHIRINA, F.D.

Effect os structural factors on the thermodynamic characteristics of basic dye salts. Part 2: Extraction with isoamyl alcohol. Radiokhimiia 4 no.6:638-646 '62. (MIRA 16:1)
(Dyes and dyeing) (Isopentyl alcohol)

L 11142-63 EWT(1)/EWP(q)/EWT(m)/BDS--AFFTC/ASD--JD/JW
ACCESSION NR: AP3000481 S/0153/63/006/001/0167/0170

AUTHOR: Krasnov, K. S.; Svettsov, V. I.

TITLE: Thermodynamic functions of gaseous halides of the alkali earth metals

SOURCE: Izv. VUZ: Khimiya i khim. tekhnologiya, v. 6, no. 1, 1963, 167-170

TOPIC TAGS: thermodynamic functions, entropy, enthalpy function, free energy functions, specific heat, vibrational frequencies, molecular force constants, Be halides, Mg halides, Ca halides, Sr halides, Ba halides

ABSTRACT: The thermodynamic functions of gaseous alkaline earth halides have not been computed up to the present time because of lack of data on molecular vibrational frequencies. Knowledge of the thermodynamic functions would enable certain calculations to be made in the fields of sublimation and hydration of the halides. The force constants for transverse vibrations, 2k(Delta)/ℓ squared, calculated by the authors according to Pearson's formula, and the frequencies of transverse vibrations, Nu sub 2, calculated to within 50% accuracy according to the valence force-field model, are shown in Table 1 of enclosure 1; included in the table are the longitudinal vibrations, Nu sub 1, and Nu sub 2, as calculated to 3% accuracy by K. S. Krasnov, A. I. Maksimov (Zh. strukturnoy khimii, 3, 707, 1962). Using

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this information the entropy at 298K, S sup 0, the enthalpy function (H sup 0 - H sup 0 sub 0)/T, and the free energy function -(F sup 0 - H sup 0 sub 0)/T (where F is the Gibbs free energy) at 298, 400, 500, 1000, 1500, 2000, 2500K, were computed for the fluorides, chlorides, bromides, and iodides of Be, Mg, Ca, Sr, and Ba, using the model of a rigid rotatorharmonic oscillator. Vibrational frequencies were also used for computing the specific heat of these substances at 298, 500, 700, 1000 1500, 2000, and 2500K. Inaccuracies in the thermodynamic functions introduced by the large uncertainty in Nu sub 2 were found to be insignificant. Orig. art. has: 3 tables.

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