MILYAYEV, Arkadiy Pavlovich; BABKINA, N.G., red.; ZUBRILINA, Z.P., tekhn.red.

[Manual on sericulture] Spravochnik po shelkovodstvu. Moskva, Gos.izd-vo sel'khoz.lit-ry, 1960. 345 p.

(MIRA 14:3)

(Sericulture)

MARKUSHIN, A.P., prof., doktor sel'khoz. nauk, zasl. deyatel' nauki RSFSR; BABKINA, N.G., red.

[Effective life of farm animals] Sroki ispol'zovaniia sel'skokhoziaistvennykh zhivotnykh. Moskva, Izd-vo "Kolos," 1964. 182 p. (MIRA 17:7)

TOMME, M.F., prof., doktor sel'khoz. nauk; BABKINA, N.G., red.

[Feeds of the U.S.S.R.; composition and food value] Korma SSSR; sostav i pitatel'nost'. Izd.4. Moskva, Izd-vo "Kolos," 1964. 446 p. (MIRA 17:8)

1. Chlen-korrespondent Vsesoyuznoy akademii sel'skokhozyaystvennykh nauk im. V.I.Lenina (for Tomme).

RODIONOV, V.V.; SHABARSHOV, I.A.; BABKINA, N.G., red.

[Multistory beehives and methods for beekeeping] Mnogokorpusnyi ulei i metody pchelovozhdeniia. Izd.2., perer. i dop. Moskva, Kolos, 1965. 157 p.
(MIRA 18:5)

PADUCHEVA, Aleksandra Leonidovna; BOYKO, Dmitriy Fedorovich; BABKINA, N.G., red.

[Hormonal methods for increasing the fertility of farm animals] Gormonal'nye metody povysheniia plodovitosti sel'skokhoziaistvennykh zhivotnykh. Moskva, Kolos, 1965. 302 p. (MIRA 18:4)

POLYAKOV, I.I., prof., doktor biol. nauk; BARANOVA, K.V., dots., kand sel'khoz. nauk; KAZANTSEV, F.M., dots., kand. sel'khoz. nauk; ORLOV, A.V., dots., kand. sel'khoz. nauk; BAEKINA, N.G., red.

[Practical course in animal husbandry] Praktikum po zhivotnovodstvu. Moskva, Kolos, 1965. 222 p. (MIRA 18:7)

MASLOV, V.A., inzh.; GLADYSHEVA, L.F., inzh.; BABKINA, N.S., inzh.

Using resistance welding of sprayers and medical autoclaves instead of gas and automatic welding under flux. Svar. proizv. no.9:34 S '64. (MIRA 17:12)

1. Kustovoy otdel svarki Donetskogo soveta narodnogo khozyaystva.

BABKINA, N.T.

VASIL'YEV, Nikolay Aleksandrovich; BABKINA, N.T., red.; GOR'KOVA, Z.D., tekhn.red.

[Raising sheep on state farms] Ovtsevodstvo v sovkhozakh. Moskva, Gos. izd-vo sel'khoz. lit-ry, 1957. 91 p. (MIRA 11:5)
(Sheep breeding)

BABKINA, O. I.

"Relief Forming Activity of Snow on the Example of Khibin, the Territory Near Moscow and the Western Caucasus." Cand Geog Sci, Moscow City Pedagogical Inst imeni V. P. Potemkin, Moscow, 1955. (KL, No 14, Apr 55).

SO: Sum. No. 704, 2 Nov 55 - Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (14).

BABKINA, V.A., fel'dsheritsa.

Feldsher IAkov Grigor'evich Brusko. Fel'd.i akush. no.1:58-59 Ja '54. (MLRA 7:1)

(Brusko, IAkov Grigor'evich, 1892-)

L 15882-66 EWP(e)/EWT(m) WH

ACC NR: AP6002807 SOURCE CODE: UR/0237/60/000/011/0027/0031

AUTHOR: Demkina, L. I.; Selezneva, A. M.; Shchavelev, O. S.; Babkina, V. A. 4/5 B

ORG: none 16,44

TITLE: The dependence of thermooptical properties of silicate glasses on their composition

SOURCE: Optiko-mekhanicheskaya promyshlennost', no. 11, 1960, 27-31

TOPIC TAGS: silicate glass, temperature dependence, optic glass, glass property

ABSTRACT: The present paper gives the results of an experimental study of the average increase in the value of the absolute index of refraction in glasses caused by increases in temperature at 643, 508, and 480 mμ wavelengths. The four base glasses used consisted of 1) SiO_2-80, K_2O-4, Na_2O_3-16, and As_2O_3-0.1; 2) SiO_2-80, K_2O-8, Na_2O-12 and As_2O_3-0.1; 3) SiO_2-75, PbO-19, K_2O-6, and As_2O_3-0.2; and 4) SiO_2-75, B_2O_3-3, As_2O_3-0.2, BaO-7, ZnO-4, K_2O-8, and Na_2O-3. They contained various amounts of SiO_2, TiO_2, B_2O_3, Al_2O_3, As_2O_3, Sb_2O_3, PbO, BaO, ZnO, CaO, K_2O, and Na_2O admixtures. Experimental data orga-

Card 1/2

2

L 15882-66

ACC NR: AP6002807 0

nized in the form of comprehensive tables permitted empirical determinations of the constants entering into theoretical expressions established by L. I. Demkina (Issledovaniye zavisimosti svoystv stekol ot ikh sostava, Oborongiz, 1959) describing the temperature dependence of various optical indexes. Orig. art. has: 7 formulas, 2 figures, and 5 tables.

SUB CODE: 11, 20 / SUBM DATE: 12Aug60 / ORIG REF: 006 / OTH REF: 008

Card 2/2

ARKHIPOVA, T.N.; KRYUKOVA, A.S.; BABKINA, V.G.

"Glikasin" sizing agent. Tekst.prom. 20 no.4:54-55 Ap '60.
(MIRA 13:8)

(Melamine) (Sizing (Textile))

FENIKSOVA, R.V.; PETROVA, I.S.; VINTSYUNAYTE, M.M.; BABKINA, V.G.; NESTEROVA, G.A.

Use of proteolytic enzymes of Actinomyces fradiae for removal of wool from raw hides. Prikl. biokhim. i mikrobiol. 1 no.3:257-262 My-Je '65. (MIRA 18:7)

1. Institut biokhimii AN SSSR imeni Bakha.

BABKINA, V.G.; ZURABYAN, K.M.; OSTROVSKIY, V.S.; RABINOVICH, Ya.M.; BELOTSERKOVSKIY, M.Ye.

Liming of pig skins with a reduced quantity of sodium sulfide. Kozh.-obuv.prom. 5 no.2:21-22 F '63. (MIRA 16:5)
(Leather)

BABKINA, V.G.; DOKUNIKHIN, N.S.; ABRAMOVA, N.I.

Change in shades taking place in some vat dyes under the effect of moisture and temperature. Zhur. prikl. khim. 37 no.6:1328-1333 Je '64. (MIRA 18:3)

1. Nauchno-issledovatel'skiy institut organicheskikh poluproduktov i krasiteley.

NURMUKHAMETOV, R.N.; BONDAREVA, L.V.; BABKINA, V.G.; DOKUNIKHIN, N.S.; ABRAMOVA, N.I.

Study of the behavior of some vat dyes in fabrics from their fluorescence spectra. Zhur. VKHO 8 no.5:588-589 '63.
(MIRA 17:1)

1. Nauchno-issledovatel'skiy institut organicheskikh poluprovodnikov i krasiteley.

KURAMSHINA, M.G.; SHIKHOVA, N.M.; GRIGOR'YEV, I.I.; KONOKOVA, Ye.I.; BABKINA, V.L.

Immunological indexes and the biological activity of streptococci in the combined treatment of rheumatic fever. Vrach. delo no.9:20-24 S '60. (MIRA 13:9)

1. Sochinskiy nauchno-issledovatel'skiy institut kurortologii.
(ANTIGENS AND ANTIBODIES) (STREPTOCOCCUS)
(RHEUMATIC FEVER)

BABKINA, V.L.

Influence of factors at the Sochi-Matsesta Health Resort on the amount of cholesterol in the blood of patients with atherosclerosis of the cerebral blood vessels. Vrach.delo no.11:85-88 N '60. (MIRA 13:11)

1. Klinika neyrorevmatizma (zav. - prof. K.F.Nikitin) Sochinskogo instituta revmatizma.
(CHOLESTEROL)
(SOCHI--HEALTH RESORTS, WATERING PLACES, ETC.)
(ARTERIOSCLEROSIS)
(BRAIN--DISEASES)

BABKINA, V.M.

Resistance of ornamental plants to flue gas. Biul.Glav.bot. sada no.33:48-52 '59. (MIRA 12:10)

1. Botanicheskiy sad Dnepropetrovskogo gosudarstvennogo universiteta.
(Dnepropetrovsk--Plants, Effect of smoke on)

BABKINA, V.M.

Flowering decorative plants for industrial sites. Nauch. zap. Dnepr. un. 78:28-38 '62.

Selecting herbaceous decorative plants for flower gardens according to the time of flowering. (71-85)
(MIRA 16:10)

KURAMSHINA, M.G.; SHIKHOVA, N.M.; KOKOKOVA, Ye.I.; BABKINA, V.L.

Dynamics of immunological indices in rheumatic patients.
Kaz.med. zhur. 4:7-8 Jl-Ag'63 (MIRA 17:2)

1. Mikrobiologicheskaya laboratoriya (zav. - starshiy nauchnyy sotrudnik M.G.Kuramshina), klinika kardiologii (zav. - dotsent N.M.Shikhova) i klinika aktivnogo revmatizma (zav.- prof. M.M.Shikhov) Sochinskogo instituta kurortologii.

BABKINA, V.Yu.; CHUB, Ye.G.; GAPUNINA, O.V.; SKUDAR', I.K.

Laboratory model of a steaming unit for corrosion tests. Zav. lab. 30 no.1:1280-1281 '64. (MIRA 18:4)

1. Nauchno-issledovatel'skiy institut osnovnoy khimii.

BABKINA, Ye.A., inzh.

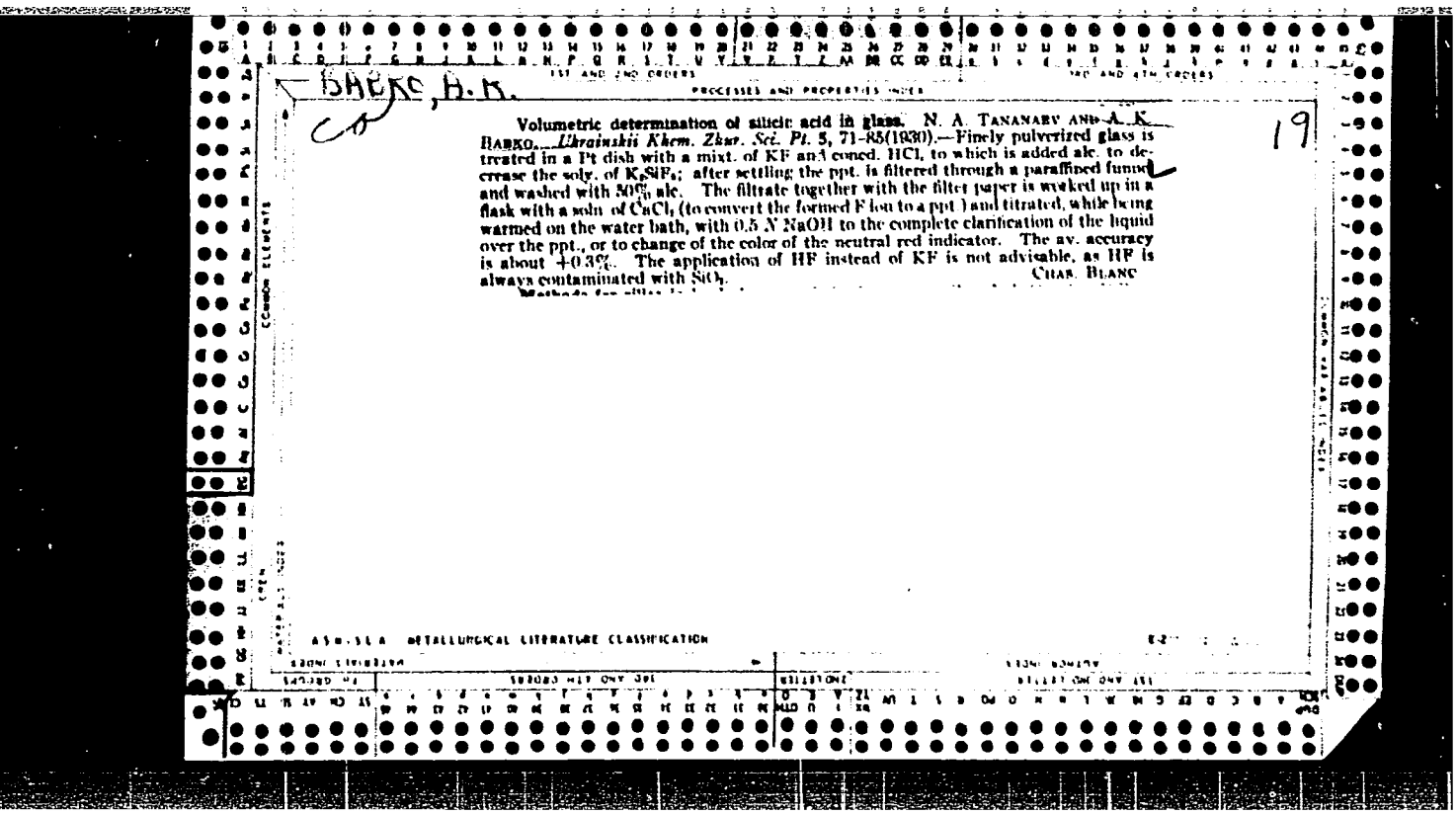
Introducing semiautomatic welding in a medium of carbon dioxide in the building of petroleum chemical enterprises in Bashkiria. Trudy BashNIIStroi no.1:122-131 '62. (MIRA 17:3)

BABKO, A.I.

Map of the natural zones of the ocean; comments on D.V.Bogdanov's article "Map of the natural zones of the ocean". Okeanologiia 2 no.3:562-563 '62. (MIRA 15:7)
(Oceanography--Charts, diagrams, etc.) (Bogdanov, D.V.)

BABKOV, Aleksey Ivanovich; KOSHECHKIN, Boris Ivanovich; ZEL'DINOVA, L.A., red.

TSunami. Leningrad, Gidrometeoizdat, 1964. 45 p.
(MIRA 17:7)

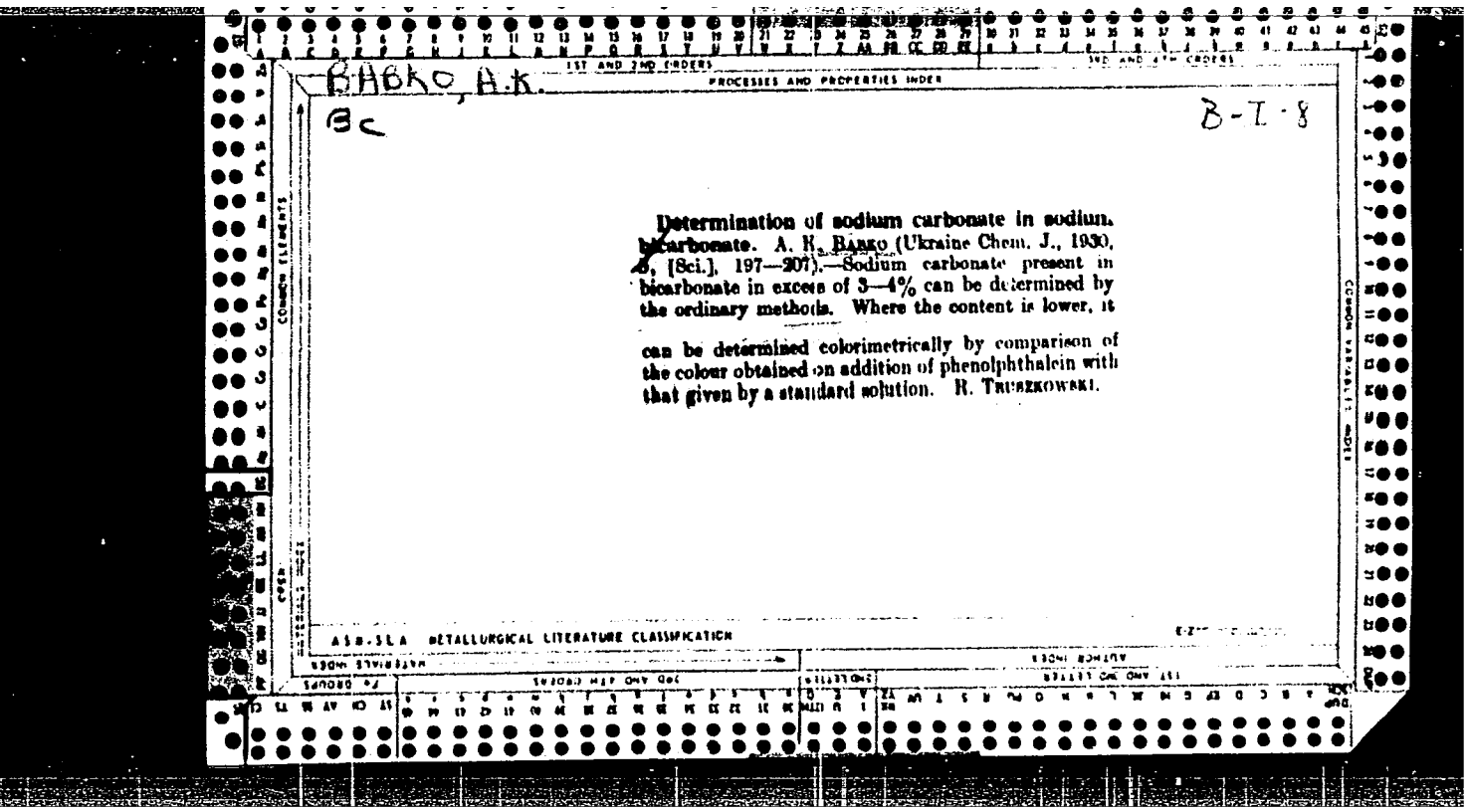


BARKO, A. K.

19

Volumetric determination of silicic acid in glass. N. A. TANANAEV AND A. K. BARKO. *Ukrainskii Khem. Zhur. Sci. Pt.* 5, 71-85(1930).—Finely pulverized glass is treated in a Pt dish with a mixt. of KF and conc. HCl, to which is added alc. to decrease the soly. of K_2SiF_6; after settling the ppt. is filtered through a paraffined funnel and washed with 50% alc. The filtrate together with the filter paper is worked up in a flask with a soln. of $CaCl_2$ (to convert the formed F ion to a ppt.) and titrated, while being warmed on the water bath, with 0.5 *N* NaOH to the complete clarification of the liquid over the ppt., or to change of the color of the neutral red indicator. The av. accuracy is about ±0.3%. The application of HF instead of KF is not advisable, as HF is always contaminated with SiO_2.

CHAS. BLANC

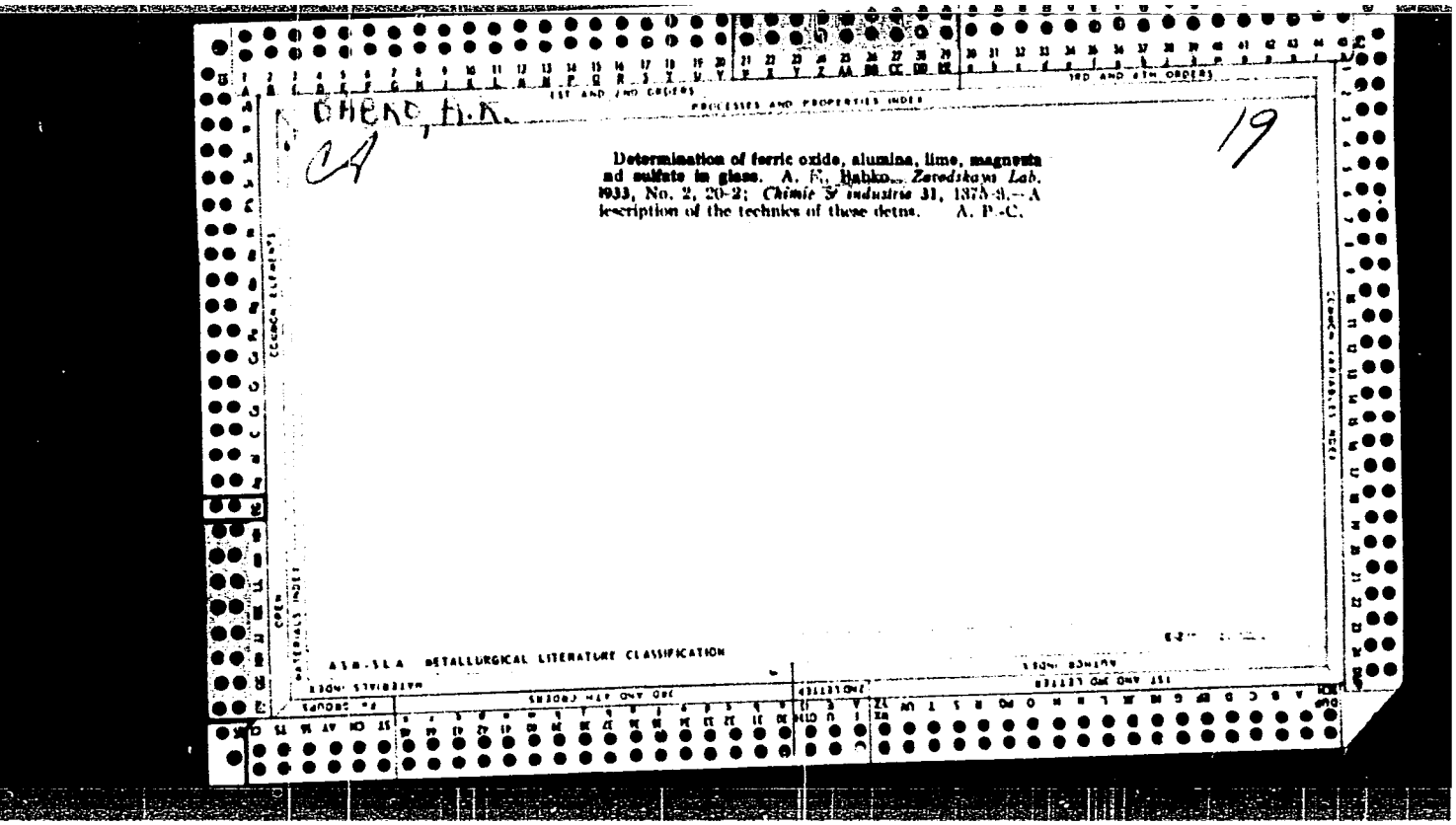


BABKO, A.K.

Bc

B-I-8

Determination of sodium carbonate in sodium bicarbonate. A. K. Babko (Ukraine Chem. J., 1930, 5, [Sci.], 197—207).—Sodium carbonate present in bicarbonate in excess of 3—4% can be determined by the ordinary methods. Where the content is lower, it can be determined colorimetrically by comparison of the colour obtained on addition of phenolphthalein with that given by a standard solution. R. Truszkowski.



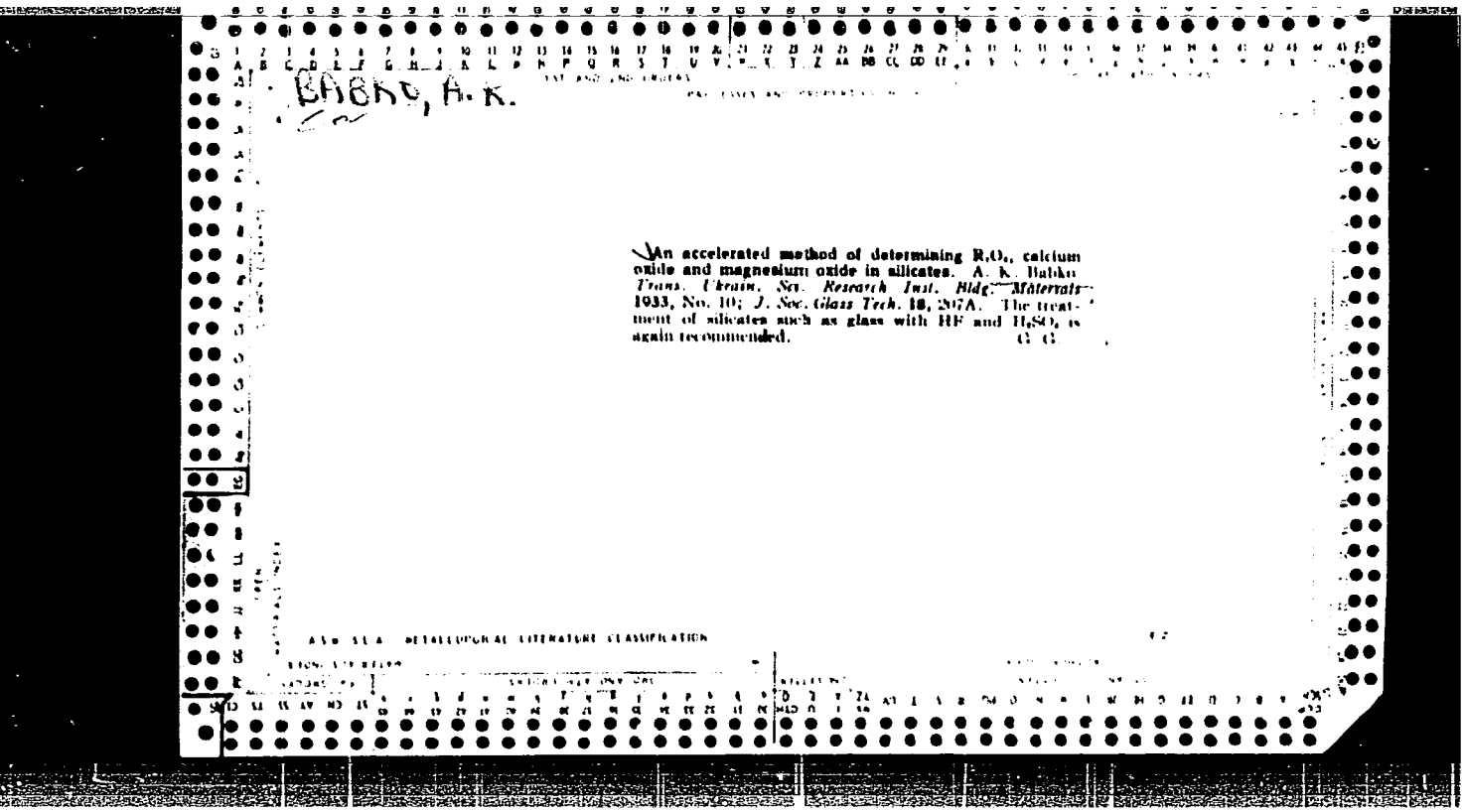
CHERD, H.K.

CA

19

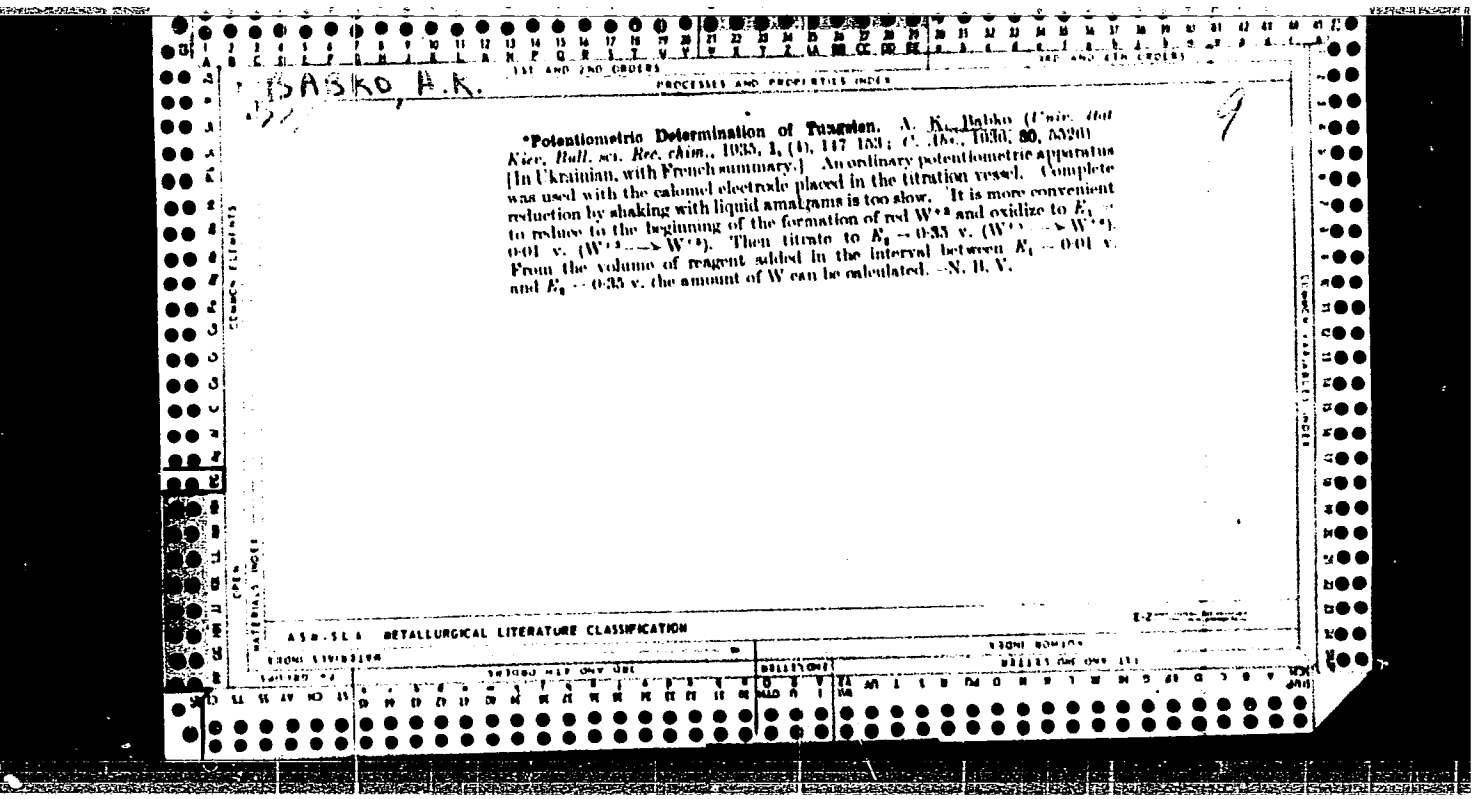
Determination of ferric oxide, alumina, lime, magnesia and sulfate in glass. A. K. Babko, *Zavodskaya Lab.* 1933, No. 2, 20-2; *Chimie & industrie* 31, 1373-8.—A description of the technics of these detns. A. P.-C.

A58-51A METALLURGICAL LITERATURE CLASSIFICATION



BABKO, A. K.

An accelerated method of determining R_2O_3, calcium oxide and magnesium oxide in silicates. A. K. Babko. *Trans. Ukrain. Sci. Research Inst. Bldg. Materials* 1933, No. 10; *J. Soc. Glass Tech.* **18**, 207A. The treatment of silicates such as glass with HF and H_2SO_4 is again recommended.

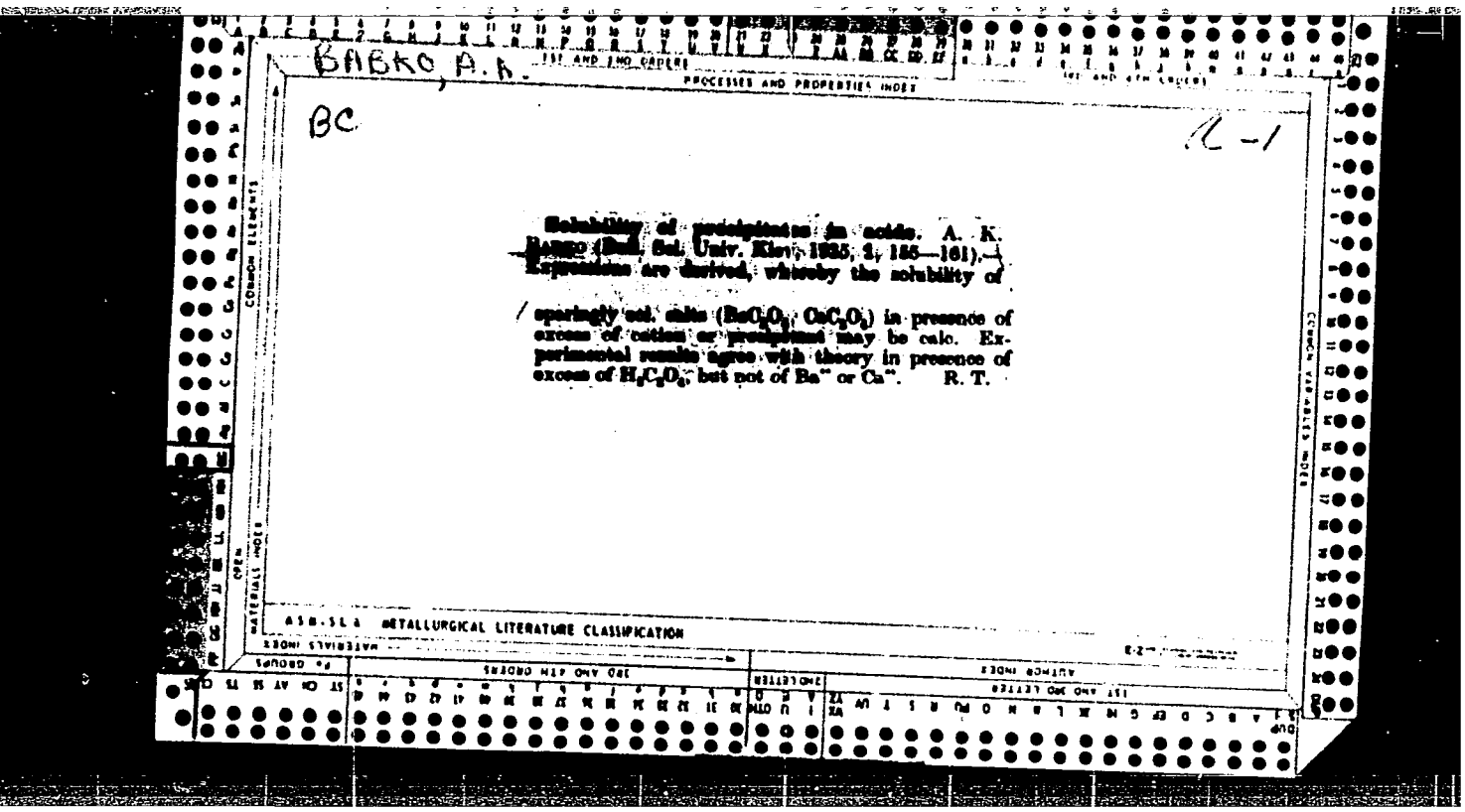


BASKO, A.K.

PROCESSES AND PROPERTIES INDEX

*Potentiometric Determination of Tungsten. A. K. Babko (Chair. Gen. Kiev, Bull. sci. Rec. chim., 1935, 1, (4), 147–153; C. Ab., 1936, 30, 5520) [In Ukrainian, with French summary.] An ordinary potentiometric apparatus was used with the calomel electrode placed in the titration vessel. Complete reduction by shaking with liquid amalgams is too slow. It is more convenient to reduce to the beginning of the formation of red W^{+5} and oxidize to E_1 = 0·01 v. ($W^{+5} \longrightarrow W^{+6}$). Then titrate to E_2 = 0·35 v. ($W^{+5} \longrightarrow W^{+6}$). From the volume of reagent added in the interval between E_1 = 0·01 v. and E_2 = 0·35 v. the amount of W can be calculated. —N. H. V.

A5#.5L4 METALLURGICAL LITERATURE CLASSIFICATION



BABKO, A. K.

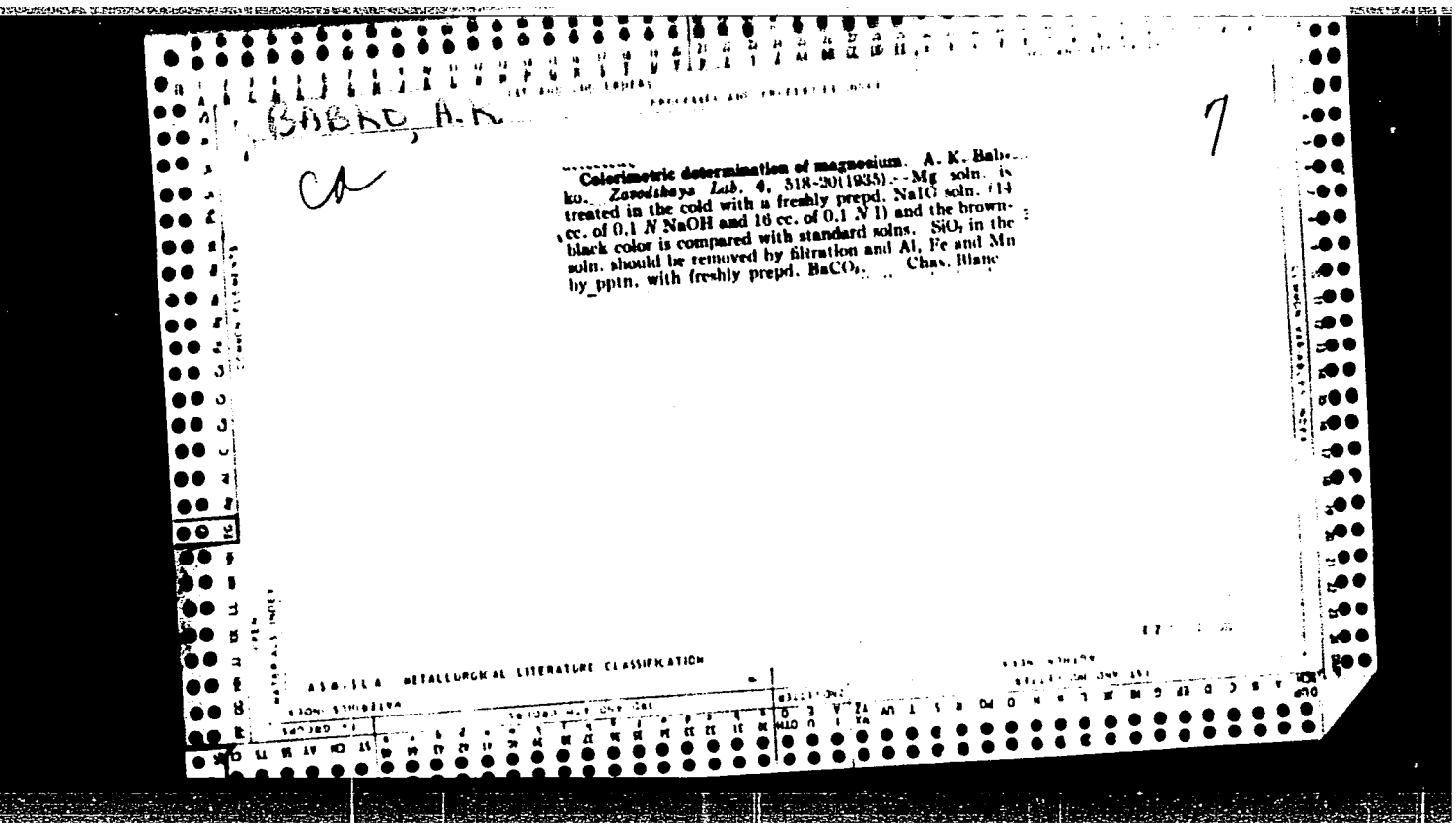
BC

IL-1

Solubility of precipitates in acids. A. K. Babko (Bull. Sci. Univ. Kiev, 1955, 1, 155—161). Expressions are derived, whereby the solubility of sparingly sol. salts (BaC_2O_4, CaC_2O_4) in presence of excess of cation or precipitant may be calc. Experimental results agree with theory in presence of excess of $H_2C_2O_4$, but not of Ba^{++} or Ca^{++}. R. T.

PROCESSES AND PROPERTIES INDEX

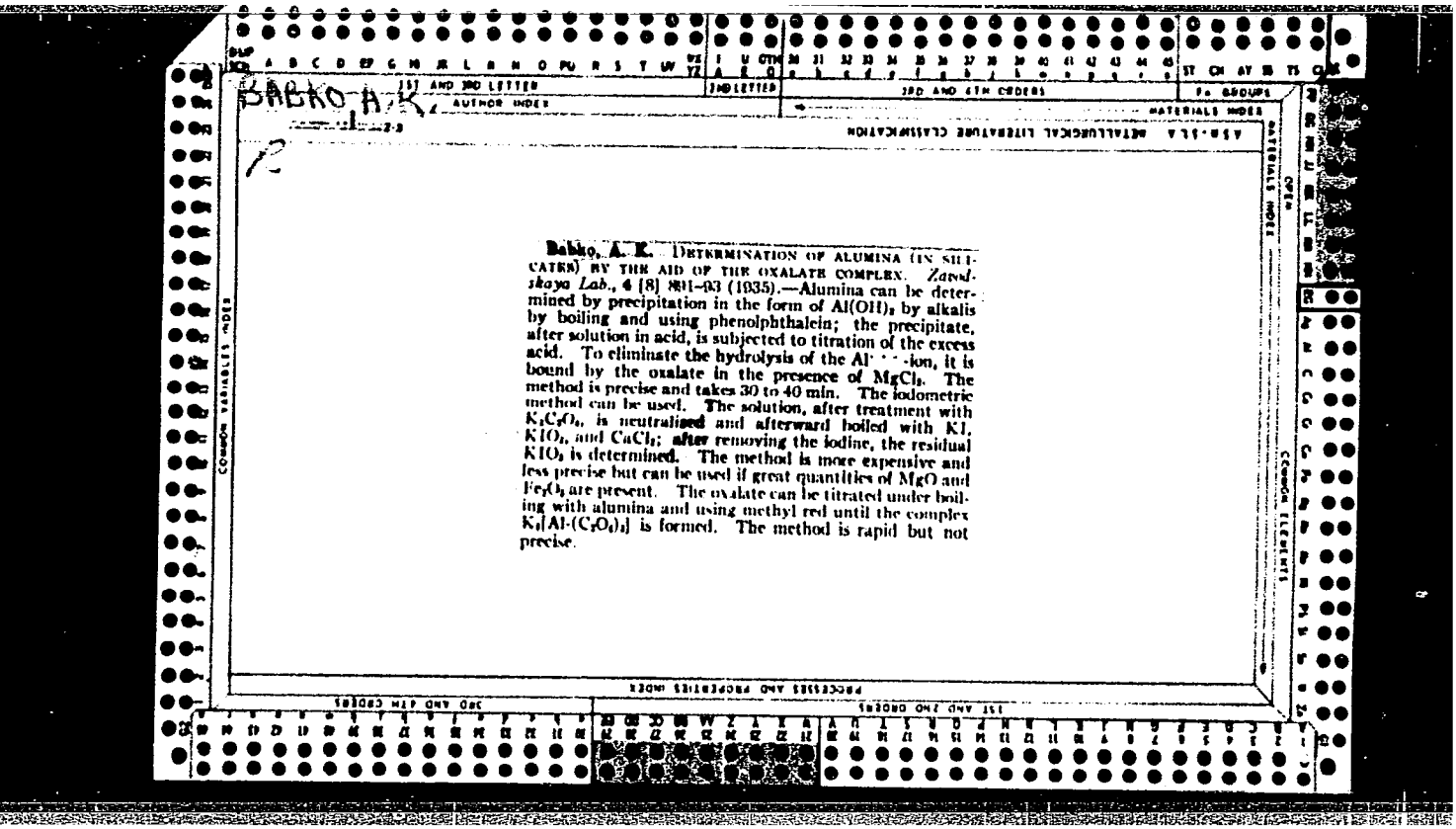
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION


BABKO, A.K.

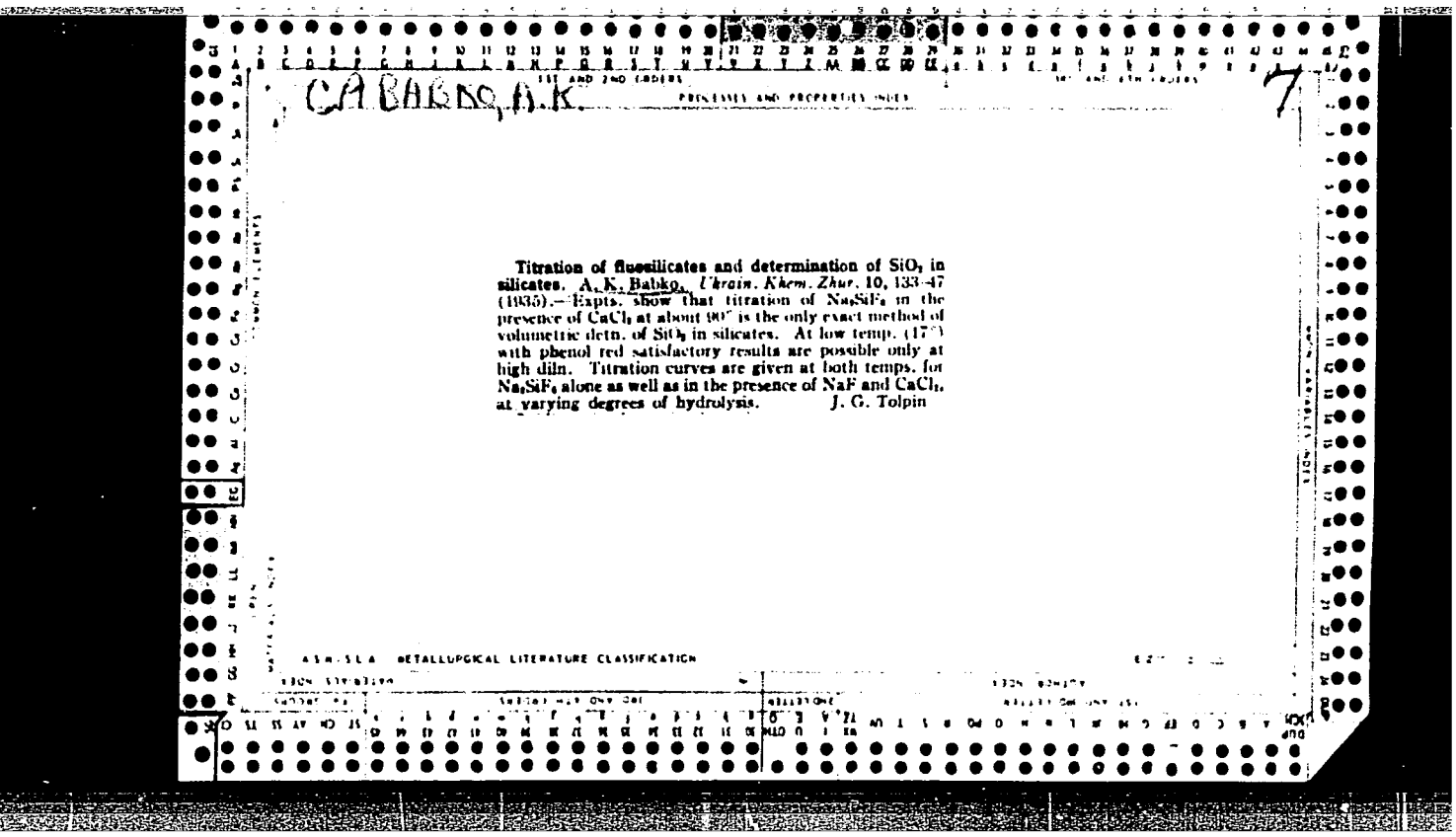
7

Colorimetric determination of magnesium. A. K. Babko. *Zavodskaya Lab.* 4, 318-20(1935).--Mg soln. is treated in the cold with a freshly prepd. NaIO soln. (14 cc. of 0.1 *N* NaOH and 16 cc. of 0.1 *N* I) and the brown-black color is compared with standard solns. SiO_2 in the soln. should be removed by filtration and Al, Fe and Mn by pptn. with freshly prepd. $BaCO_3$. Chas. Blanc

A56-11A METALLURGICAL LITERATURE CLASSIFICATION



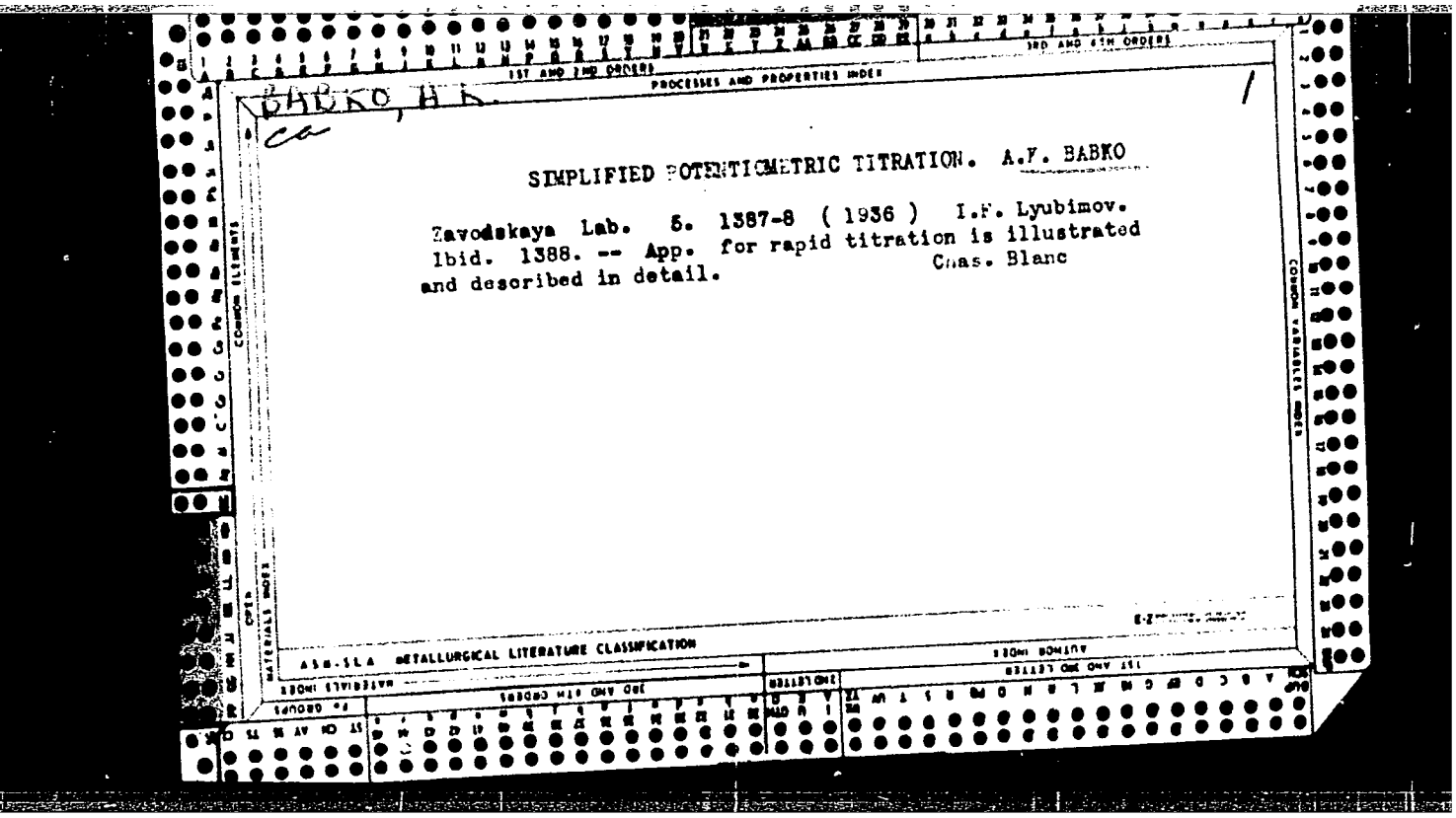
Babko, A. K. DETERMINATION OF ALUMINA (IN SILICATES) BY THE AID OF THE OXALATE COMPLEX. *Zavodskaya Lab.*, 4 [8] 801–03 (1935).—Alumina can be determined by precipitation in the form of $Al(OH)_3$ by alkalis by boiling and using phenolphthalein; the precipitate, after solution in acid, is subjected to titration of the excess acid. To eliminate the hydrolysis of the $Al^{\cdots}$-ion, it is bound by the oxalate in the presence of $MgCl_2$. The method is precise and takes 30 to 40 min. The iodometric method can be used. The solution, after treatment with $K_2C_2O_4$, is neutralized and afterward boiled with KI, KIO_3, and $CaCl_2$; after removing the iodine, the residual KIO_3 is determined. The method is more expensive and less precise but can be used if great quantities of MgO and Fe_2O_3 are present. The oxalate can be titrated under boiling with alumina and using methyl red until the complex $K_3[Al\text{-}(C_2O_4)_3]$ is formed. The method is rapid but not precise.



CA BABKO, A.K.

7

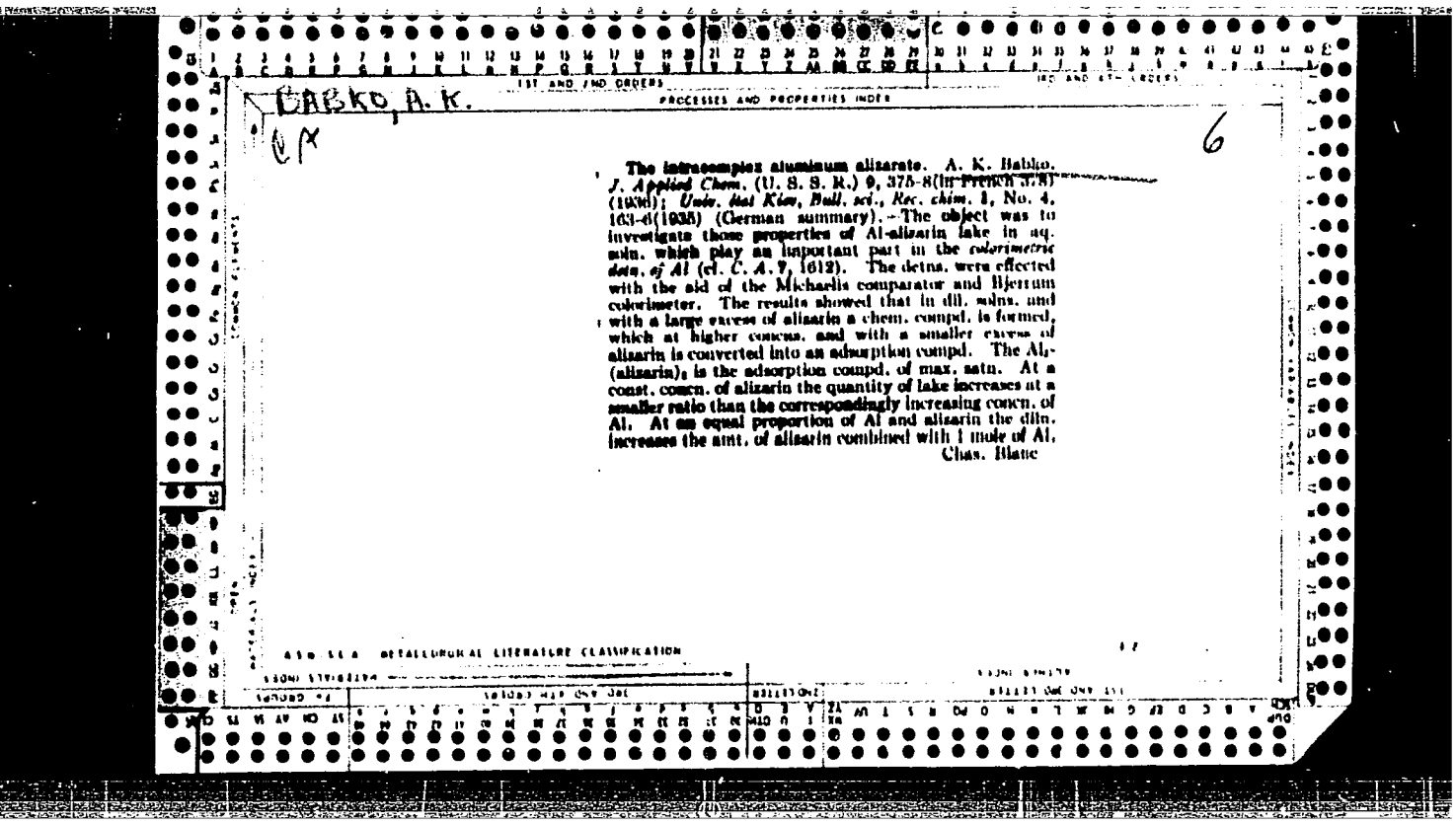
Titration of fluosilicates and determination of SiO_2 in silicates. A. K. Babko. *Ukrain. Khem. Zhur.* 10, 133-47 (1935).—Expts. show that titration of Na_2SiF_6 in the presence of $CaCl_2$ at about 90° is the only exact method of volumetric detn. of SiO_2 in silicates. At low temp. (17°) with phenol red satisfactory results are possible only at high dilns. Titration curves are given at both temps. for Na_2SiF_6 alone as well as in the presence of NaF and $CaCl_2$ at varying degrees of hydrolysis. J. G. Tolpin



BABKO, A. V.
Ca

SIMPLIFIED POTENTIOMETRIC TITRATION. A.V. BABKO

Zavodskaya Lab. 5. 1387-8 (1936) I.F. Lyubimov.
Ibid. 1388. -- App. for rapid titration is illustrated
and described in detail. Chas. Blanc

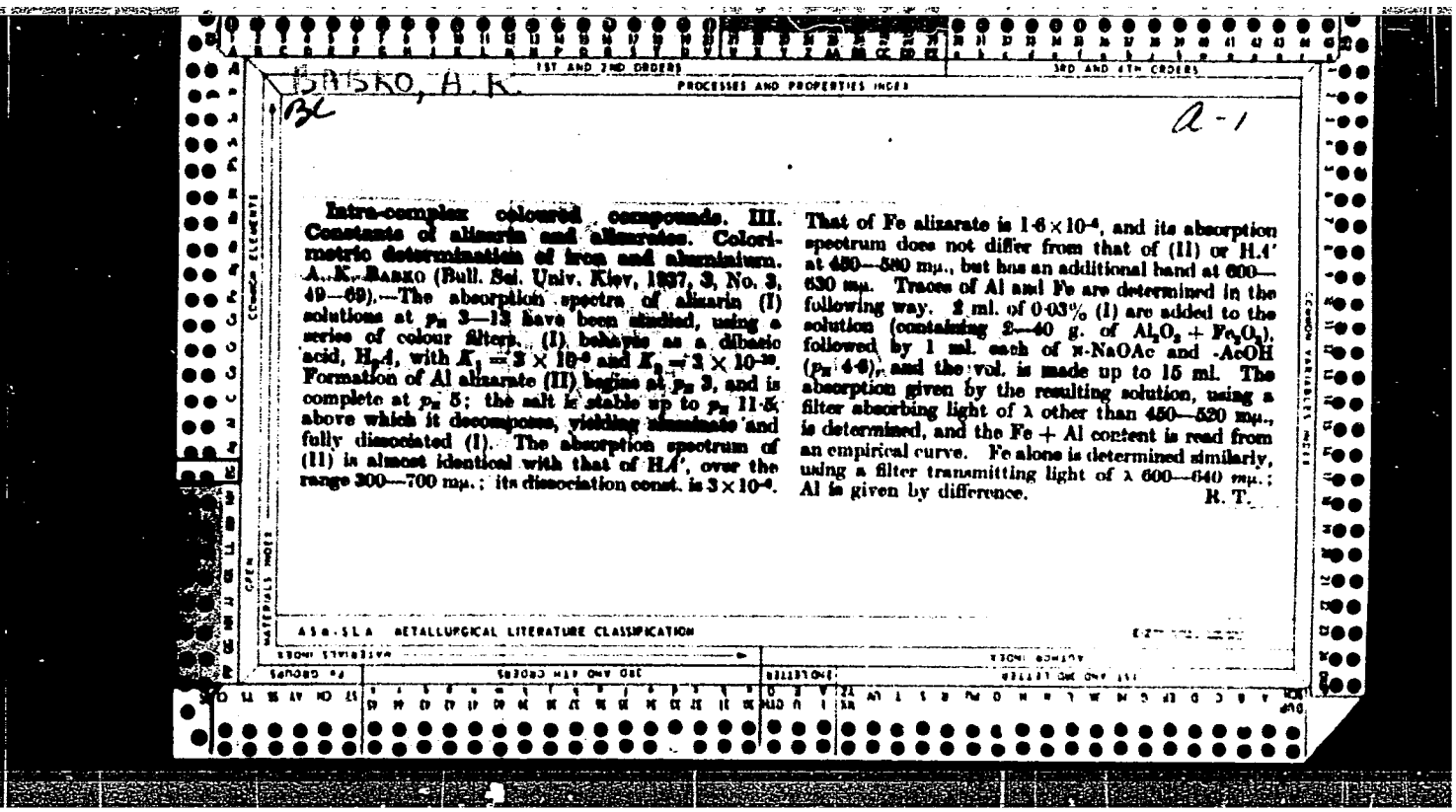


BABKO, A. K.

6

The intracomplex aluminum alizarate. A. K. Babko. *J. Applied Chem.* (U. S. S. R.) 9, 375-8(in French 378) (1936); *Univ. Inst Kiew, Bull. sci., Rec. chim.* 1, No. 4, 163-6(1935) (German summary).—The object was to investigate those properties of Al-alizarin lake in aq. soln. which play an important part in the *colorimetric detn. of Al* (cf. *C. A.* 7, 1612). The detns. were effected with the aid of the Michaelis comparator and Bjerrum colorimeter. The results showed that in dil. solns. and with a large excess of alizarin a chem. compd. is formed, which at higher concns. and with a smaller excess of alizarin is converted into an adsorption compd. The Al_2(alizarin)$_3$ is the adsorption compd. of max. satn. At a const. concn. of alizarin the quantity of lake increases at a smaller ratio than the correspondingly increasing concn. of Al. At an equal proportion of Al and alizarin the dilu. increases the amt. of alizarin combined with 1 mole of Al.

Chas. Blanc



1ST AND 2ND ORDERS

3RD AND 4TH ORDERS

PROCESSES AND PROPERTIES INDEX

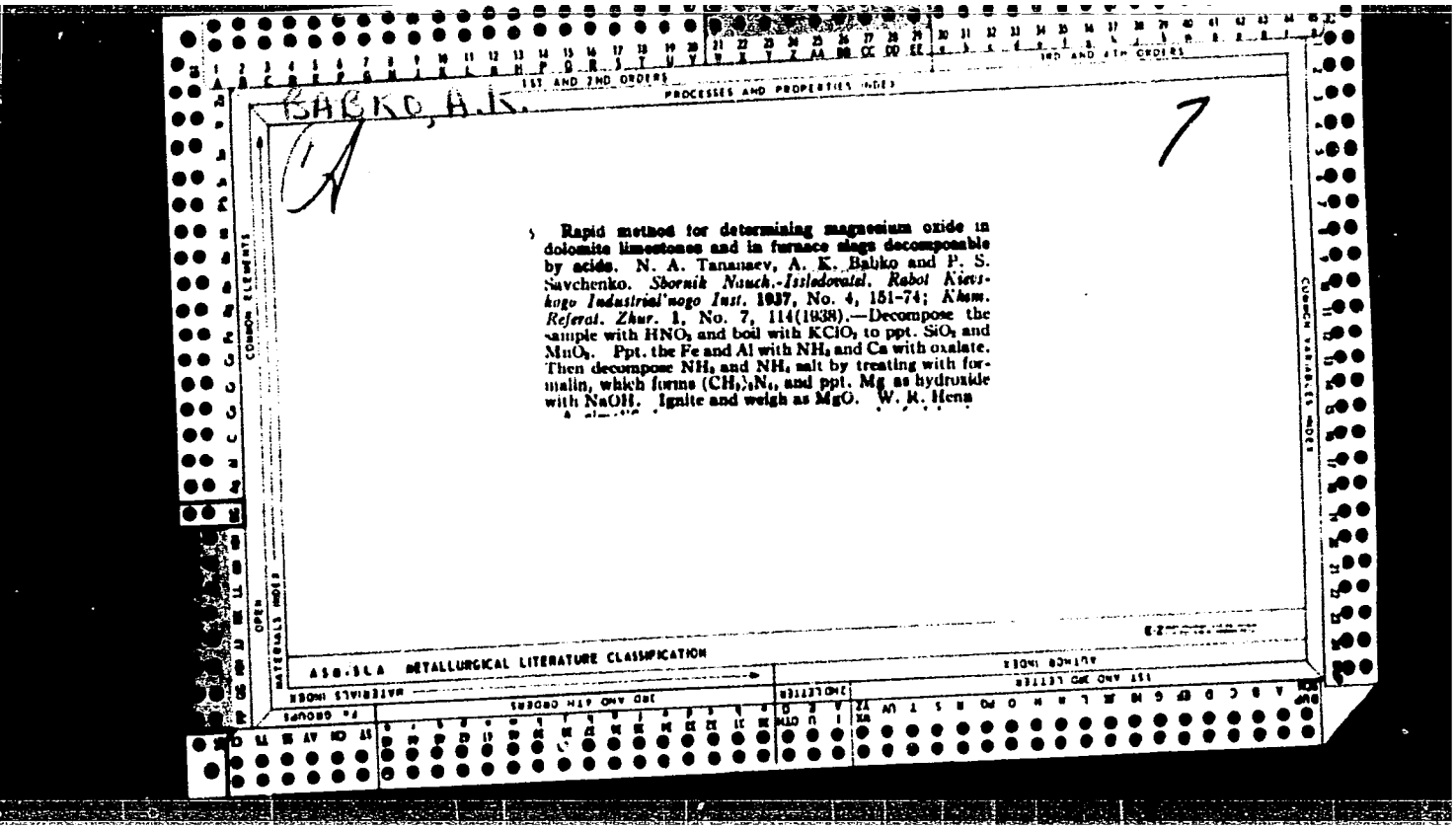
BRSKO, A. K.

B2

a-1

Intra-complex coloured compounds. III. Constants of alizarin and alizarates. Colorimetric determination of iron and aluminium. A. K. Brsko (Bull. Sci. Univ. Kiev, 1937, 3, No. 3, 49—69).—The absorption spectra of alizarin (I) solutions at p_H 3—13 have been studied, using a series of colour filters. (I) behaves as a dibasic acid, H_2A, with $K_1 = 3 \times 10^{-8}$ and $K_2 = 2 \times 10^{-12}$. Formation of Al alizarate (II) begins at p_H 3, and is complete at p_H 5; the salt is stable up to p_H 11·5, above which it decomposes, yielding aluminate and fully dissociated (I). The absorption spectrum of (II) is almost identical with that of HA', over the range 300—700 mμ.; its dissociation const. is 3×10^{-6}. That of Fe alizarate is $1·6 \times 10^{-4}$, and its absorption spectrum does not differ from that of (II) or HA' at 480—580 mμ., but has an additional band at 600—630 mμ. Traces of Al and Fe are determined in the following way. 2 ml. of 0·03% (I) are added to the solution (containing 2—40 g. of $Al_2O_3 + Fe_2O_3$), followed by 1 ml. each of N-NaOAc and -AcOH (p_H 4·6), and the vol. is made up to 15 ml. The absorption given by the resulting solution, using a filter absorbing light of λ other than 480—520 mμ., is determined, and the Fe + Al content is read from an empirical curve. Fe alone is determined similarly, using a filter transmitting light of λ 600—640 mμ.; Al is given by difference. R. T.

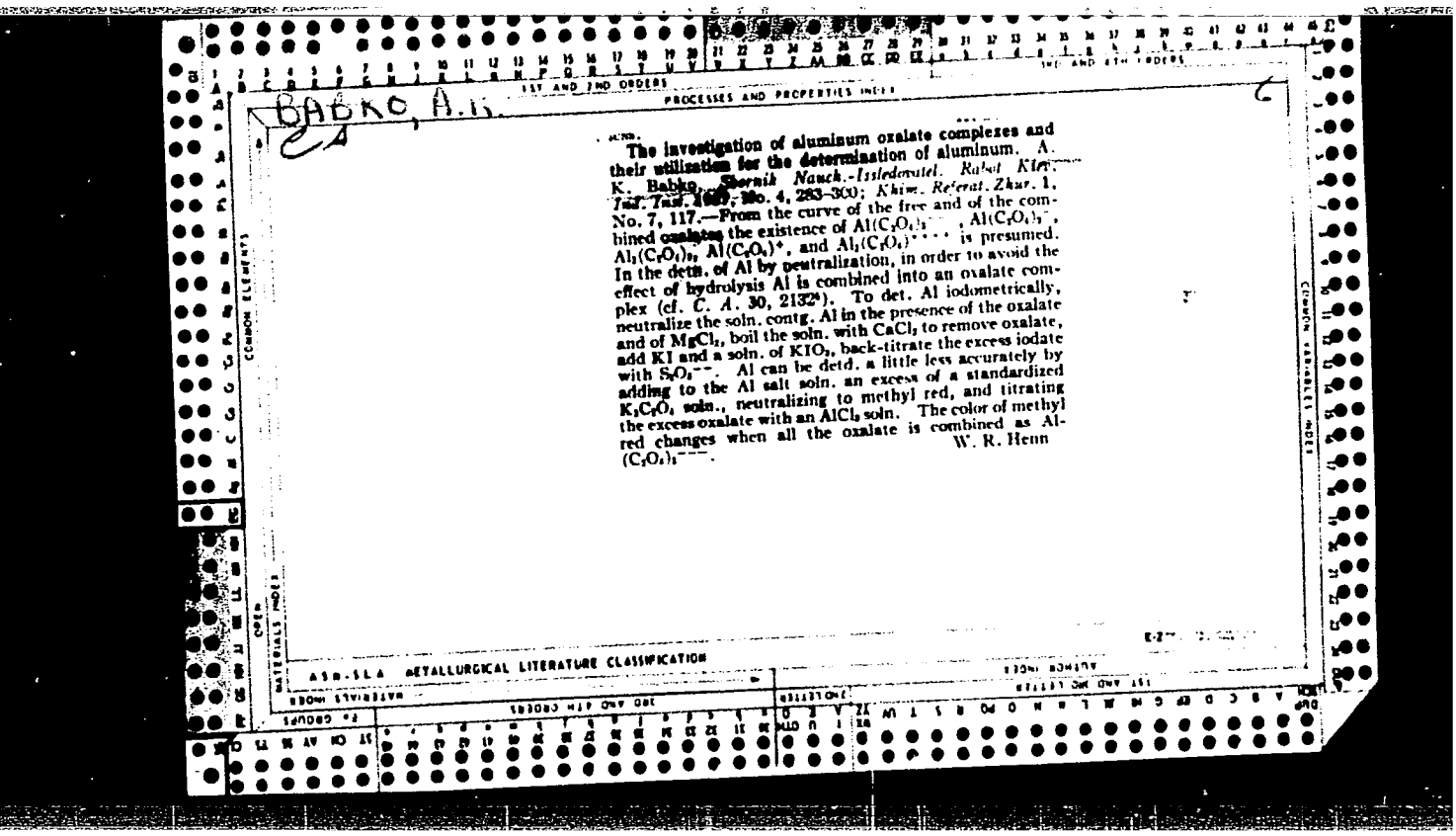
ASLIB METALLURGICAL LITERATURE CLASSIFICATION



BAEKO, A.K.

A 7

Rapid method for determining magnesium oxide in dolomite limestones and in furnace slags decomposable by acids. N. A. Tananaev, A. K. Babko and P. S. Savchenko. *Sbornik Nauch.-Issledovatel. Rabot Kievskogo Industrial'nogo Inst.* 1937, No. 4, 151-74; *Khim. Referat. Zhur.* 1, No. 7, 114(1938).—Decompose the sample with HNO_3 and boil with $KClO_3$ to ppt. SiO_2 and MnO_2. Ppt. the Fe and Al with NH_4 and Ca with oxalate. Then decompose NH_4 and NH_4 salt by treating with formalin, which forms $(CH_2)_6N_4$, and ppt. Mg as hydroxide with NaOH. Ignite and weigh as MgO. W. M. Hess



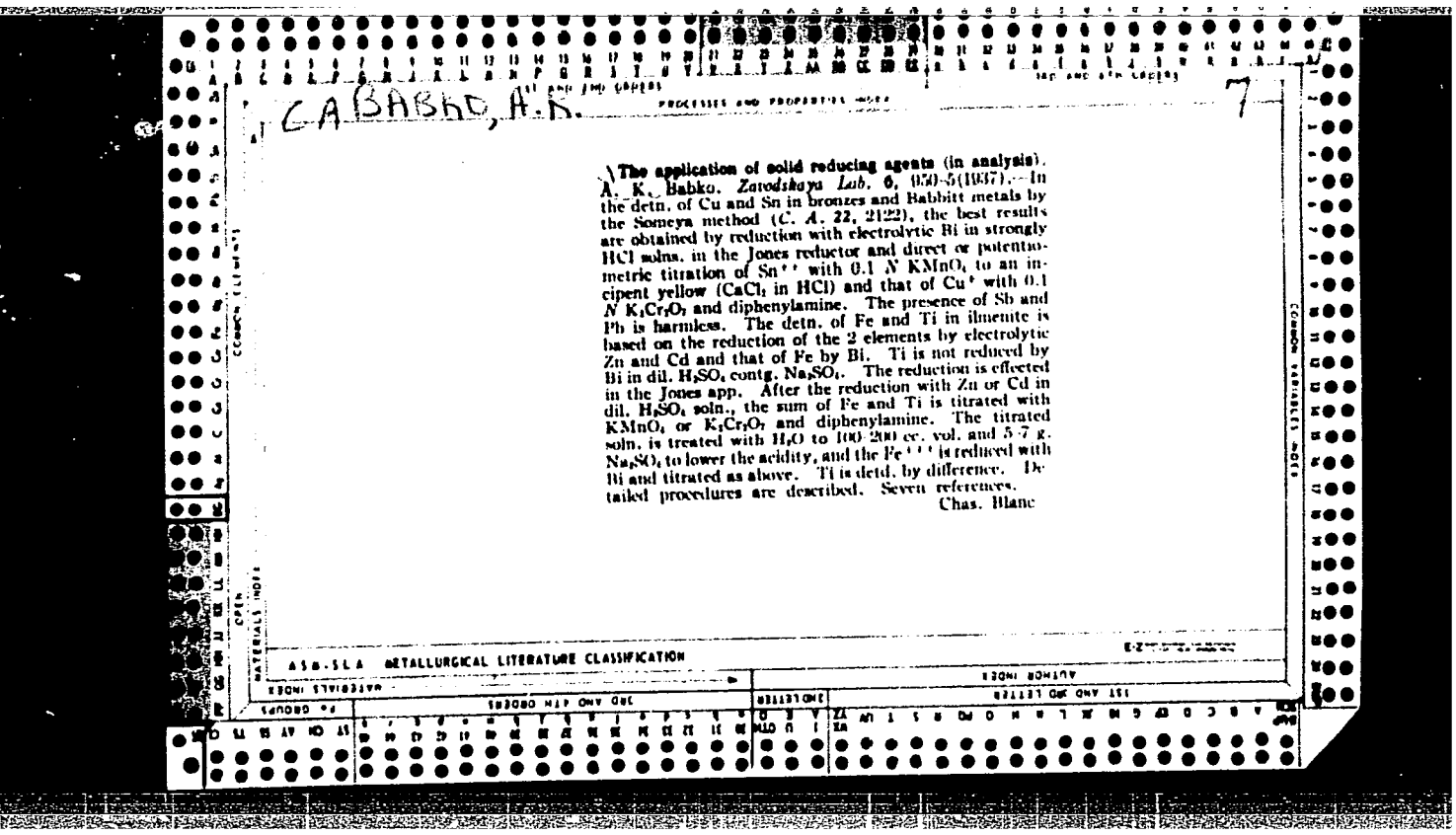
BABKO, A.K.

PROCESSES AND PROPERTIES INDEX

The investigation of aluminum oxalate complexes and their utilization for the determination of aluminum. A. K. Babko. *Sbornik Nauch.-Issledovatel. Rabot Kiev. Tsel. Tsav.* 1939, No. 4, 283–300; *Khim. Referat. Zhur.* 1, No. 7, 117.—From the curve of the free and of the combined oxalates the existence of $Al(C_2O_4)^-$, $Al(C_2O_4)_2^-$, $Al_2(C_2O_4)_3$, $Al(C_2O_4)^+$, and $Al_2(C_2O_4)^{++++}$ is presumed. In the detn. of Al by neutralization, in order to avoid the effect of hydrolysis Al is combined into an oxalate complex (cf. *C. A.* 30, 2132[8]). To det. Al iodometrically, neutralize the soln. contg. Al in the presence of the oxalate and of $MgCl_2$, boil the soln. with $CaCl_2$ to remove oxalate, add KI and a soln. of KIO_3, back-titrate the excess iodate with $S_2O_3^{--}$. Al can be detd. a little less accurately by adding to the Al salt soln. an excess of a standardized $K_2C_2O_4$ soln., neutralizing to methyl red, and titrating the excess oxalate with an $AlCl_3$ soln. The color of methyl red changes when all the oxalate is combined as $Al(C_2O_4)_3^{---}$.

W. R. Henn

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

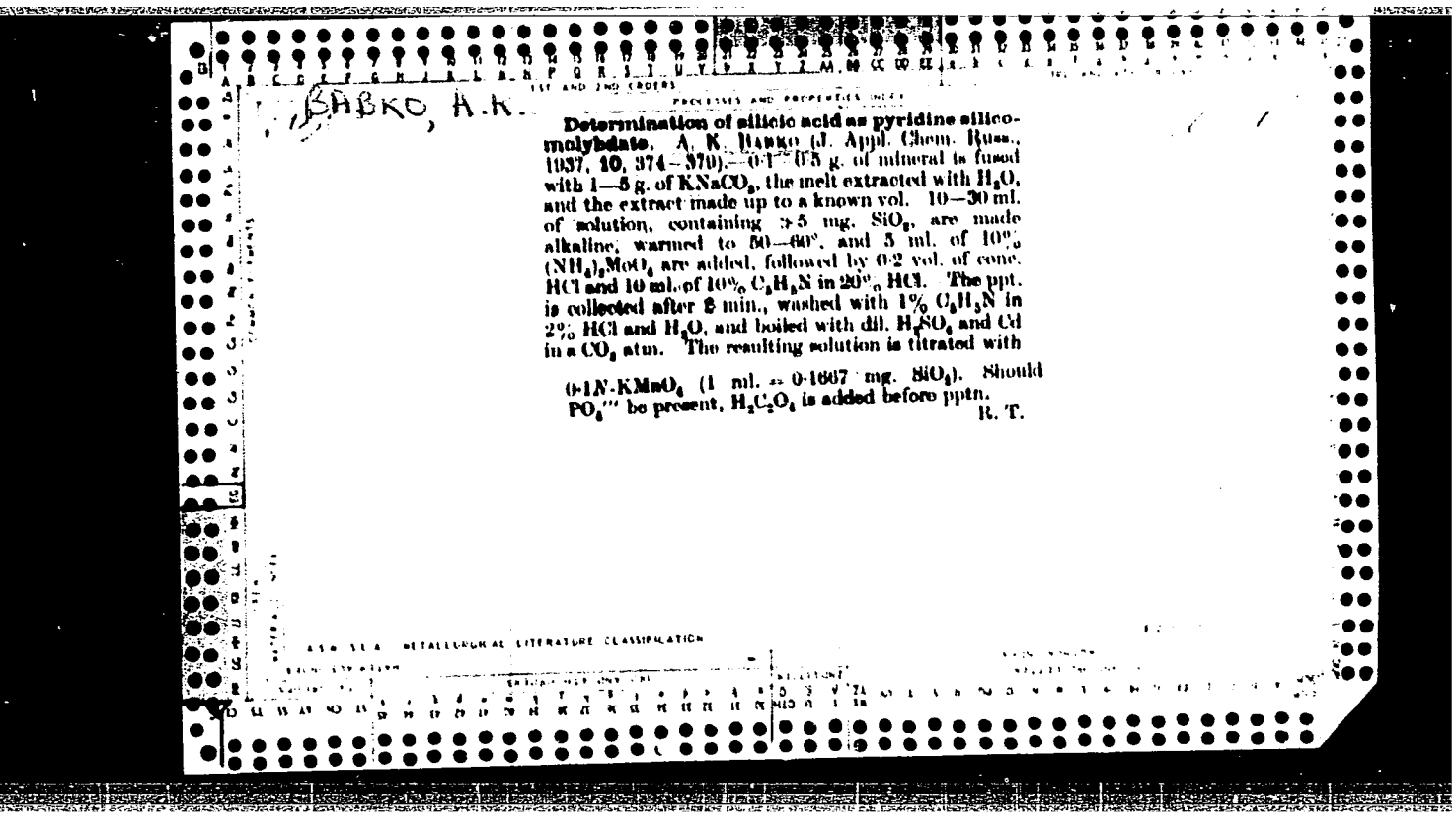


CABABKO, A. K.

7

The application of solid reducing agents (in analysis). A. K. Babko. *Zavodskaya Lab.* **6**, 650-5(1937).—In the detn. of Cu and Sn in bronzes and Babbitt metals by the Someya method (*C. A.* **22**, 2122), the best results are obtained by reduction with electrolytic Bi in strongly HCl solns. in the Jones reductor and direct or potentiometric titration of Sn^{++} with 0.1 *N* $KMnO_4$ to an incipent yellow ($CaCl_2$ in HCl) and that of Cu^{+} with 0.1 *N* $K_2Cr_2O_7$ and diphenylamine. The presence of Sb and Pb is harmless. The detn. of Fe and Ti in ilmenite is based on the reduction of the 2 elements by electrolytic Zn and Cd and that of Fe by Bi. Ti is not reduced by Bi in dil. H_2SO_4 contg. Na_2SO_4. The reduction is effected in the Jones app. After the reduction with Zn or Cd in dil. H_2SO_4 soln., the sum of Fe and Ti is titrated with $KMnO_4$ or $K_2Cr_2O_7$ and diphenylamine. The titrated soln. is treated with H_2O to 100-200 cc. vol. and 5-7 g. Na_2SO_4 to lower the acidity, and the Fe^{+++} is reduced with Bi and titrated as above. Ti is detd. by difference. Detailed procedures are described. Seven references.

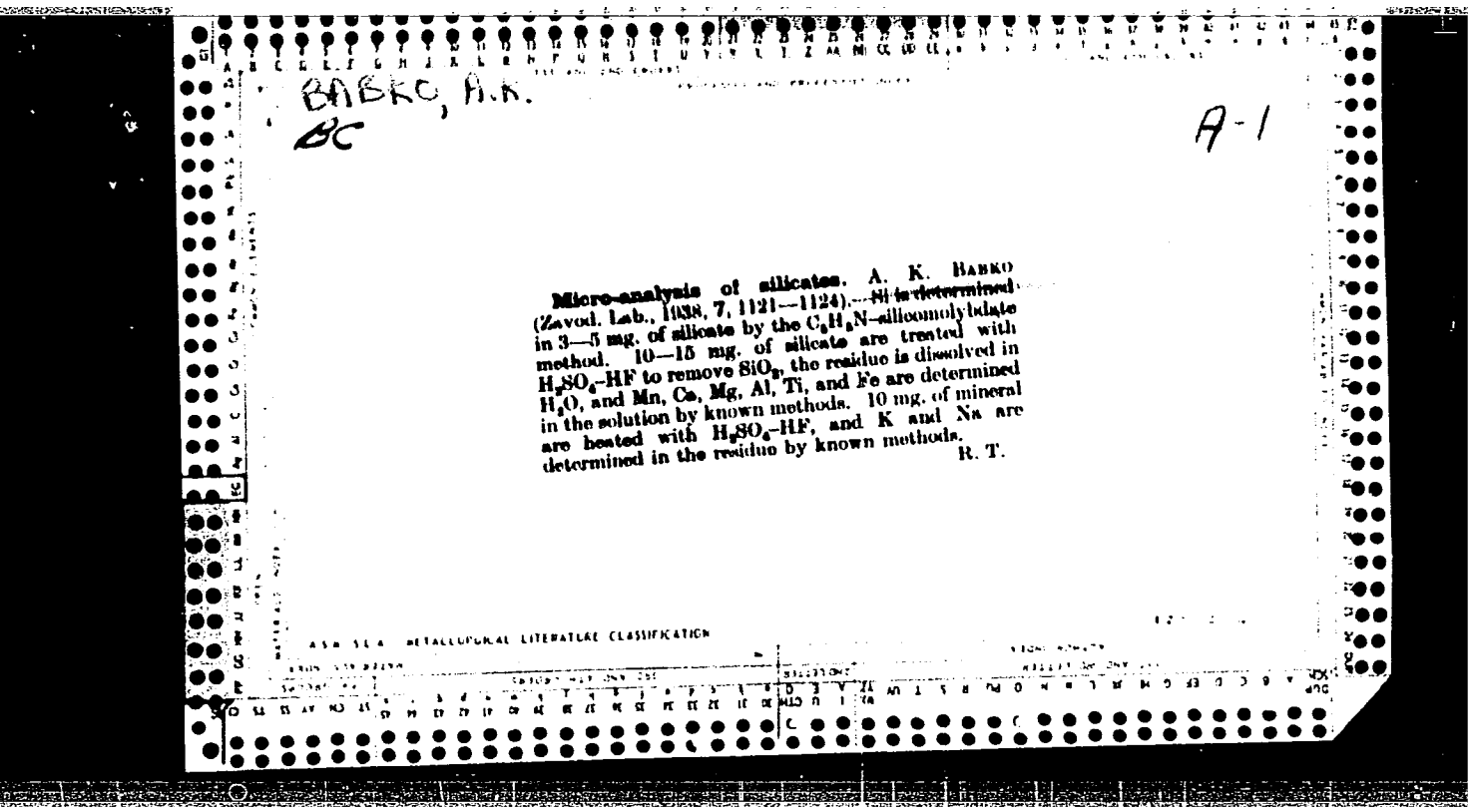
Chas. Blanc



БАБКО, А.К.

Determination of silicic acid as pyridine silicomolybdate. A. K. Бабко (J. Appl. Chem. Russ., 1937, **10**, 374—379).—0·1—0·5 g. of mineral is fused with 1—5 g. of $KNaCO_3$, the melt extracted with H_2O, and the extract made up to a known vol. 10—30 ml. of solution, containing >5 mg. SiO_2, are made alkaline, warmed to 50—60°, and 5 ml. of 10% $(NH_4)_2MoO_4$ are added, followed by 0·2 vol. of conc. HCl and 10 ml. of 10% C_5H_5N in 20% HCl. The ppt. is collected after 8 min., washed with 1% C_5H_5N in 2% HCl and H_2O, and boiled with dil. H_2SO_4 and Cd in a CO_2 atm. The resulting solution is titrated with 0·1*N*-$KMnO_4$ (1 ml. = 0·1607 mg. SiO_2). Should PO_4''' be present, $H_2C_2O_4$ is added before pptn.

R. T.



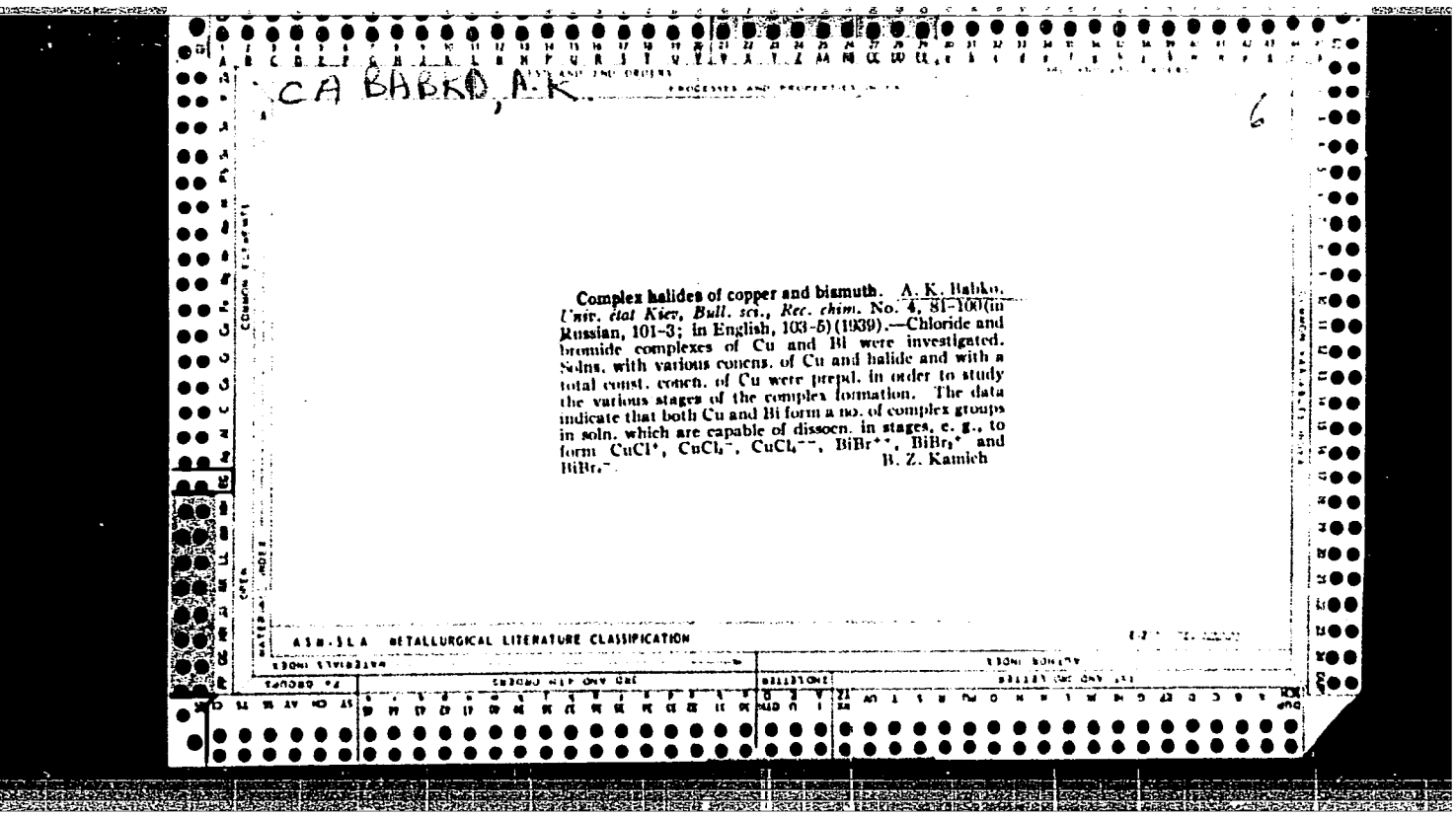
BABKO, A.K.
BC

A-1

Micro-analysis of silicates. A. K. Babko (Zavod. Lab., 1938, 7, 1121—1124).—Si is determined in 3—5 mg. of silicate by the C_9H_7N–silicomolybdate method. 10—15 mg. of silicate are treated with H_2SO_4–HF to remove SiO_2, the residue is dissolved in H_2O, and Mn, Ca, Mg, Al, Ti, and Fe are determined in the solution by known methods. 10 mg. of mineral are heated with H_2SO_4–HF, and K and Na are determined in the residue by known methods.

R. T.

ASM SLA METALLURGICAL LITERATURE CLASSIFICATION



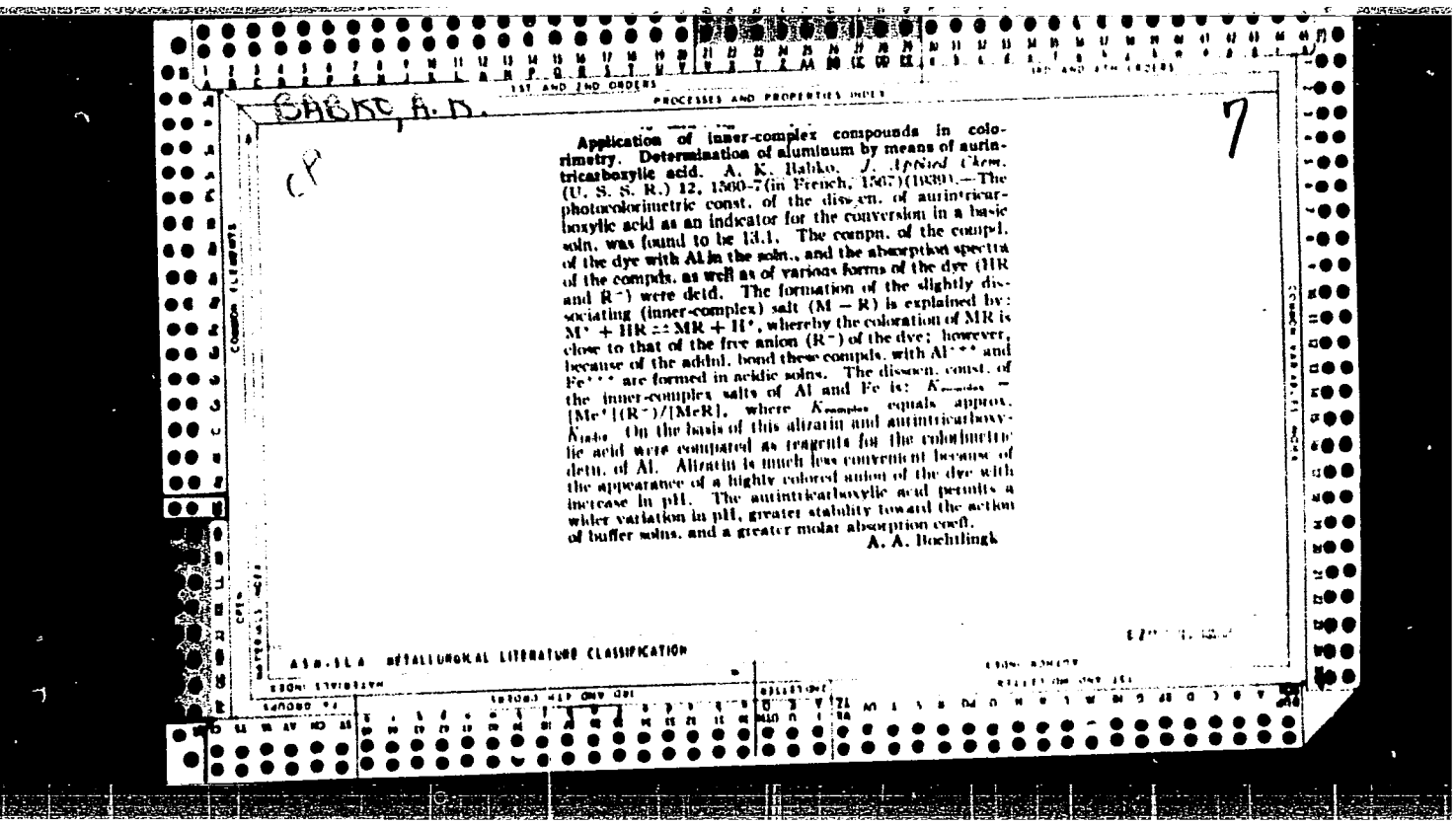
CA BABKO, A.K.

6

Complex halides of copper and bismuth. A. K. Babko. *Univ. Kiev, Bull. sci., Rec. chim.* No. 4, 81–100 (in Russian, 101–3; in English, 103–5) (1939).—Chloride and bromide complexes of Cu and Bi were investigated. Solns. with various concns. of Cu and halide and with a total const. concn. of Cu were prepd. in order to study the various stages of the complex formation. The data indicate that both Cu and Bi form a no. of complex groups in soln. which are capable of dissocn. in stages, e. g., to form $CuCl^+$, $CuCl_3^-$, $CuCl_4^{--}$, $BiBr^{++}$, $BiBr_2^+$ and $BiBr_4^-$.

B. Z. Kamich

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



BABKO, A. K.

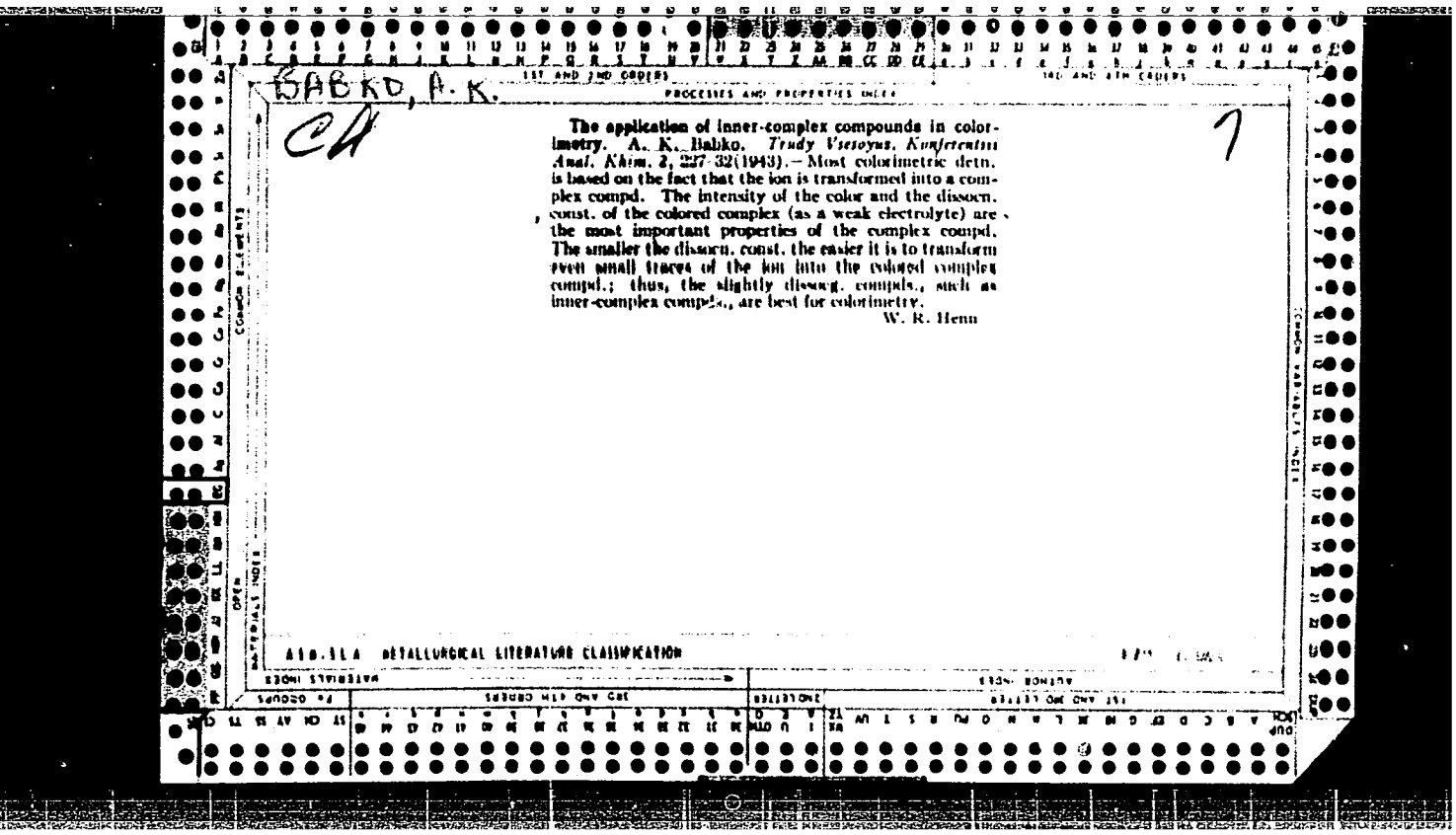
7

PROCESSES AND PROPERTIES INDEX

Application of inner-complex compounds in colorimetry. Determination of aluminum by means of aurintricarboxylic acid. A. K. Babko. *J. Applied Chem. (U. S. S. R.)* 12, 1360-7(in French, 1367)(1939).—The photocolorimetric const. of the dissocn. of aurintricarboxylic acid as an indicator for the conversion in a basic soln. was found to be 13.1. The compn. of the compd. of the dye with Al in the soln., and the absorption spectra of the compds. as well as of various forms of the dye (HR and R^-) were detd. The formation of the slightly dissociating (inner-complex) salt (M — R) is explained by: $M^{+} + HR \rightleftarrows MR + H^{+}$, whereby the coloration of MR is close to that of the free anion (R^-) of the dye; however, because of the additl. bond these compds. with Al^{+++} and Fe^{+++} are formed in acidic solns. The dissocn. const. of the inner-complex salts of Al and Fe is: $K_{diss.} = [Me^{+}][R^-]/[MeR]$, where $K_{compl.}$ equals approx. $K_{diss.}$ On the basis of this alizarin and aurintricarboxylic acid were computed as reagents for the colorimetric detn. of Al. Alizarin is much less convenient because of the appearance of a highly colored anion of the dye with increase in pH. The aurintricarboxylic acid permits a wider variation in pH, greater stability toward the action of buffer solns. and a greater molar absorption coeff.

A. A. Bochtlingk

A50-51A METALLURGICAL LITERATURE CLASSIFICATION



BABKO, A. K.

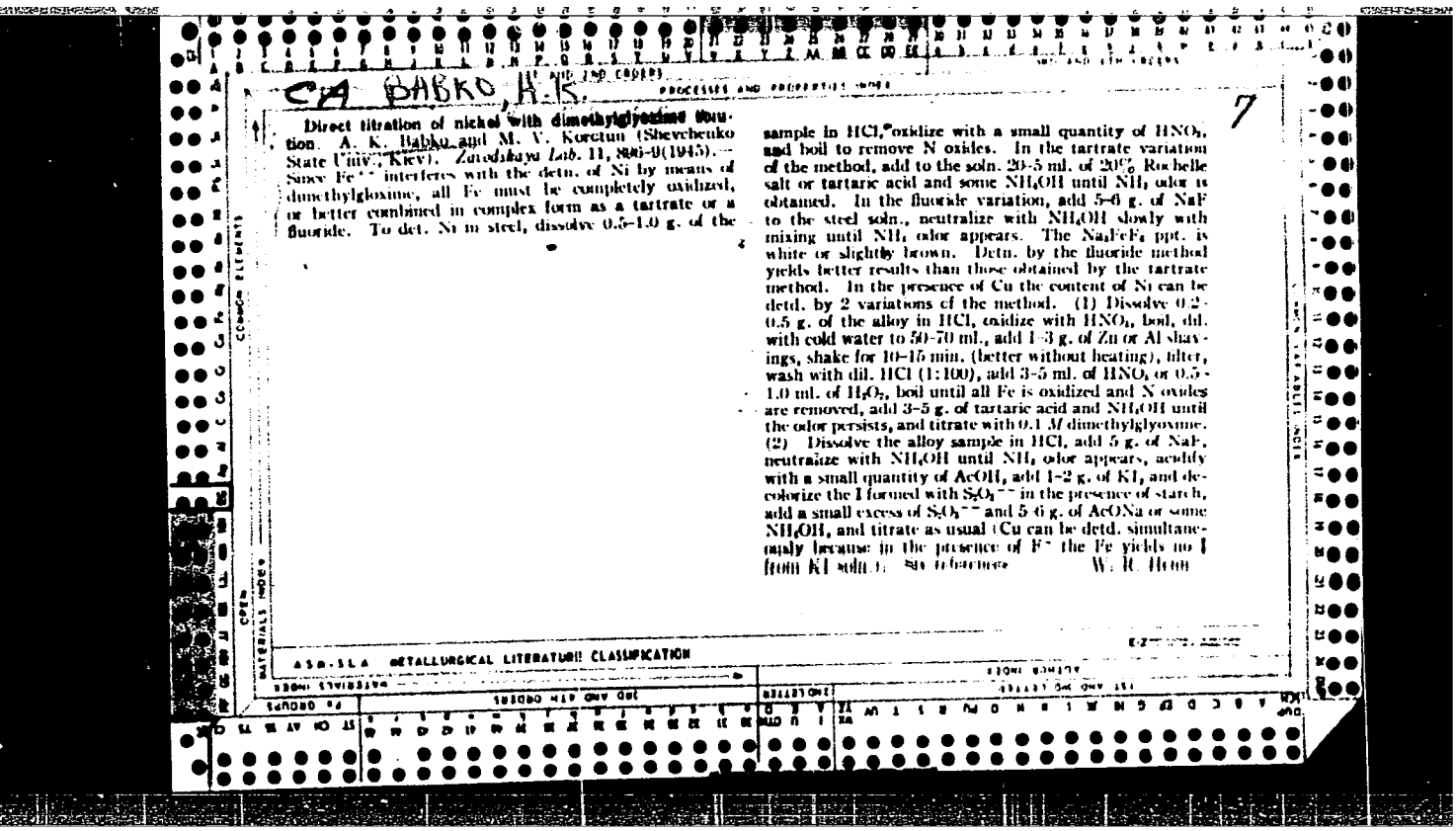
CA

7

The application of inner-complex compounds in colorimetry. A. K. Babko. *Trudy Vsesoyus. Konferentsii Anal. Khim.* 2, 227-32(1943).—Most colorimetric detn. is based on the fact that the ion is transformed into a complex compd. The intensity of the color and the dissocn. const. of the colored complex (as a weak electrolyte) are the most important properties of the complex compd. The smaller the dissocn. const. the easier it is to transform even small traces of the ion into the colored complex compd.; thus, the slightly dissocg. compds., such as inner-complex compds., are best for colorimetry.

W. R. Henn

A10.51A METALLURGICAL LITERATURE CLASSIFICATION

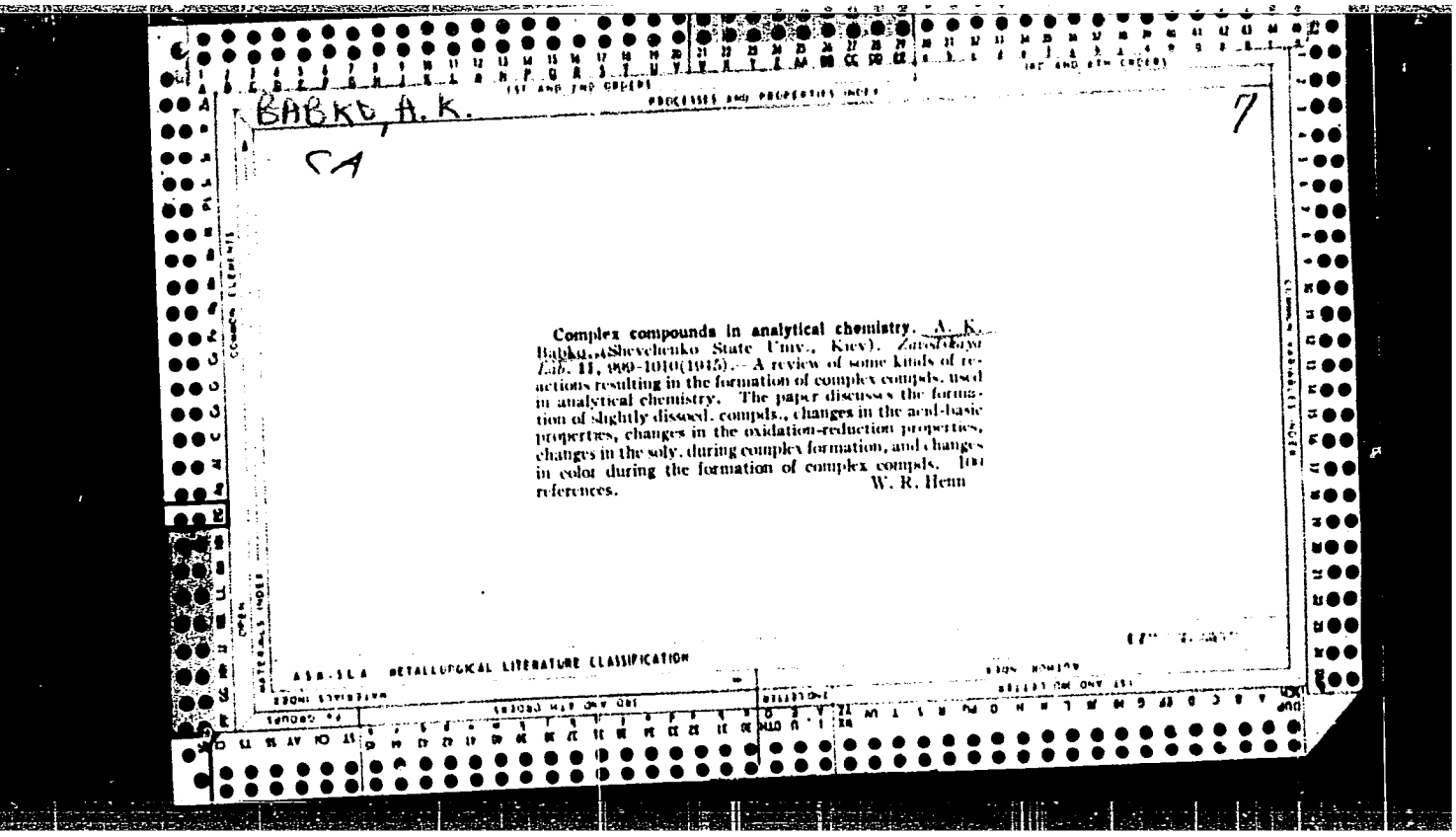


CA BABKO, A.K.

7

Direct titration of nickel with dimethylglyoxime solution. A. K. Babko and M. V. Korotun (Shevchenko State Univ., Kiev). *Zavodskaya Lab.* 11, 886-9(1945).—Since Fe^{++} interferes with the detn. of Ni by means of dimethylglyoxime, all Fe must be completely oxidized, or better combined in complex form as a tartrate or a fluoride. To det. Ni in steel, dissolve 0.5–1.0 g. of the sample in HCl, oxidize with a small quantity of HNO_3, and boil to remove N oxides. In the tartrate variation of the method, add to the soln. 20–5 ml. of 20% Rochelle salt or tartaric acid and some NH_4OH until NH_3 odor is obtained. In the fluoride variation, add 5–6 g. of NaF to the steel soln., neutralize with NH_4OH slowly with mixing until NH_3 odor appears. The Na_3FeF_6 ppt. is white or slightly brown. Detn. by the fluoride method yields better results than those obtained by the tartrate method. In the presence of Cu the content of Ni can be detd. by 2 variations of the method. (1) Dissolve 0.2–0.5 g. of the alloy in HCl, oxidize with HNO_3, boil, dil. with cold water to 50–70 ml., add 1–3 g. of Zn or Al shavings, shake for 10–15 min. (better without heating), filter, wash with dil. HCl (1:100), add 3–5 ml. of HNO_3 or 0.5–1.0 ml. of H_2O_2, boil until all Fe is oxidized and N oxides are removed, add 3–5 g. of tartaric acid and NH_4OH until the odor persists, and titrate with 0.1 *M* dimethylglyoxime. (2) Dissolve the alloy sample in HCl, add 5 g. of NaF, neutralize with NH_4OH until NH_3 odor appears, acidify with a small quantity of AcOH, add 1–2 g. of KI, and decolorize the I formed with $S_2O_3^{--}$ in the presence of starch, add a small excess of $S_2O_3^{--}$ and 5–6 g. of AcONa or some NH_4OH, and titrate as usual (Cu can be detd. simultaneously because in the presence of F^- the Fe yields no I from KI soln.). 80 references. W. R. Hood

A58-51A METALLURGICAL LITERATURE CLASSIFICATION



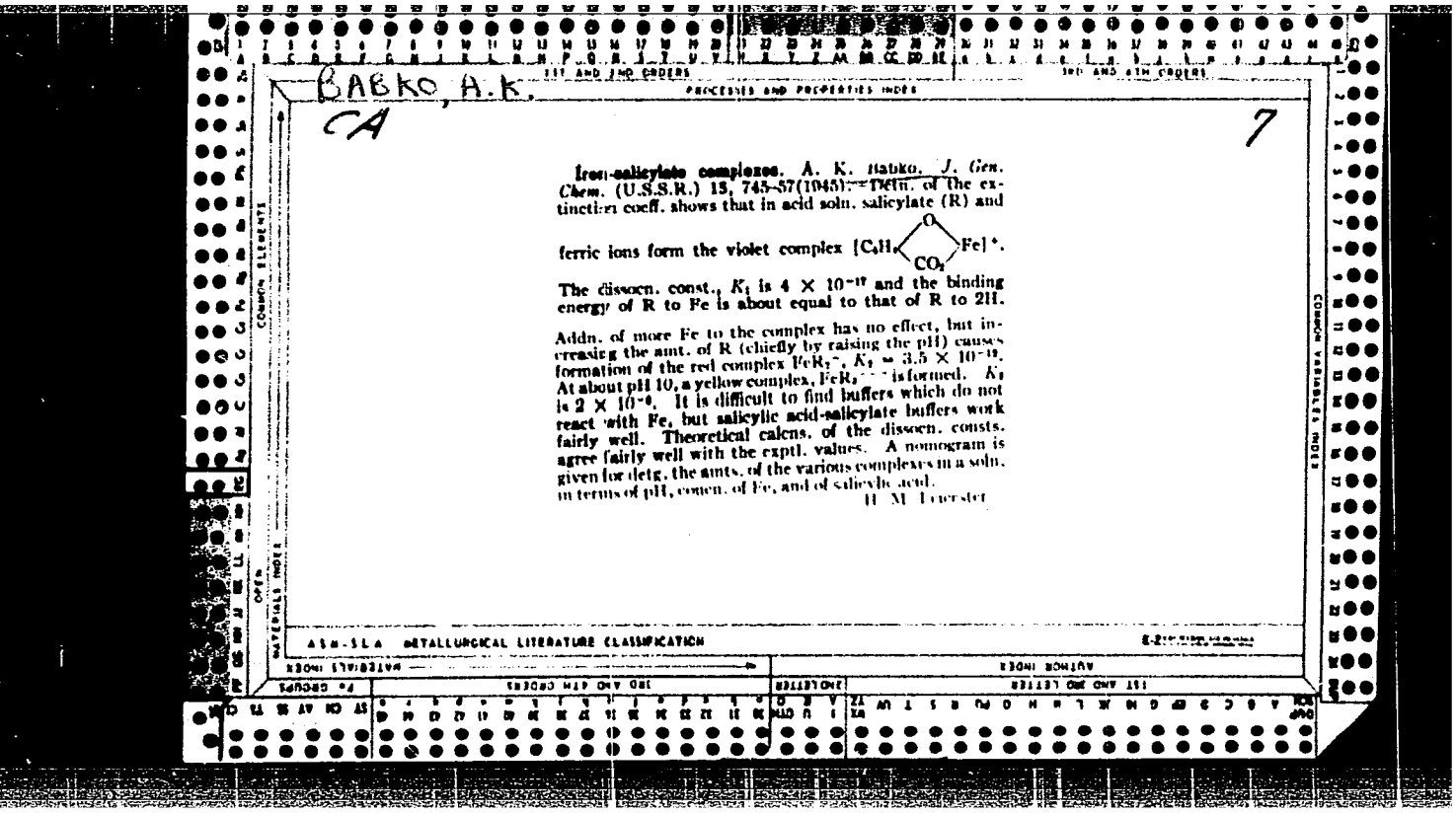
BABKO, A. K.

CA

7

Complex compounds in analytical chemistry. A. K. Babko. (Shevchenko State Univ., Kiev). *Zavodskaya Lab.* **11**, 989-1010(1945).—A review of some kinds of reactions resulting in the formation of complex compds. used in analytical chemistry. The paper discusses the formation of slightly dissocd. compds., changes in the acid-basic properties, changes in the oxidation-reduction properties, changes in the soly. during complex formation, and changes in color during the formation of complex compds. 101 references.
W. R. Henn

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



BABKO, A.K.

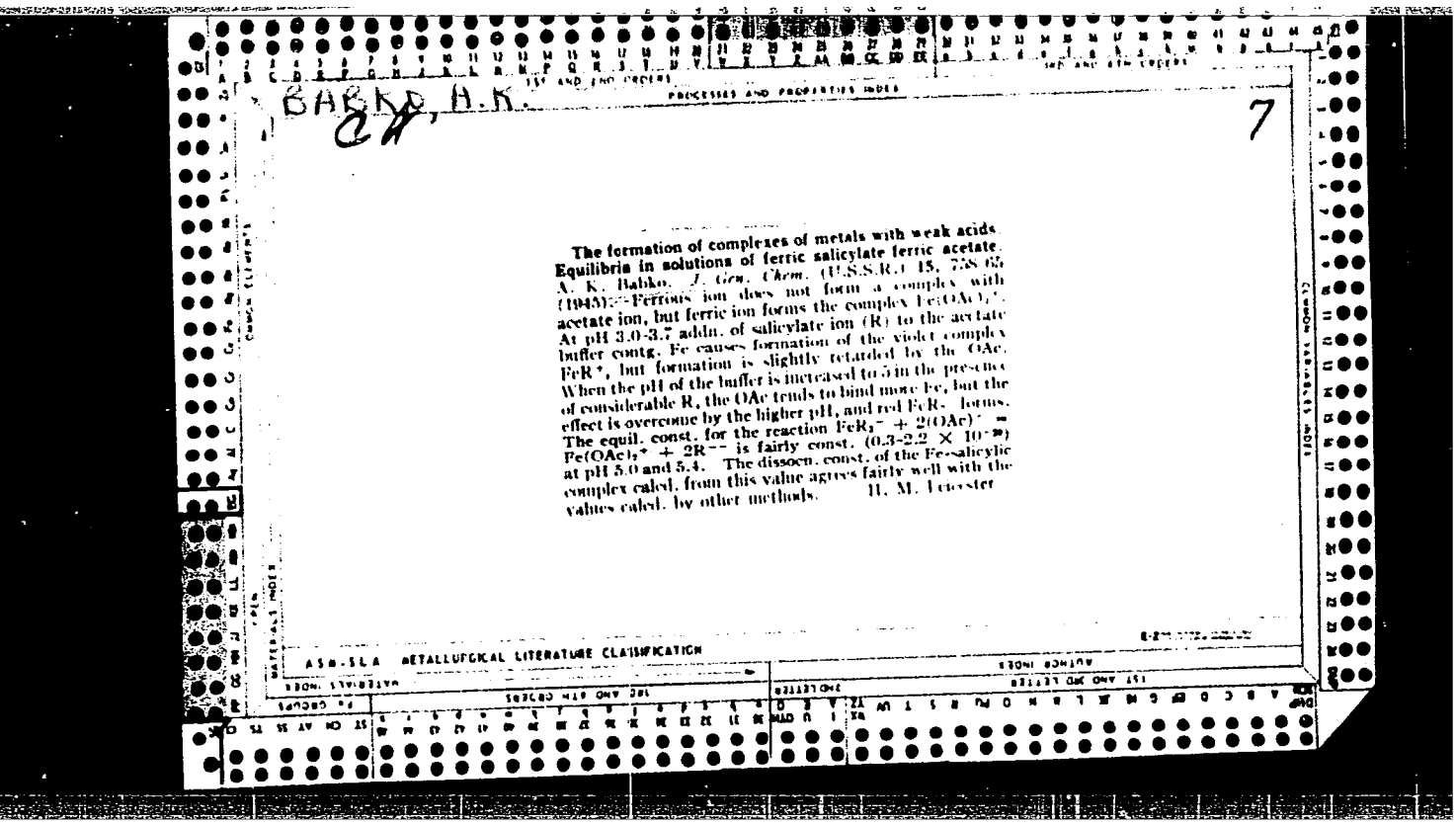
CA 7

Iron-salicylate complexes. A. K. Babko. *J. Gen. Chem.* (U.S.S.R.) 15, 745-57(1945).—Detn. of the extinction coeff. shows that in acid soln. salicylate (R) and ferric ions form the violet complex $[C_6H_4\langle{}^{O}_{CO_2}\rangle Fe]^+$.

The dissocn. const., K_1 is 4×10^{-17} and the binding energy of R to Fe is about equal to that of R to 2H.

Addn. of more Fe to the complex has no effect, but increasing the amt. of R (chiefly by raising the pH) causes formation of the red complex FeR_2^-, $K_2 = 3.5 \times 10^{-19}$. At about pH 10, a yellow complex, FeR_3^{---} is formed. K_3 is 2×10^{-6}. It is difficult to find buffers which do not react with Fe, but salicylic acid-salicylate buffers work fairly well. Theoretical calcns. of the dissocn. consts. agree fairly well with the exptl. values. A nomogram is given for detg. the amts. of the various complexes in a soln. in terms of pH, concn. of Fe, and of salicylic acid.

H. M. Leicester

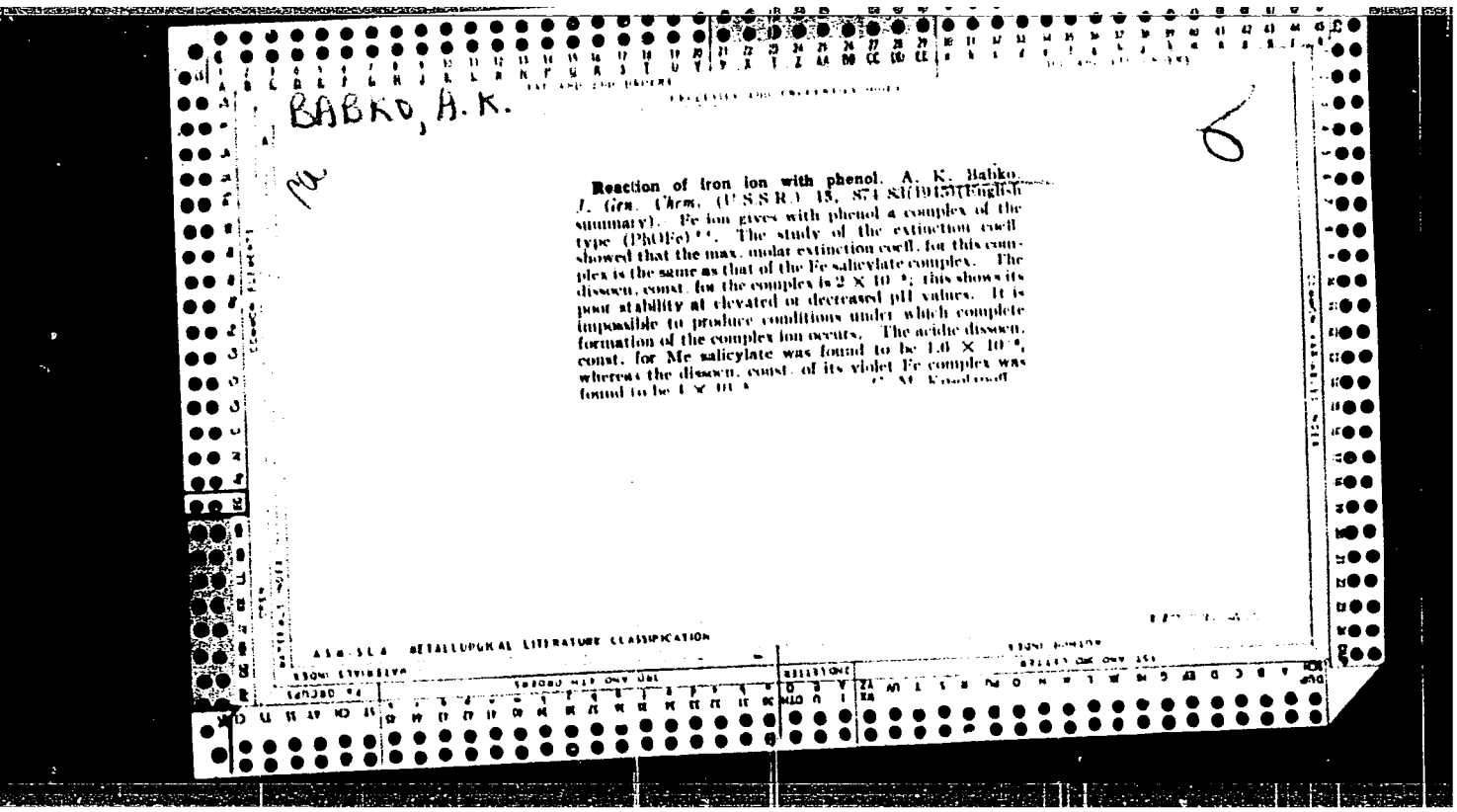


BABKO, A.K.

7

The formation of complexes of metals with weak acids. Equilibria in solutions of ferric salicylate ferric acetate. A. K. Babko. *J. Gen. Chem.* (U.S.S.R.) 15, 758 (1945).—Ferrous ion does not form a complex with acetate ion, but ferric ion forms the complex $Fe(OAc)_3^{--}$. At pH 3.0-3.7 addn. of salicylate ion (R) to the acetate buffer contg. Fe causes formation of the violet complex FeR^+, but formation is slightly retarded by the OAc. When the pH of the buffer is increased to 5 in the presence of considerable R, the OAc tends to bind more Fe, but the effect is overcome by the higher pH, and red FeR_3^{---} forms. The equil. const. for the reaction $FeR_3^{---} + 2(OAc)^- = Fe(OAc)_2^+ + 2R^{--}$ is fairly const. ($0.3\text{-}2.2 \times 10^{-20}$) at pH 5.0 and 5.4. The dissocn. const. of the Fe-salicylic complex calcd. from this value agrees fairly well with the values calcd. by other methods. H. M. Leicester

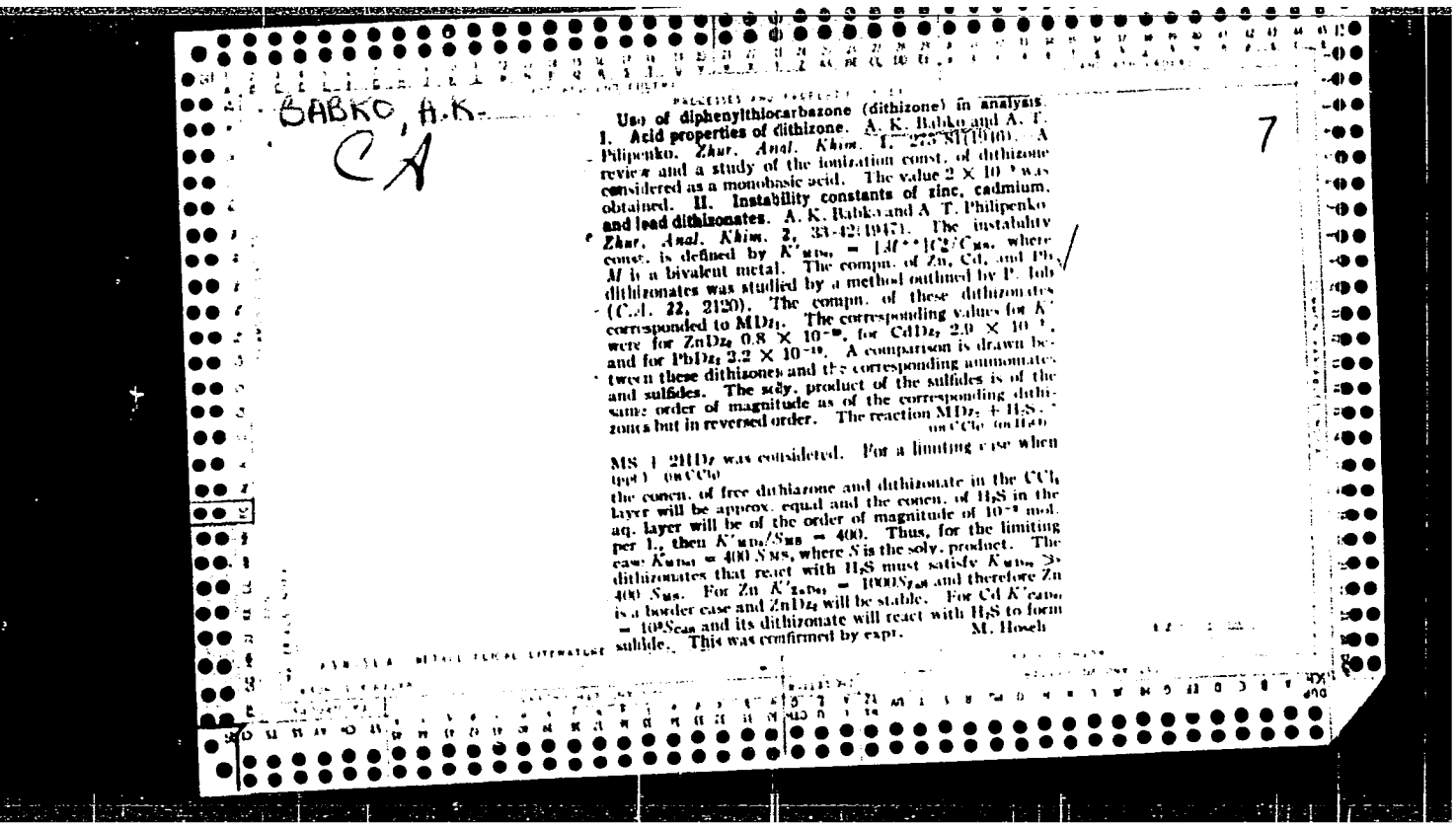
A.S.M.-S.L.A. METALLURGICAL LITERATURE CLASSIFICATION



BABKO, A. K.

Reaction of iron ion with phenol. A. K. Babko. *J. Gen. Chem.* (U.S.S.R.) 15, 874-81(1945)(English summary). Fe ion gives with phenol a complex of the type $(PhOFe)^{++}$. The study of the extinction coeff. showed that the max. molar extinction coeff. for this complex is the same as that of the Fe salicylate complex. The dissocn. const. for the complex is 2×10^{-5}; this shows its poor stability at elevated or decreased pH values. It is impossible to produce conditions under which complete formation of the complex ion occurs. The acidic dissocn. const. for Me salicylate was found to be 1.0×10^{-3}, whereas the dissocn. const. of its violet Fe complex was found to be 1×10^{-5}.

A.S.M.-S.L.A. METALLURGICAL LITERATURE CLASSIFICATION



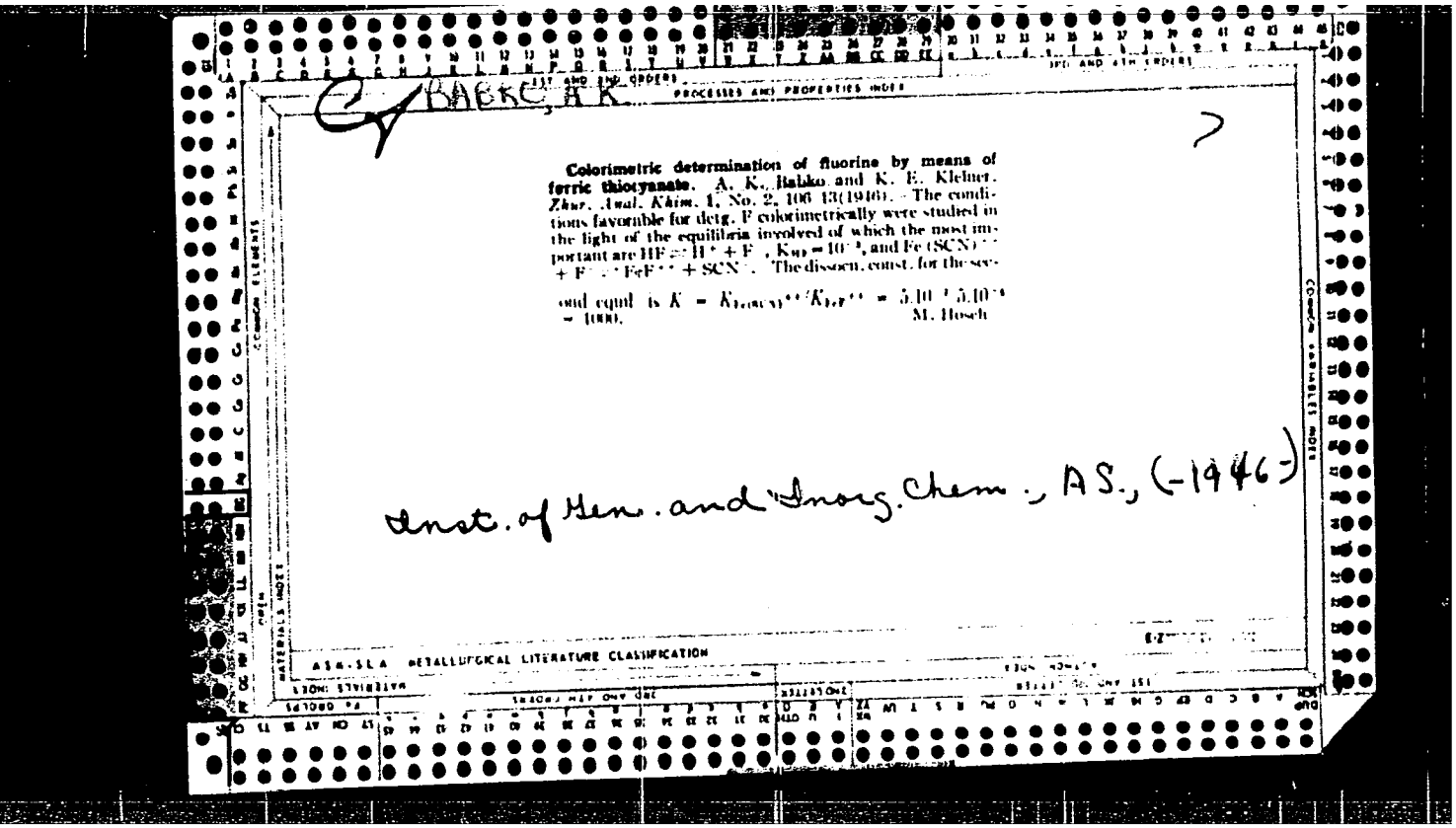
BABKO, A.K.

CA

7

Use of diphenylthiocarbazone (dithizone) in analysis.

I. Acid properties of dithizone. A. K. Babko and A. T. Pilipenko. *Zhur. Anal. Khim.* 1, 275-81(1946). A review and a study of the ionization const. of dithizone considered as a monobasic acid. The value 2×10^{-5} was obtained. **II. Instability constants of zinc, cadmium, and lead dithizonates.** A. K. Babko and A. T. Philipenko *Zhur. Anal. Khim.* 2, 33-42(1947). The instability const. is defined by $K'_{MDz} = [M^{++}][Dz^-]^2/C_{MDz}$, where M is a bivalent metal. The compn. of Zn, Cd, and Pb dithizonates was studied by a method outlined by P. Job (C.A. 22, 2120). The compn. of these dithizonates corresponded to MDz_2. The corresponding values for K' were for $ZnDz_2$ 0.8×10^{-5}, for $CdDz_2$ 2.0×10^{-5}, and for $PbDz_2$ 3.2×10^{-19}. A comparison is drawn between these dithizones and the corresponding ammoniates and sulfides. The soly. product of the sulfides is of the same order of magnitude as of the corresponding dithizonates but in reversed order. The reaction $MDz_2 + H_2S \rightleftarrows$ $MS + 2HDz$ was considered. For a limiting case when $(pp.t.)_{MS}$ in CCl_4 / $(pp.t.)_{MDz_2}$ in CCl_4 on H_2O the concn. of free dithizone and dithizonate in the CCl_4 layer will be approx. equal and the concn. of H_2S in the aq. layer will be of the order of magnitude of 10^{-5} mol. per l., then $K'_{MDz_2}/S_{MS} = 400$. Thus, for the limiting case $K'_{MDz_2} = 400\,S_{MS}$, where S is the soly. product. The dithizonates that react with H_2S must satisfy $K'_{MDz_2} > 400\,S_{MS}$. For Zn $K'_{ZnDz_2} = 1000S_{ZnS}$ and therefore Zn is a border case and $ZnDz_2$ will be stable. For Cd $K'_{CdDz_2} = 10^5 S_{CdS}$ and its dithizonate will react with H_2S to form sulfide. This was confirmed by expt. M. Hoseh



BAEKO, A. K.

Colorimetric determination of fluorine by means of ferric thiocyanate. A. K. Babko and K. E. Kleiner. *Zhur. Anal. Khim.* 1, No. 2, 106-13(1946). The conditions favorable for detg. F colorimetrically were studied in the light of the equilibria involved of which the most important are $HF \rightleftharpoons H^+ + F^-$, $K_{HF} = 10^{-3}$, and $Fe(SCN)^{++} + F^- \rightleftharpoons FeF^{++} + SCN^-$. The dissocn. const. for the second equil. is $K = K_{Fe(SCN)^{++}}/K_{FeF^{++}} = 5.10^{-2}/5.10^{-5} = 1000$.
M. Hosch

Inst. of Gen. and Inorg. Chem., AS., (-1946-)

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

BABKO, A.K.

Diagrams of properties and equilibria of complex compounds in solution. A. K. Babko. *Zapiski Inst. Khim., Akad. Nauk Ukr. R.* [illegible] 3-11 (Russian and English summaries, 12-13)(1946).—A review of physicochemical methods of analysis of the behavior of various complex chem. compds. in soln. under specific conditions. The detn. of properties is based on the construction of equil. diagrams from which the equil. factor is obtained for a given compd. and condition. M. O. Holowaty

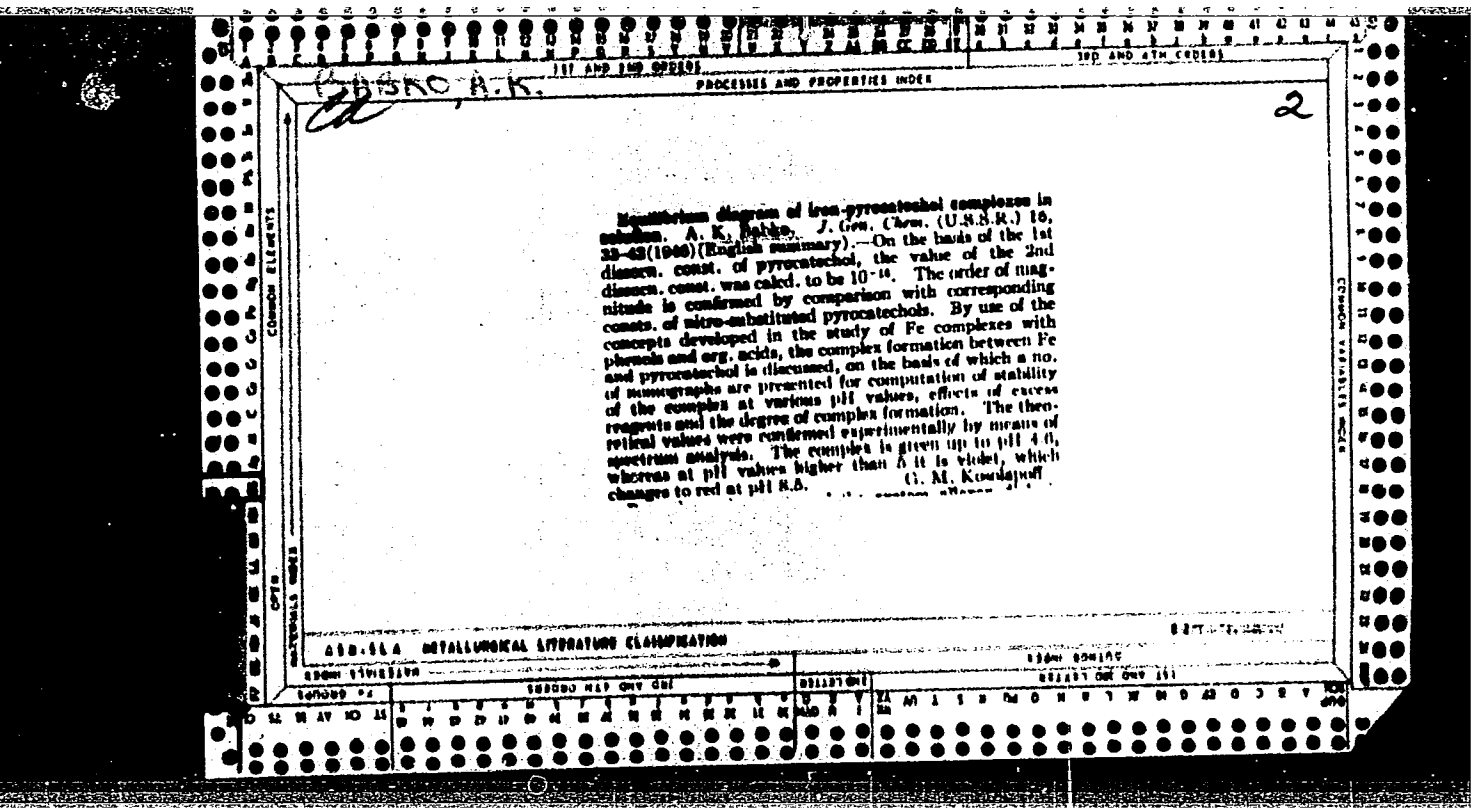
Babko, A. K.

3113

THE REACTION OF NICKEL ION WITH DIMETHYLGLY-

OXIME IN THE PRESENCE OF OXIDIZING AGENTS. A. K. Babko. Translated from Zhur. Anal. Khim. 3, 284-9(1948). (ASD-tr-1443; AEC-tr-1416, W. O. 21828)

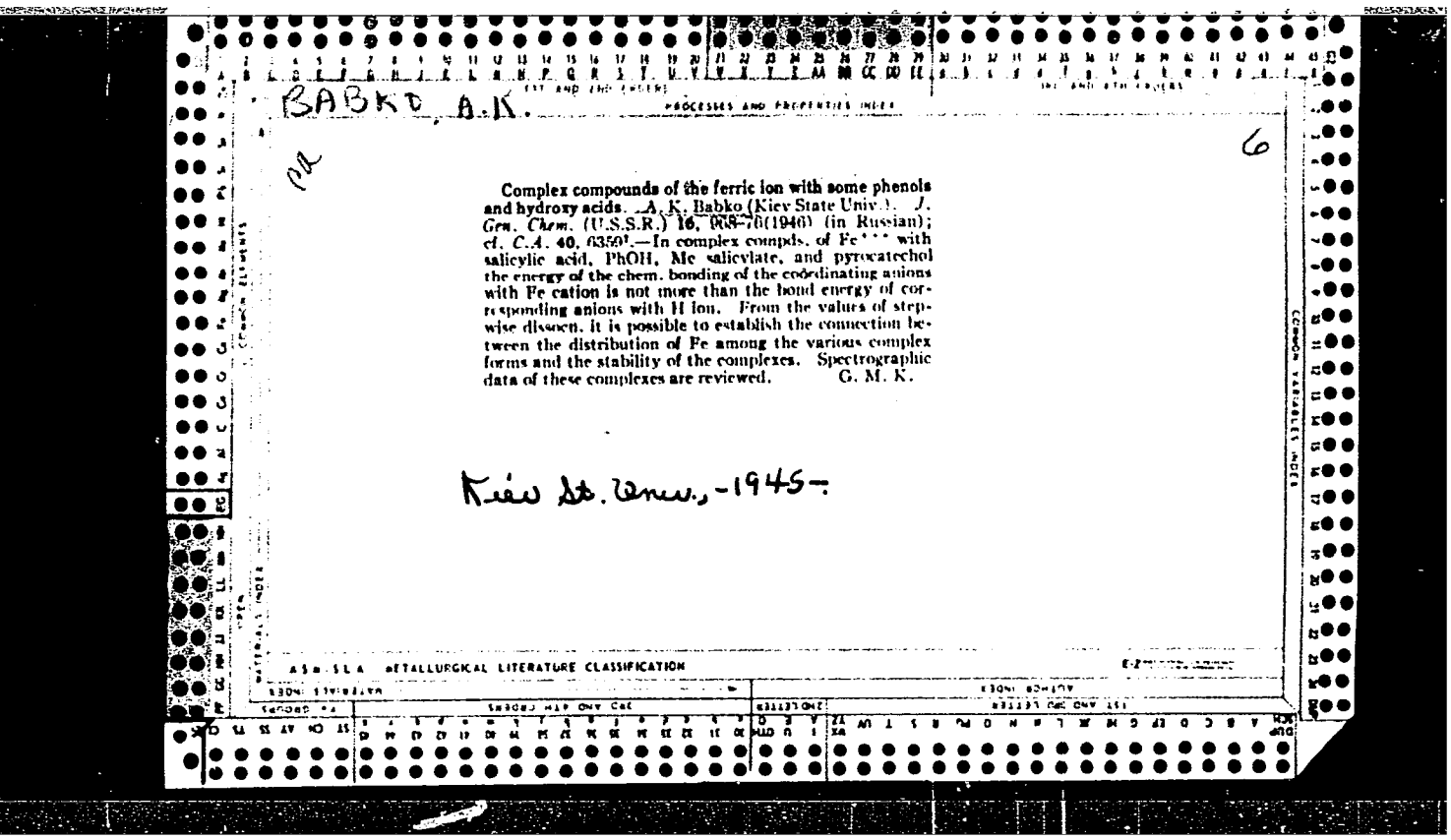
An investigation has been made of the reaction of Ni with dimethylglyoxime in the presence of oxidants. It was shown that molar extinction coefficients are a good criterion for comparing the sensitivity of reactions; it was shown by this means that the sensitivity of dimethylglyoxime as a reagent for detecting Ni is increased threefold in the presence of oxidants. The composition of the complex was studied by physicochemical methods of solution analysis. It was found that when the excess of oxidant is slight, the composition of the complex is Ni : H_2Dm = 1 : 2. When the excess of oxidant is large, the ratio is 1 : 3. The structure of the complex is discussed. It is shown that contrary to Feigl's views, the complex is a combination of Ni^{++} with some unstable oxidation product of dimethylglyoxime. (auth)



PROCESSES AND PROPERTIES INDEX

2

Equilibrium diagram of iron-pyrocatechol complexes in solution. A. K. Babko. *J. Gen. Chem. (U.S.S.R.)* 16, 33-43(1946)(English summary).—On the basis of the 1st dissocn. const. of pyrocatechol, the value of the 2nd dissocn. const. was calcd. to be 10^{-14}. The order of magnitude is confirmed by comparison with corresponding consts. of nitro-substituted pyrocatechols. By use of the concepts developed in the study of Fe complexes with phenols and org. acids, the complex formation between Fe and pyrocatechol is discussed, on the basis of which a no. of monographs are presented for computation of stability of the complex at various pH values, effects of excess reagents and the degree of complex formation. The theoretical values were confirmed experimentally by means of spectrum analysis. The complex is green up to pH 4.0, whereas at pH values higher than 4 it is violet, which changes to red at pH 8.5. (G. M. Kosolapoff



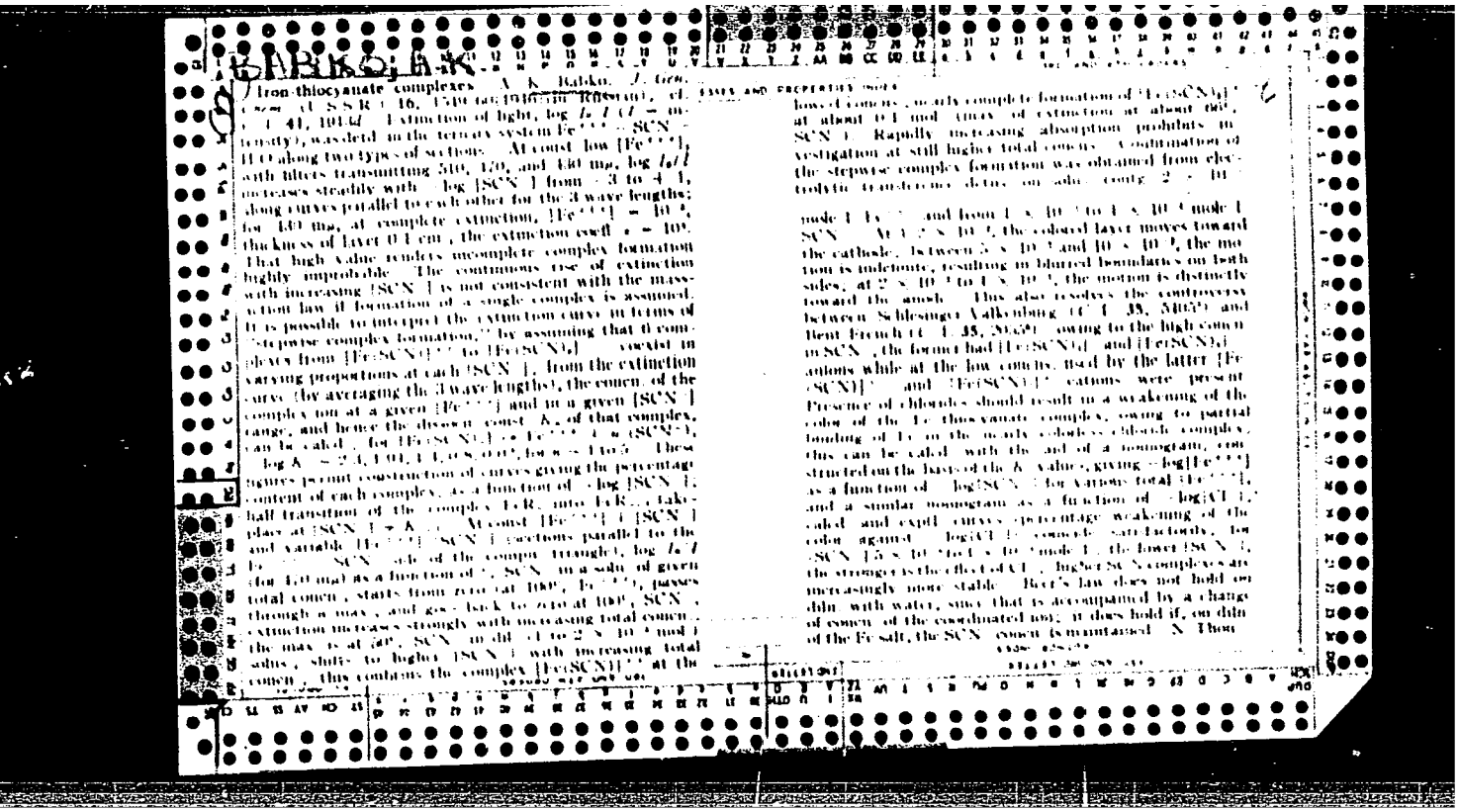
BABKO, A.K.

6

Complex compounds of the ferric ion with some phenols and hydroxy acids. A. K. Babko (Kiev State Univ.). *J. Gen. Chem.* (U.S.S.R.) **16**, 668–70(1946) (in Russian); cf. *C.A.* **40**, 6359[1].—In complex compds. of Fe^{+++} with salicylic acid, PhOH, Me salicylate, and pyrocatechol the energy of the chem. bonding of the coördinating anions with Fe cation is not more than the bond energy of corresponding anions with H ion. From the values of stepwise dissocn. it is possible to establish the connection between the distribution of Fe among the various complex forms and the stability of the complexes. Spectrographic data of these complexes are reviewed. G. M. K.

Kiev St. Univ., -1945-

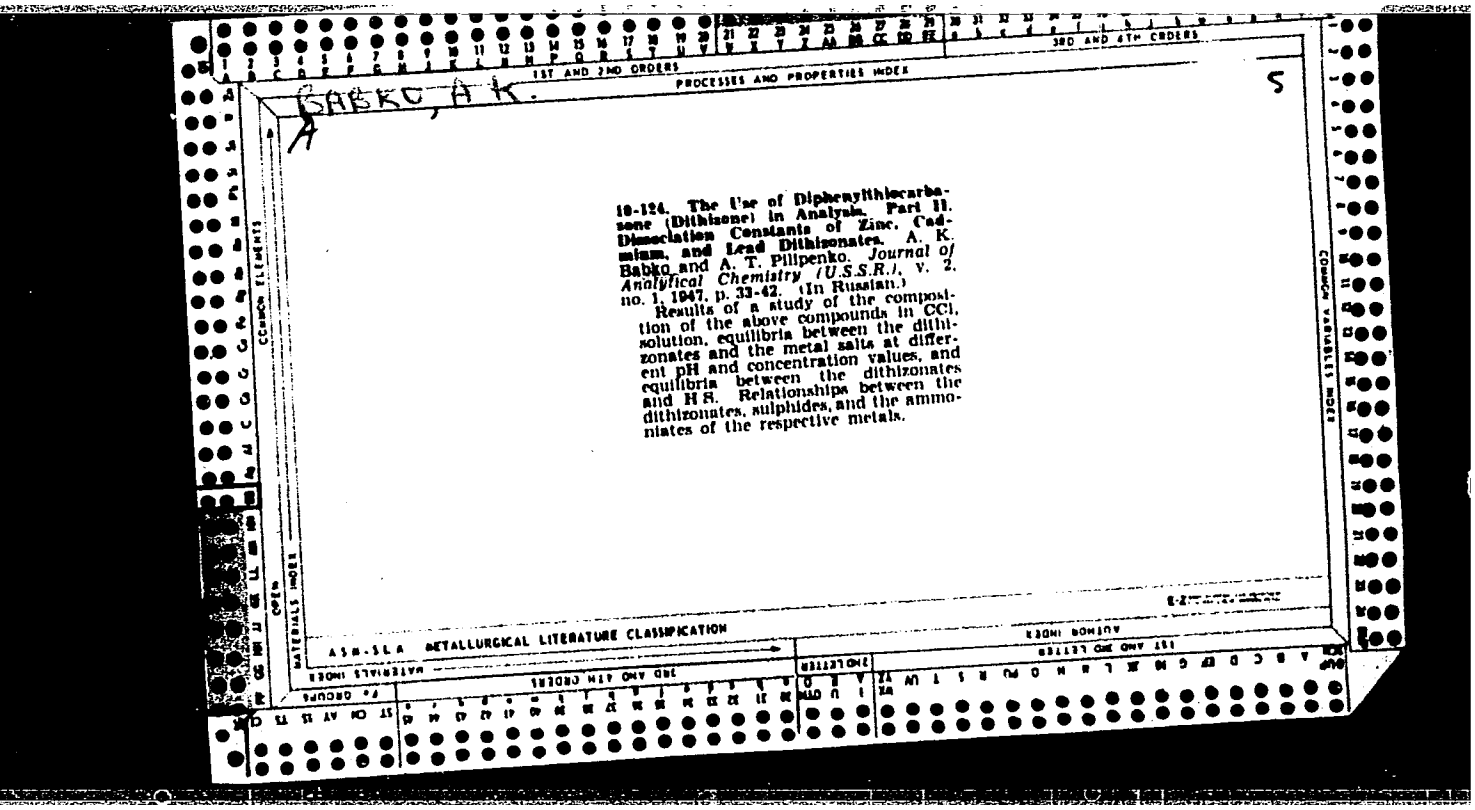
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



"Ferric-Rhodanide Complexes," Zhur. Obshch. Khim., 16, No. 10, 1946. Mbr. Inst. Chemistry, Acad. Sci. USSR, -1945-.

BABKO, A.K.

"Complex Ferric Sulfocynures in Solution," Dok. AN, 52, No. 1, 1946. Inst. Chem. Acad. Sci. 1945-.



BABKO, A K.

5

1ST AND 2ND ORDERS

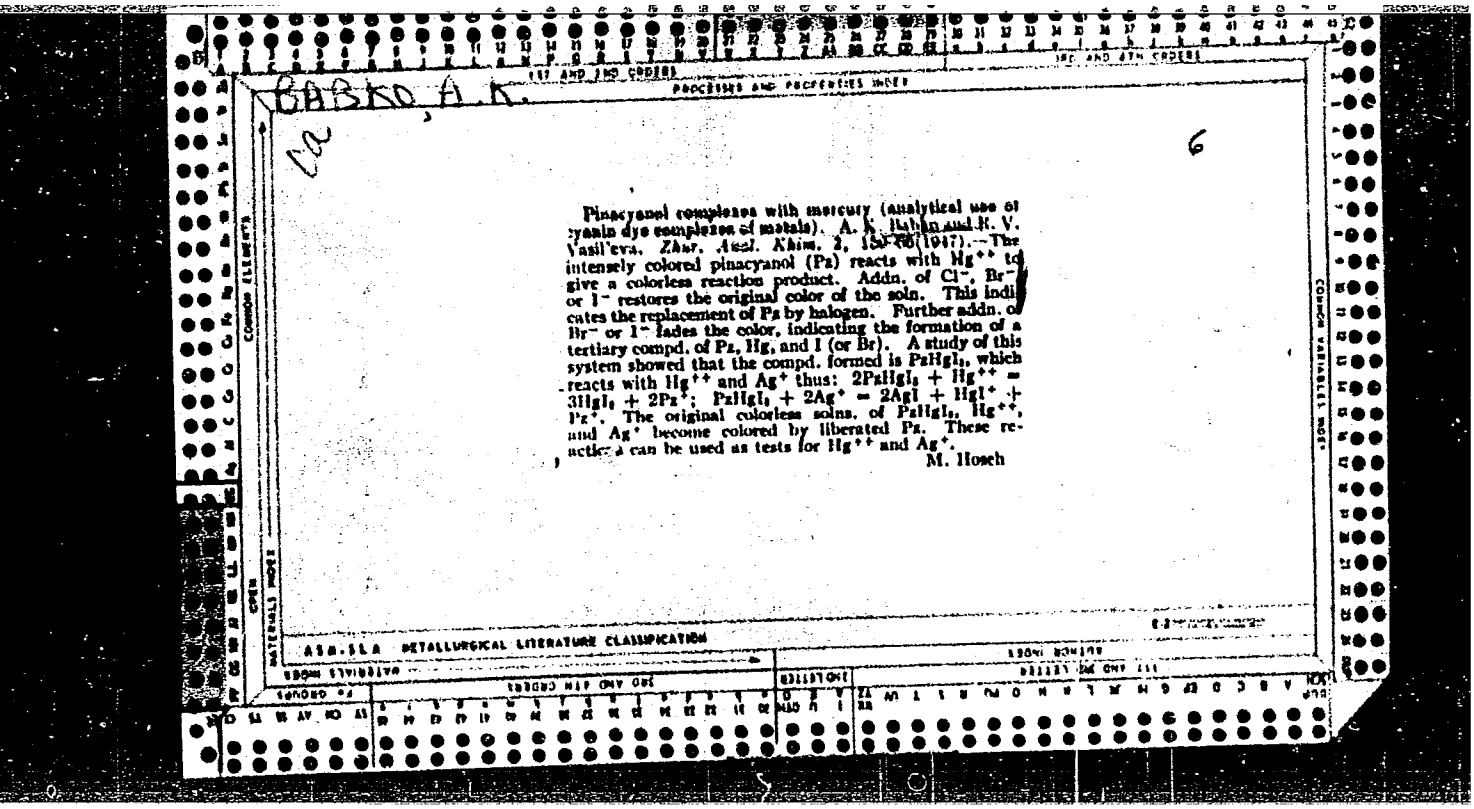
PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

18-124. The Use of Diphenylthiocarbazone (Dithizone) in Analysis. Part II. Dissociation Constants of Zinc, Cadmium, and Lead Dithizonates. A. K. Babko and A. T. Pilipenko. *Journal of Analytical Chemistry (U.S.S.R.)*, v. 2, no. 1, 1947, p. 33-42. (In Russian.)

Results of a study of the composition of the above compounds in CCl, solution, equilibria between the dithizonates and the metal salts at different pH and concentration values, and equilibria between the dithizonates and H S. Relationships between the dithizonates, sulphides, and the ammoniates of the respective metals.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



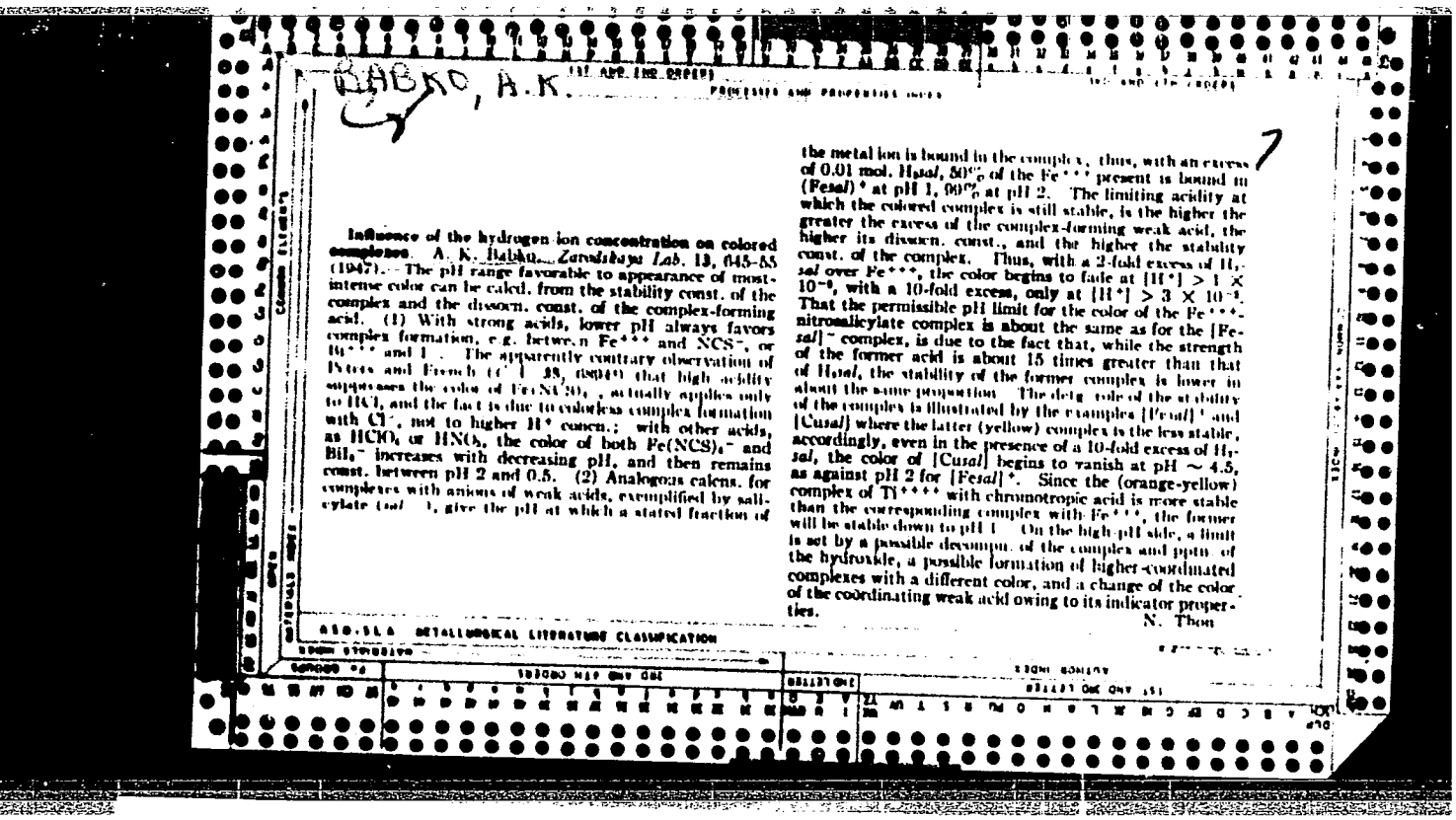
GABKO, A. K.

12

6

Pinacyanol complexes with mercury (analytical use of cyanin dye complexes of metals). A. K. Babko and R. V. Vasil'eva. *Zhur. Anal. Khim.* 2, 150-60 (1947).—The intensely colored pinacyanol (Pz) reacts with Hg^{++} to give a colorless reaction product. Addn. of Cl^-, Br^- or I^- restores the original color of the soln. This indicates the replacement of Pz by halogen. Further addn. of Br^- or I^- fades the color, indicating the formation of a tertiary compd. of Pz, Hg, and I (or Br). A study of this system showed that the compd. formed is $PzHgI_3$, which reacts with Hg^{++} and Ag^+ thus: $2PzHgI_3 + Hg^{++} = 3HgI_2 + 2Pz^+$; $PzHgI_3 + 2Ag^+ = 2AgI + HgI^+ + Pz^+$. The original colorless solns. of $PzHgI_3$, Hg^{++}, and Ag^+ become colored by liberated Pz. These reactions can be used as tests for Hg^{++} and Ag^+.

M. Hoseh

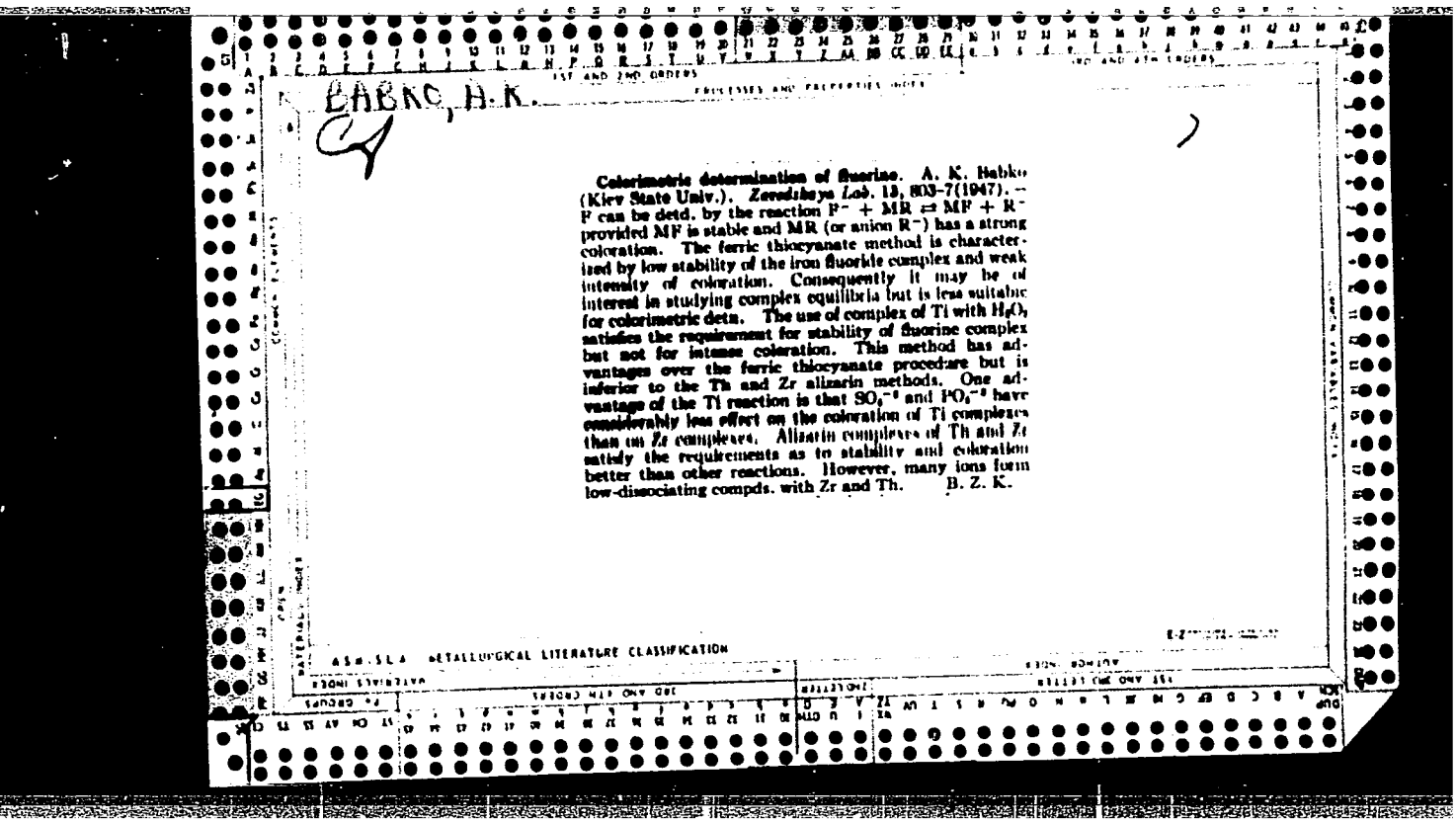


BABKO, A.K.

Influence of the hydrogen ion concentration on colored complexes. A. K. Babko. *Zavodskaya Lab.* 13, 645-55 (1947).—The pH range favorable to appearance of most-intense color can be calcd. from the stability const. of the complex and the dissocn. const. of the complex-forming acid. (1) With strong acids, lower pH always favors complex formation, e.g. between Fe^{+++} and NCS^-, or Bi^{+++} and I$^-$. The apparently contrary observation of Noyes and French (C. A. 28, 4980) that high acidity suppresses the color of $Fe(NCS)_3$, actually applies only to HCl, and the fact is due to colorless complex formation with Cl^-, not to higher H^+ concn.; with other acids, as $HClO_4$ or HNO_3, the color of both $Fe(NCS)_4^-$ and BiI_4^- increases with decreasing pH, and then remains const. between pH 2 and 0.5. (2) Analogous calcns. for complexes with anions of weak acids, exemplified by salicylate (*sal*$^-$), give the pH at which a stated fraction of the metal ion is bound in the complex, thus, with an excess of 0.01 mol. H_2sal, 50% of the Fe^{+++} present is bound in $(Fesal)^+$ at pH 1, 99% at pH 2. The limiting acidity at which the colored complex is still stable, is the higher the greater the excess of the complex-forming weak acid, the higher its dissocn. const., and the higher the stability const. of the complex. Thus, with a 2-fold excess of H_2sal over Fe^{+++}, the color begins to fade at $[H^+] > 1 \times 10^{-4}$, with a 10-fold excess, only at $[H^+] > 3 \times 10^{-4}$. That the permissible pH limit for the color of the Fe^{+++}-nitrosalicylate complex is about the same as for the $[Fesal]^-$ complex, is due to the fact that, while the strength of the former acid is about 15 times greater than that of H_2sal, the stability of the former complex is lower in about the same proportion. The deig. role of the stability of the complex is illustrated by the examples $[Fesal]^+$ and $[Cusal]$ where the latter (yellow) complex is the less stable, accordingly, even in the presence of a 10-fold excess of H_2sal, the color of $[Cusal]$ begins to vanish at pH ~ 4.5, as against pH 2 for $[Fesal]^+$. Since the (orange-yellow) complex of Ti^{++++} with chromotropic acid is more stable than the corresponding complex with Fe^{+++}, the former will be stable down to pH 1. On the high-pH side, a limit is set by a possible decompn. of the complex and pptn. of the hydroxide, a possible formation of higher-coordinated complexes with a different color, and a change of the color of the coordinating weak acid owing to its indicator properties.

N. Thon

A50-51A METALLURGICAL LITERATURE CLASSIFICATION

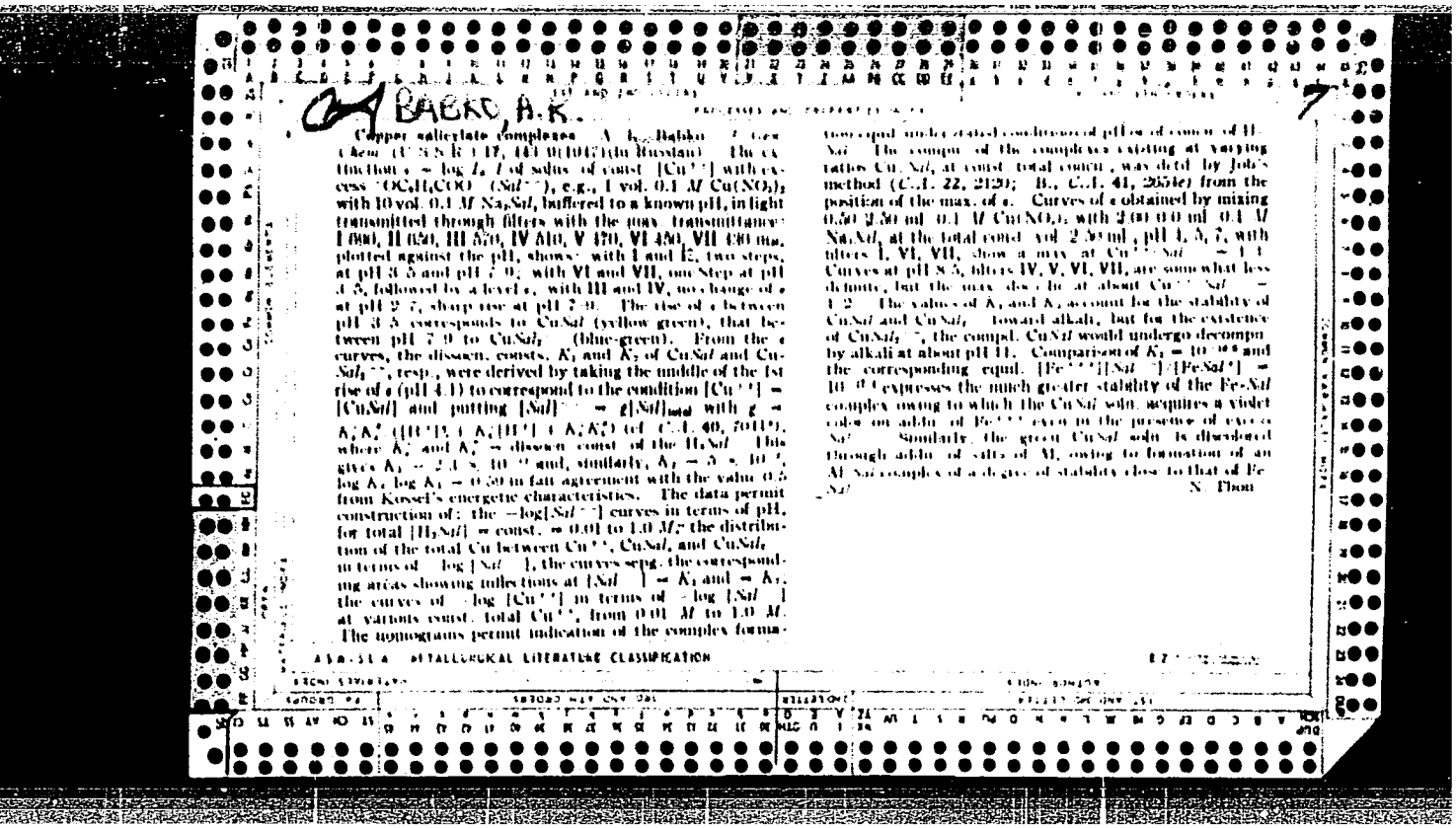


BABKO, A. K.

C4

Colorimetric determination of fluorine. A. K. Babko (Kiev State Univ.). *Zavodskaya Lab.* 13, 803-7(1947). — F can be detd. by the reaction $F^- + MR \rightleftarrows MF + R^-$ provided MF is stable and MR (or anion R^-) has a strong coloration. The ferric thiocyanate method is characterized by low stability of the iron fluoride complex and weak intensity of coloration. Consequently it may be of interest in studying complex equilibria but is less suitable for colorimetric detn. The use of complex of Ti with H_2O_2 satisfies the requirement for stability of fluorine complex but not for intense coloration. This method has advantages over the ferric thiocyanate procedure but is inferior to the Th and Zr alizarin methods. One advantage of the Ti reaction is that SO_4^{-2} and PO_4^{-3} have considerably less effect on the coloration of Ti complexes than on Zr complexes. Alizarin complexes of Th and Zr satisfy the requirements as to stability and coloration better than other reactions. However, many ions form low-dissociating compds. with Zr and Th. B. Z. K.

A.S.M.-S.L.A. METALLURGICAL LITERATURE CLASSIFICATION

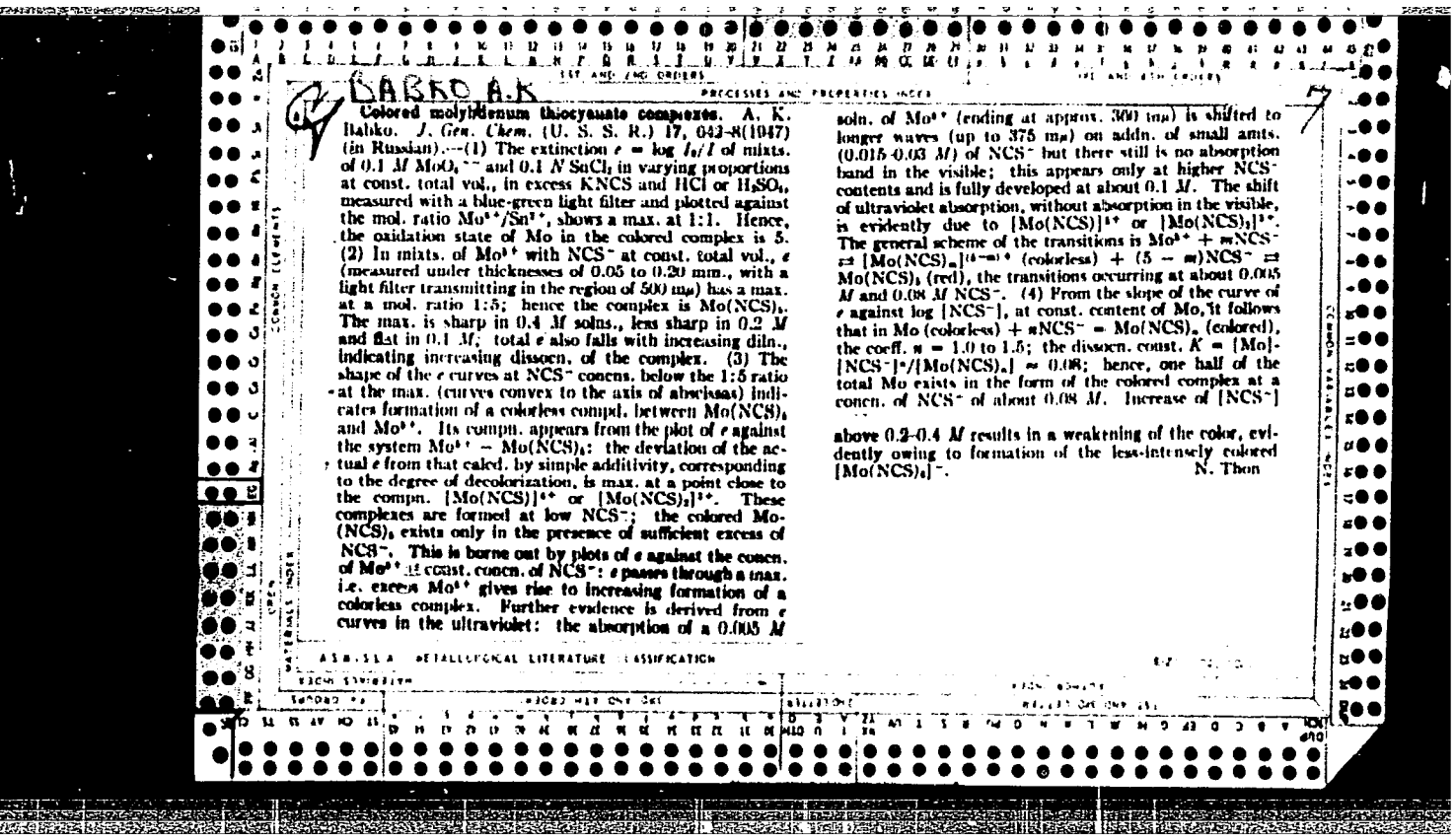


BABKO, A. K.

Copper salicylate complexes. A. K. Babko. *Zhur. Obshchei Khim.* (*J. Gen. Chem.*) (U.S.S.R.) 17, 103–9(1947) (in Russian). The extinction coefficient $\epsilon = \log I_0/I$ of solns. of const. $[Cu^{++}]$ with excess $^-OC_6H_4COO^-$ (Sal^{--}), e.g., 1 vol. 0.1 *M* $Cu(NO_3)_2$ with 10 vol. 0.1 *M* Na_2Sal, buffered to a known pH, in light transmitted through filters with the max. transmittance: I 400, II 450, III 470, IV 490, V 520, VI 540, VII 580 mμ, plotted against the pH, shows: with I and II, two steps, at pH 3.5 and pH 7.0; with VI and VII, one step at pH 4.5, followed by a level ε, with III and IV, no change of ε at pH 2.7, sharp rise at pH 7.0. The rise of ε between pH 3.5 corresponds to $CuSal$ (yellow green), that between pH 7.0 to $CuSal_2^{--}$ (blue-green). From the ε curves, the dissocn. consts. K_1 and K_2 of $CuSal$ and $CuSal_2^{--}$, resp., were derived by taking the middle of the 1st rise of ε (pH 4.1) to correspond to the condition $[Cu^{++}] = [CuSal]$ and putting $[Sal^{--}] = g[Sal^{--}]_{total}$ with $g = K_1K_2/([H^+]^2 + K_1[H^+] + K_1K_2)$ (cf. *C.A.* 40, 7011⁹), where K_1 and K_2 = dissocn. const. of the H_2Sal. This gives $K_1 = 2.5 \times 10^{-9}$ and, similarly, $K_2 = 5 \times 10^{-12}$, $\log K_1/\log K_2 = 0.50$ in fair agreement with the value 0.5 from Kossel's energetic characteristics. The data permit construction of: the $-\log[Sal^{--}]$ curves in terms of pH, for total $[H_2Sal]$ = const. = 0.01 to 1.0 *M*; the distribution of the total Cu between Cu^{++}, $CuSal$, and $CuSal_2^{--}$ in terms of $-\log[Sal^{--}]$, the curves segg. the corresponding areas showing inflections at $[Sal^{--}] = K_1$ and $= K_2$; the curves of $-\log[Cu^{++}]$ in terms of $-\log[Sal^{--}]$ at various const. total Cu^{++}, from 0.01 *M* to 1.0 *M*. The nomograms permit indication of the complex formation equil. under stated conditions and of pH as a function of H_2Sal. The compn. of the complexes existing at varying ratios $Cu:Sal$, at const. total concn., was detd. by Job's method (*C.A.* 22, 2129; *B., C.A.* 41, 2951*e*) from the position of the max. of ε. Curves of ε obtained by mixing 0.50–2.50 ml. 0.1 *M* $Cu(NO_3)_2$ with 2.00–0.0 ml. 0.1 *M* Na_2Sal, at the total const. vol. 2.5 ml., pH 4, 5, 7, with filters I, VI, VII, show a max. at $Cu^{++}:Sal^{--} = 1:1$. Curves at pH 8.5, filters IV, V, VI, VII, are somewhat less definite, but the max. also lie at about $Cu^{++}:Sal^{--} = 1:2$. The values of K_1 and K_2 account for the stability of $CuSal$ and $CuSal_2^{--}$ toward alkali, but for the existence of $CuSal_2^{--}$, the compl. $CuSal$ would undergo decompn. by alkali at about pH 11. Comparison of $K_1 = 10^{-9.6}$ and the corresponding equil. $[Fe^{+++}][Sal^{--}]/[FeSal^+] = 10^{-16.4}$ expresses the much greater stability of the $FeSal$ complex owing to which the $CuSal$ soln. acquires a violet color on addn. of Fe^{+++} even in the presence of excess Sal^{--}. Similarly, the green $CuSal$ soln. is discolored through addn. of salts of Al, owing to formation of an $AlSal$ complex of a degree of stability close to that of $FeSal$.

N. Thon

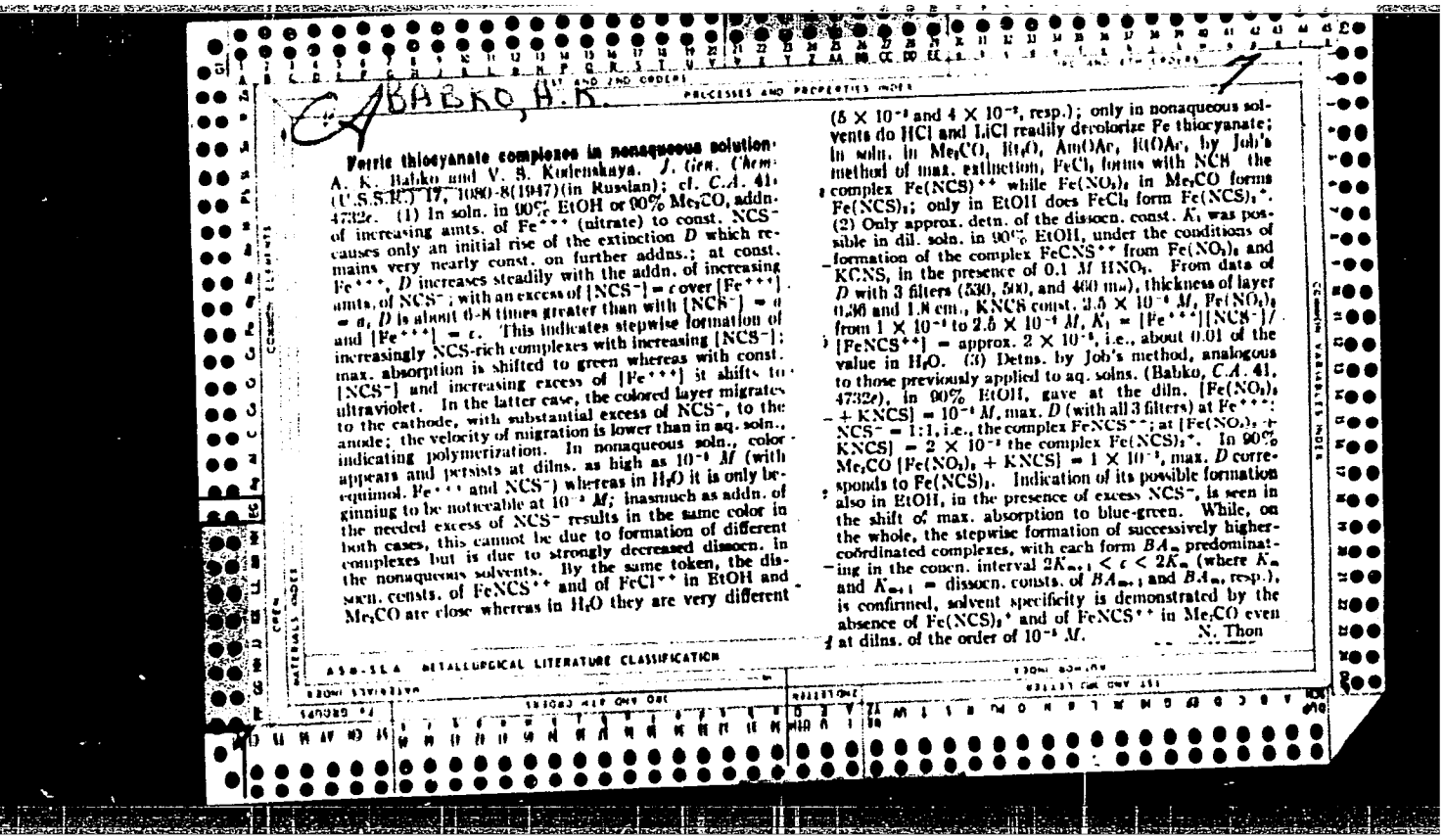
A 50-51 A METALLURGICAL LITERATURE CLASSIFICATION



LABRO A.K

Colored molybdenum thiocyanate complexes. A. K. Babko. *J. Gen. Chem.* (U. S. S. R.) 17, 643-8(1947) (in Russian).—(1) The extinction $\epsilon = \log I_0/I$ of mixts. of 0.1 *M* MoO_4^{--} and 0.1 *N* $SnCl_2$ in varying proportions at const. total vol., in excess KNCS and HCl or H_2SO_4, measured with a blue-green light filter and plotted against the mol. ratio Mo^{6+}/Sn^{2+}, shows a max. at 1:1. Hence, the oxidation state of Mo in the colored complex is 5. (2) In mixts. of Mo^{5+} with NCS^- at const. total vol., ϵ (measured under thicknesses of 0.05 to 0.20 mm., with a light filter transmitting in the region of 500 mμ) has a max. at a mol. ratio 1:5; hence the complex is $Mo(NCS)_5$. The max. is sharp in 0.4 *M* solns., less sharp in 0.2 *M* and flat in 0.1 *M*; total ϵ also falls with increasing diln., indicating increasing dissocn. of the complex. (3) The shape of the ϵ curves at NCS^- concns. below the 1:5 ratio at the max. (curves convex to the axis of abscissas) indicates formation of a colorless compd. between $Mo(NCS)_5$ and Mo^{5+}. Its compn. appears from the plot of ϵ against the system $Mo^{5+} - Mo(NCS)_5$: the deviation of the actual ϵ from that calcd. by simple additivity, corresponding to the degree of decolorization, is max. at a point close to the compn. $[Mo(NCS)]^{4+}$ or $[Mo(NCS)_2]^{3+}$. These complexes are formed at low NCS^-; the colored $Mo(NCS)_5$ exists only in the presence of sufficient excess of NCS^-. This is borne out by plots of ϵ against the concn. of Mo^{5+} at const. concn. of NCS^-: ϵ passes through a max. i.e. excess Mo^{5+} gives rise to increasing formation of a colorless complex. Further evidence is derived from ϵ curves in the ultraviolet: the absorption of a 0.005 *M* soln. of Mo^{5+} (ending at approx. 300 mμ) is shifted to longer waves (up to 375 mμ) on addn. of small amts. (0.015-0.03 *M*) of NCS^- but there still is no absorption band in the visible; this appears only at higher NCS^- contents and is fully developed at about 0.1 *M*. The shift of ultraviolet absorption, without absorption in the visible, is evidently due to $[Mo(NCS)]^{4+}$ or $[Mo(NCS)_2]^{3+}$. The general scheme of the transitions is $Mo^{5+} + nNCS^- \rightleftarrows [Mo(NCS)_n]^{(5-n)+}$ (colorless) + $(5 - n)NCS^- \rightleftarrows Mo(NCS)_5$ (red), the transitions occurring at about 0.005 *M* and 0.08 *M* NCS^-. (4) From the slope of the curve of ϵ against log $[NCS^-]$, at const. content of Mo, it follows that in Mo (colorless) + $nNCS^- = Mo(NCS)_n$ (colored), the coeff. $n = 1.0$ to 1.5; the dissocn. const. $K = [Mo][NCS^-]^n/[Mo(NCS)_n] \approx 0.08$; hence, one half of the total Mo exists in the form of the colored complex at a concn. of NCS^- of about 0.08 *M*. Increase of $[NCS^-]$ above 0.2-0.4 *M* results in a weakening of the color, evidently owing to formation of the less-intensely colored $[Mo(NCS)_6]^-$.

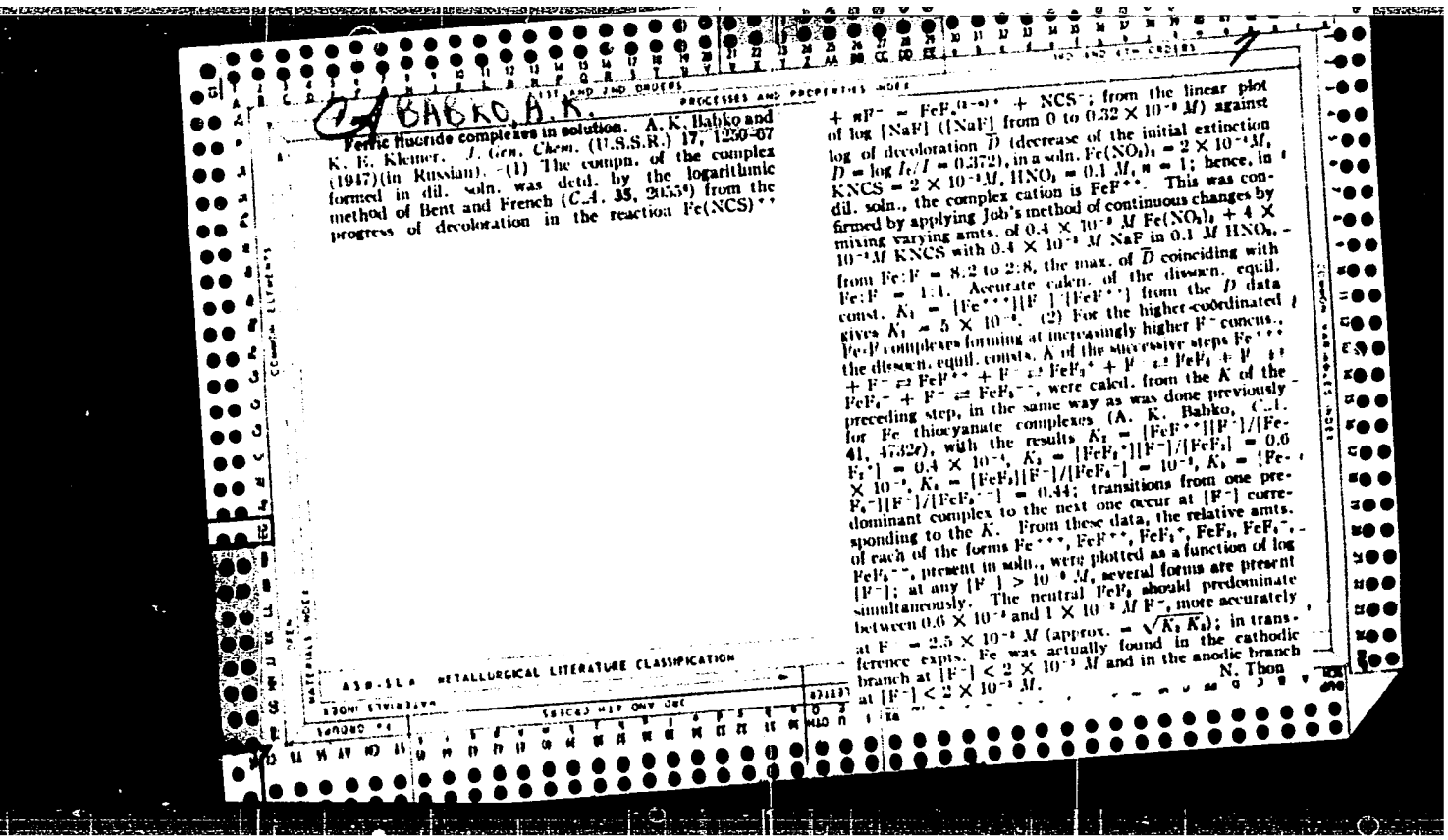
N. Thon



CA BABKO, A. K.

Ferric thiocyanate complexes in nonaqueous solution. A. K. Babko and V. S. Kudenskaya. *J. Gen. Chem.* (U.S.S.R.) 17, 1080-8(1947)(in Russian); cf. *C.A.* 41, 4732e. (1) In soln. in 90% EtOH or 90% Me_2CO, addn. of increasing amts. of Fe^{+++} (nitrate) to const. NCS^- causes only an initial rise of the extinction D which remains very nearly const. on further addns.; at const. Fe^{+++}, D increases steadily with the addn. of increasing amts. of NCS^-; with an excess of $[NCS^-] = c$ over $[Fe^{+++}] = a$, D is about 0.8 times greater than with $[NCS^-] = a$ and $[Fe^{+++}] = c$. This indicates stepwise formation of increasingly NCS-rich complexes with increasing $[NCS^-]$; max. absorption is shifted to green whereas with const. $[NCS^-]$ and increasing excess of $[Fe^{+++}]$ it shifts to ultraviolet. In the latter case, the colored layer migrates to the cathode, with substantial excess of NCS^-, to the anode; the velocity of migration is lower than in aq. soln., indicating polymerization. In nonaqueous soln., color appears and persists at dilns. as high as 10^{-4} M (with equimol. Fe^{+++} and NCS^-) whereas in H_2O it is only beginning to be noticeable at 10^{-2} M; inasmuch as addn. of the needed excess of NCS^- results in the same color in both cases, this cannot be due to formation of different complexes but is due to strongly decreased dissocn. in the nonaqueous solvents. By the same token, the dissocn. consts. of $FeNCS^{++}$ and of $FeCl^{++}$ in EtOH and Me_2CO are close whereas in H_2O they are very different (5×10^{-3} and 4×10^{-4}, resp.); only in nonaqueous solvents do HCl and LiCl readily decolorize Fe thiocyanate; in soln. in Me_2CO, H_2O, Am(OAc), BO(OAc), by Job's method of max. extinction, $FeCl_3$ forms with NCH the complex $Fe(NCS)^{++}$ while $Fe(NO_3)_3$ in Me_2CO forms $Fe(NCS)_3$; only in EtOH does $FeCl_3$ form $Fe(NCS)_3$. (2) Only approx. detn. of the dissocn. const. K_1 was possible in dil. soln. in 90% EtOH, under the conditions of formation of the complex $FeCNS^{++}$ from $Fe(NO_3)_3$ and KCNS, in the presence of 0.1 M HNO_3. From data of D with 3 filters (530, 500, and 460 mμ), thickness of layer 0.30 and 1.8 cm., KNCS const. 2.5×10^{-4} M, $Fe(NO_3)_3$ from 1×10^{-4} to 2.5×10^{-4} M, $K_1 = [Fe^{+++}][NCS^-]/[FeNCS^{++}]$ = approx. 2×10^{-4}, i.e., about 0.01 of the value in H_2O. (3) Detns. by Job's method, analogous to those previously applied to aq. solns. (Babko, *C.A.* 41, 4732e), in 90% EtOH, gave at the dilns. $[Fe(NO_3)_3 + KNCS] = 10^{-4}$ M, max. D (with all 3 filters) at Fe^{+++}: $NCS^- = 1:1$, i.e., the complex $FeNCS^{++}$; at $[Fe(NO_3)_3 + KNCS] = 2 \times 10^{-4}$ the complex $Fe(NCS)_2^+$. In 90% Me_2CO $[Fe(NO_3)_3 + KNCS] = 1 \times 10^{-4}$, max. D corresponds to $Fe(NCS)_3$. Indication of its possible formation also in EtOH, in the presence of excess NCS^-, is seen in the shift of max. absorption to blue-green. While, on the whole, the stepwise formation of successively higher-coördinated complexes, with each form BA_n predominating in the concn. interval $2K_{n+1} < c < 2K_n$ (where K_n and K_{n+1} = dissocn. consts. of BA_{n-1} and BA_n, resp.), is confirmed, solvent specificity is demonstrated by the absence of $Fe(NCS)_2^+$ and of $FeNCS^{++}$ in Me_2CO even at dilns. of the order of 10^{-3} M. N. Thon

A50-51A METALLURGICAL LITERATURE CLASSIFICATION

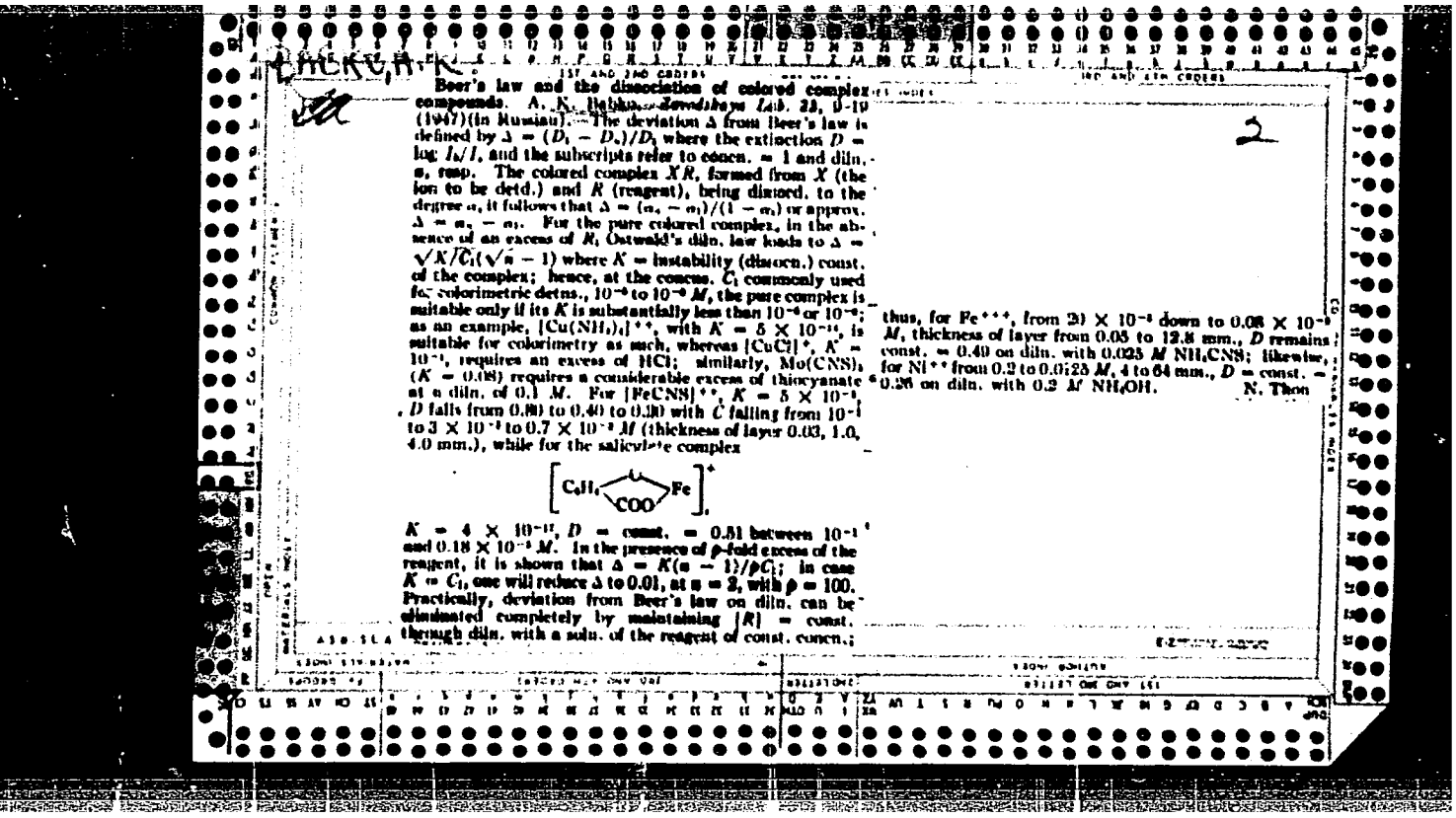


BABKO, A. K.

Ferric fluoride complexes in solution. A. K. Babko and K. E. Kleiner. *J. Gen. Chem.* (U.S.S.R.) 17, 1230–07 (1947)(in Russian). (1) The compn. of the complex formed in dil. soln. was detd. by the logarithmic method of Bent and French (*C.A.* 35, 2055⁹) from the progress of decoloration in the reaction $Fe(NCS)^{++} + nF^- = FeF_n^{(3-n)+} + NCS^-$; from the linear plot of log [NaF] ([NaF] from 0 to 0.32×10^{-3} *M*) against log of decoloration $\bar{D}$ (decrease of the initial extinction $D = \log I_0/I = 0.372$), in a soln. $Fe(NO_3)_3 = 2 \times 10^{-4}$ *M*, KNCS $= 2 \times 10^{-4}$ *M*, $HNO_3 = 0.1$ *M*, $n = 1$; hence, in dil. soln., the complex cation is FeF^{++}. This was confirmed by applying Job's method of continuous changes by mixing varying amts. of 0.4×10^{-3} *M* $Fe(NO_3)_3 + 4 \times 10^{-3}$ *M* KNCS with 0.4×10^{-3} *M* NaF in 0.1 *M* HNO_3, - from Fe:F = 8:2 to 2:8, the max. of $\bar{D}$ coinciding with Fe:F = 1:1. Accurate calcn. of the dissocn. equil. const. $K_1 = [Fe^{+++}][F^-]/[FeF^{++}]$ from the $\bar{D}$ data gives $K_1 = 5 \times 10^{-6}$. (2) For the higher-coördinated Fe:F complexes forming at increasingly higher F^- concns., the dissocn. equil. consts. K of the successive steps $Fe^{+++} + F^- \rightleftarrows FeF^{++} + F^- \rightleftarrows FeF_2^+ + F^- \rightleftarrows FeF_3 + F^- \rightleftarrows FeF_4^- + F^- \rightleftarrows FeF_5^{--}$, were calcd. from the K of the preceding step, in the same way as was done previously for Fe thiocyanate complexes (A. K. Babko, *C.A.* 41, 4732*e*), with the results $K_1 = [FeF^{++}][F^-]/[FeF_2^+] = 0.4 \times 10^{-6}$, $K_2 = [FeF_2^+][F^-]/[FeF_3] = 0.6 \times 10^{-6}$, $K_3 = [FeF_3][F^-]/[FeF_4^-] = 10^{-6}$, $K_4 = [FeF_4^-][F^-]/[FeF_5^{--}] = 0.44$; transitions from one predominant complex to the next one occur at $[F^-]$ corresponding to the K. From these data, the relative amts. of each of the forms Fe^{+++}, FeF^{++}, FeF_2^+, FeF_3, FeF_4^-, FeF_5^{--}, present in soln., were plotted as a function of log $[F^-]$; at any $[F^-] > 10^{-6}$ *M*, several forms are present simultaneously. The neutral FeF_3 should predominate between 0.6×10^{-6} and 1×10^{-3} *M* F^-, more accurately at $F^- = 2.5 \times 10^{-4}$ *M* (approx. $= \sqrt{K_3 K_4}$); in transference expts. Fe was actually found in the cathodic branch at $[F^-] < 2 \times 10^{-4}$ *M* and in the anodic branch at $[F^-] < 2 \times 10^{-3}$ *M*.

N. Thon

A50-51A METALLURGICAL LITERATURE CLASSIFICATION

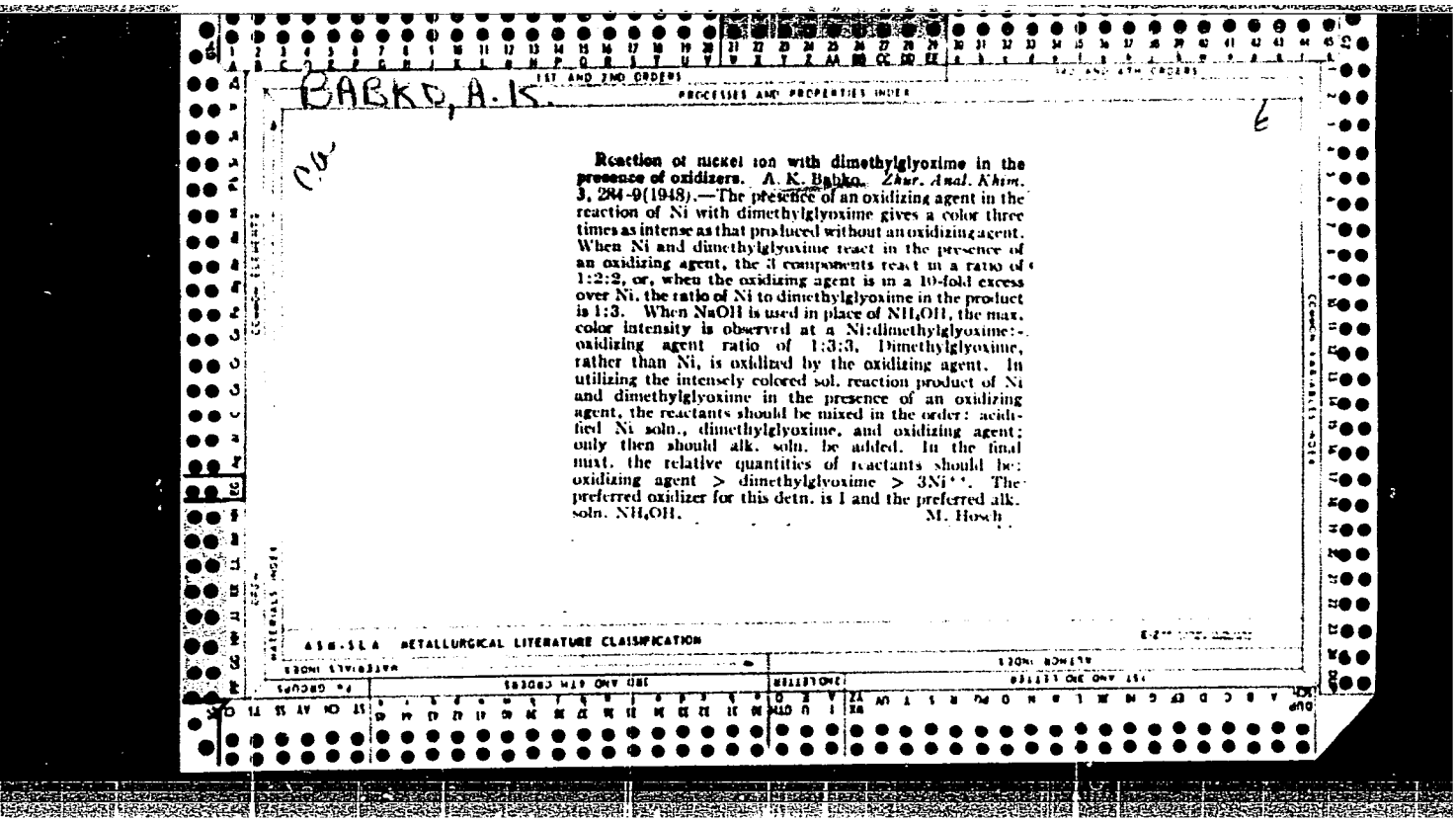


Beer's law and the dissociation of colored complex compounds. A. K. Babko. *Zavodskaya Lab.* 13, 9-19 (1947)(in Russian).—The deviation Δ from Beer's law is defined by $\Delta = (D_1 - D_c)/D_1$ where the extinction $D = \log I_0/I$, and the subscripts refer to concn. = 1 and dilu., c, resp. The colored complex XR, formed from X (the ion to be detd.) and R (reagent), being dissocd. to the degree α, it follows that $\Delta = (\alpha_c - \alpha_1)/(1 - \alpha_1)$ or approx. $\Delta = \alpha_c - \alpha_1$. For the pure colored complex, in the absence of an excess of R, Ostwald's dilu. law leads to $\Delta = \sqrt{K/C_1}(\sqrt{n} - 1)$ where K = instability (dissocn.) const. of the complex; hence, at the concns. C_1 commonly used for colorimetric detns., 10^{-3} to 10^{-4} M, the pure complex is suitable only if its K is substantially less than 10^{-6} or 10^{-6}; as an example, $[Cu(NH_3)_4]^{++}$, with $K = 5 \times 10^{-14}$, is suitable for colorimetry as such, whereas $[CuCl]^+$, $K = 10^{-1}$, requires an excess of HCl; similarly, $Mo(CNS)_3$ ($K = 0.08$) requires a considerable excess of thiocyanate at a dilu. of 0.1 M. For $[FeCNS]^{++}$, $K = 5 \times 10^{-4}$, D falls from 0.80 to 0.40 to 0.30 with C falling from 10^{-4} to 3×10^{-5} to 0.7×10^{-5} M (thickness of layer 0.03, 1.0, 4.0 mm.), while for the salicylate complex

$$\left[C_6H_4\begin{smallmatrix}O\\COO\end{smallmatrix}Fe\right]^+$$

$K = 4 \times 10^{-17}$, D = const. = 0.51 between 10^{-1} and 0.18×10^{-3} M. In the presence of ρ-fold excess of the reagent, it is shown that $\Delta = K(n - 1)/\rho C_1$; in case $K = C_1$, one will reduce Δ to 0.01, at $n = 2$, with $\rho = 100$. Practically, deviation from Beer's law on dilu. can be eliminated completely by maintaining $[R]$ = const. through dilu. with a solu. of the reagent of const. concn.; thus, for Fe^{+++}, from $3) \times 10^{-4}$ down to 0.08×10^{-4} M, thickness of layer from 0.05 to 12.8 mm., D remains const. = 0.40 on dilu. with 0.025 M NH_4CNS; likewise, for Ni^{++} from 0.2 to 0.025 M, 4 to 64 mm., D = const. = 0.36 on dilu. with 0.2 M NH_4OH.

N. Thon

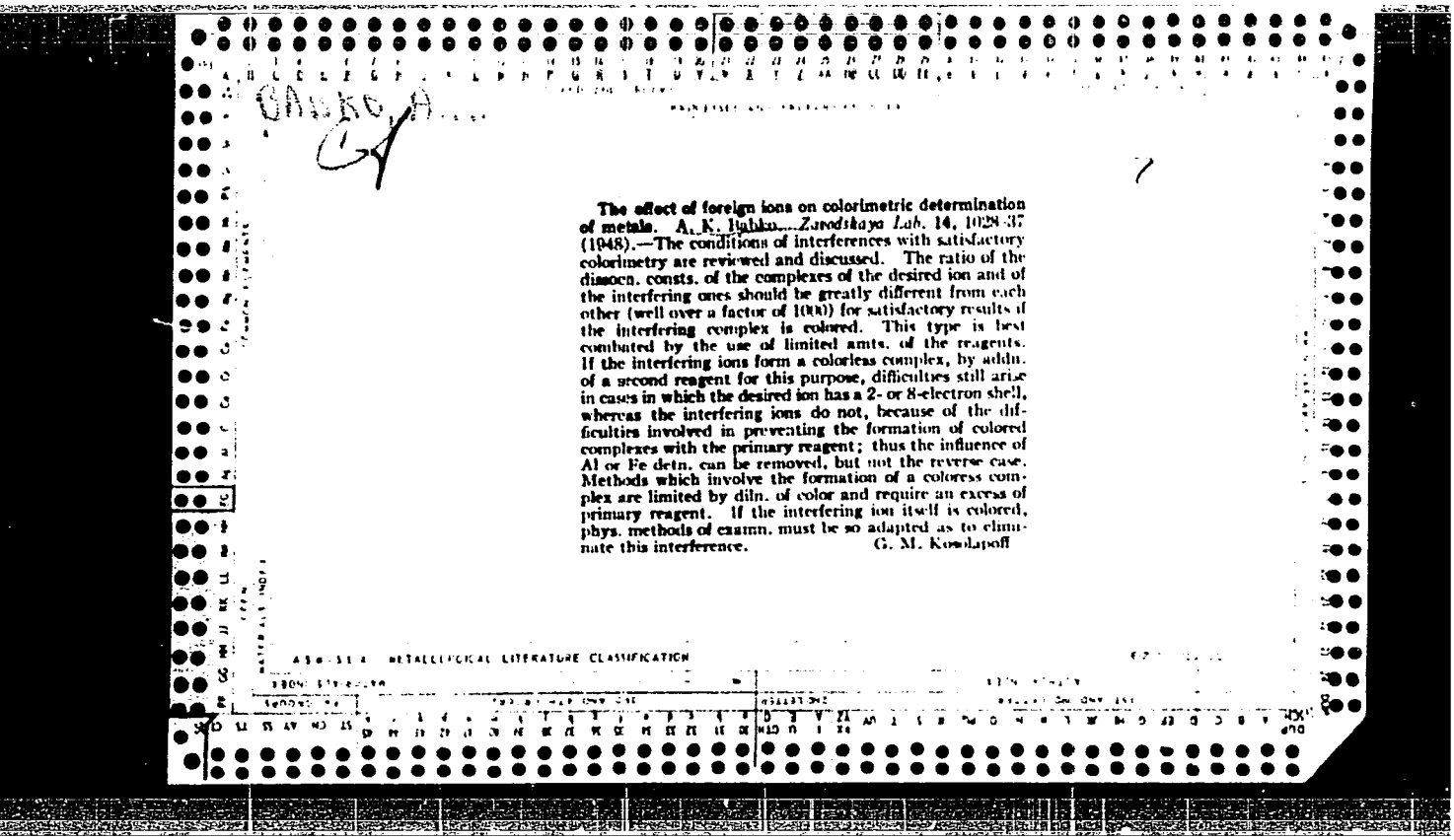


BABKO, A.K.

Reaction of nickel ion with dimethylglyoxime in the presence of oxidizers. A. K. Babko. *Zhur. Anal. Khim.* 3, 284-9(1948).—The presence of an oxidizing agent in the reaction of Ni with dimethylglyoxime gives a color three times as intense as that produced without an oxidizing agent. When Ni and dimethylglyoxime react in the presence of an oxidizing agent, the 3 components react in a ratio of 1:2:2, or, when the oxidizing agent is in a 10-fold excess over Ni, the ratio of Ni to dimethylglyoxime in the product is 1:3. When NaOH is used in place of NH_4OH, the max. color intensity is observed at a Ni:dimethylglyoxime:oxidizing agent ratio of 1:3:3. Dimethylglyoxime, rather than Ni, is oxidized by the oxidizing agent. In utilizing the intensely colored sol. reaction product of Ni and dimethylglyoxime in the presence of an oxidizing agent, the reactants should be mixed in the order: acidified Ni soln., dimethylglyoxime, and oxidizing agent; only then should alk. soln. be added. In the final mixt. the relative quantities of reactants should be: oxidizing agent > dimethylglyoxime > $3Ni^{++}$. The preferred oxidizer for this detn. is I and the preferred alk. soln. NH_4OH.

M. Hosch

A S M - S L A METALLURGICAL LITERATURE CLASSIFICATION



The effect of foreign ions on colorimetric determination of metals. A. K. Babko. *Zavodskaya Lab.* 14, 1028-37 (1948).—The conditions of interferences with satisfactory colorimetry are reviewed and discussed. The ratio of the dissocn. consts. of the complexes of the desired ion and of the interfering ones should be greatly different from each other (well over a factor of 1000) for satisfactory results if the interfering complex is colored. This type is best combated by the use of limited amts. of the reagents. If the interfering ions form a colorless complex, by addn. of a second reagent for this purpose, difficulties still arise in cases in which the desired ion has a 2- or 8-electron shell, whereas the interfering ions do not, because of the difficulties involved in preventing the formation of colored complexes with the primary reagent; thus the influence of Al or Fe detn. can be removed, but not the reverse case. Methods which involve the formation of a colorless complex are limited by diln. of color and require an excess of primary reagent. If the interfering ion itself is colored, phys. methods of examn. must be so adapted as to eliminate this interference. G. M. Kosolapoff

BABKO, A. K.
CA

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Colorimetric determination in a mixture of two colored components. A. K. Babko and M. M. Korsun (Kiev State Univ.). *Zavodskaya Lab.* 14, 1160-70(1948).—The problem of detn. of 2 colored components by colorimetric means is discussed in detail. In cases involving 2 colored complexes of different metals, the selection of the spectral region is made according to the absorption curves of the components, and for a system like Cr and Mn (as dichromate-permanganate mixt.) the use of ordinary colorimeter with light filters is satisfactory (passing 530-550 mμ and 430 mμ, resp.). If the absorption curves of the reagent itself and the colored complex differ significantly, a calibration color standard set is recommended; for smaller differences, calibration curves are advised. When 2 colored complexes arise from the same ion (different no. of coördination) the most satisfactory location of the observation light band lies between the 2 max. absorption peaks, i.e. at a point of absorption of both complexes in approx. equal ratio. G. M. Kosolapoff

BABKO, A.K.

USSR/Chemistry - Solutions, Theory of May 48
Chemistry - Solutions, Concentration of

"Dependence of the Composition of Complex Groups in Solution on the Nature of the Concentration," A. K. Babko, Inst Gen and Inorg Chem, Acad Sci USSR, 6 ½ pp

"Zhur Obshch Khim" Vol XVIII (LXXX), No 5 pp 816-22

Theoretical discussion. The composition of a complex group in solution corresponds to the stoichiometric relationship between the central ion B and the coordinated ion A only at high values of the over-all concentration c and small values of the dissociation constant k, to wit when $c \gg k$. With small concentra-

8/49756

USSR/Chemistry - Solutions, Theory of May 48
(Contd 1)

tions and insufficiently stable complexes, i.e., when $c \leq k$, the composition of the complex group in solution corresponds to the coordination number less than does the stoichiometric ratio of the over-all concentrations A_{ov}: B. It depends to a considerable extent on the absolute concentration of the excess free A. In the general case, the relation between the composition of a complex group in solution and the concentration conditions is expressed by a triangular diagram B-S-A, where S is the solvent. Some particular cases are examined on this basis and

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USSR/Chemistry - Solutions, Theory of May 48
(Contd 2)

the limitations of Job's method are demonstrated.

Submitted 24 Mar 1947.

P/49756

USSR/Chemistry - Systems, Ternary Sep 48
Chemistry - Analysis, Physicochemical

"Complex Formation in the Ternary System: Copper Ion, Pyridine, Salicilate (in Solution)," A. K. Babko, Inst Gen and Inorg Chem, Acad Sci Ukrainian SSR, 9½ pp

"Zhur Obshch Khimii" Vol XVIII, No 9, 1607-16

Studies formation of intensely colored ternary complex in solution containing copper ions, salicilate and pyridine. Method used was physicochemical analysis. Composition of system is represented by triangle Cu++ Sal--Py (with 0.05 gm-mol concentrations of all components).

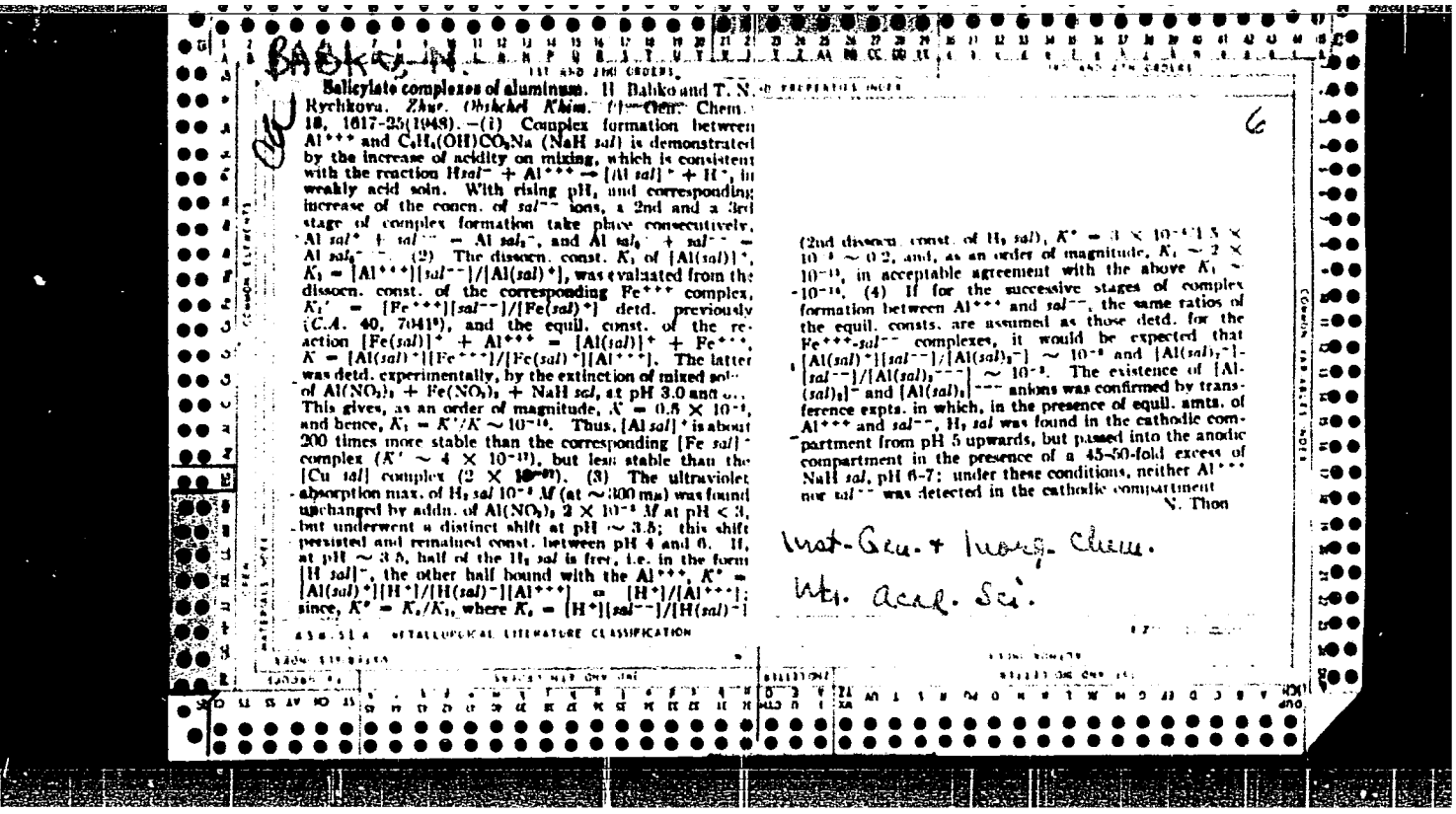
30/4976
Sep 48

USSR/Chemistry - Systems, Ternary

Measures extinction of solutions for certain light filters. Devises method for physicochemical analysis of colored solutions of ternary systems by combining the "isochrome" and separate sections of the ternary system. Shows that two binary complexes, $CuPy_2^{++}$ and $CuSal_2$, and one ternary compound $[CuPy_2Sal]^+$ are formed in system studied. The ternary complex has many properties characteristic of intracomplex compounds, in particular, intense color, stability in solution, and solubility in organic solvents. Submitted 10 Jun 47.

30/4976

Babko, A.K.



BABKO, A.K.

Salicylate complexes of aluminum. II Babko and T. N. Ryehkova. *Zhur. Obshchel Khim.* (J. Gen. Chem.) 18, 1617-25(1948).—(1) Complex formation between Al^{+++} and $C_6H_4(OH)CO_2Na$ (NaH *sal*) is demonstrated by the increase of acidity on mixing, which is consistent with the reaction $Hsal^- + Al^{+++} \rightarrow [Al\ sal]^+ + H^+$, in weakly acid soln. With rising pH, and corresponding increase of the concn. of sal^{--} ions, a 2nd and a 3rd stage of complex formation take place consecutively, $Al\ sal^+ + sal^{--} = Al\ sal_2^-$, and $Al\ sal_2^- + sal^{--} = Al\ sal_3^{---}$. (2) The dissocn. const. K_1 of $[Al(sal)]^+$, $K_1 = [Al^{+++}][sal^{--}]/[Al(sal)^+]$, was evaluated from the dissocn. const. of the corresponding Fe^{+++} complex, $K_1' = [Fe^{+++}][sal^{--}]/[Fe(sal)^+]$ detd. previously (*C.A.* 40, 7041[9]), and the equil. const. of the reaction $[Fe(sal)]^+ + Al^{+++} = [Al(sal)]^+ + Fe^{+++}$, $K = [Al(sal)^+][Fe^{+++}]/[Fe(sal)^+][Al^{+++}]$. The latter was detd. experimentally, by the extinction of mixed sol- of $Al(NO_3)_3 + Fe(NO_3)_3 + NaH\ sal$, at pH 3.0 and ... This gives, as an order of magnitude, $K = 0.5 \times 10^{-4}$, and hence, $K_1 = K'/K \sim 10^{-10}$. Thus, $[Al\ sal]^+$ is about 200 times more stable than the corresponding $[Fe\ sal]^+$ complex ($K' \sim 4 \times 10^{-12}$), but less stable than the $[Cu\ sal]$ complex (2×10^{-21}). (3) The ultraviolet absorption max. of $H_2\ sal$ 10^{-4} *M* (at ~300 mμ) was found unchanged by addn. of $Al(NO_3)_3$ 2×10^{-3} *M* at pH < 3, but underwent a distinct shift at pH ~ 3.5; this shift persisted and remained const. between pH 4 and 6. If, at pH ~ 3.5, half of the $H_2\ sal$ is free, i.e. in the form $[H\ sal]^-$, the other half bound with the Al^{+++}, $K^* = [Al(sal)^+][H^+]/[H(sal)^-][Al^{+++}] = [H^+]/[Al^{+++}]$; since, $K^* = K_2/K_1$, where $K_2 = [H^+][sal^{--}]/[H(sal)^-]$ (2nd dissocn. const. of $H_2\ sal$), $K^* = 3 \times 10^{-4}$ $1.5 \times 10^{-4} \sim 0.2$, and, as an order of magnitude, $K_1 \sim 2 \times 10^{-10}$, in acceptable agreement with the above $K_1 \sim 10^{-10}$. (4) If for the successive stages of complex formation between Al^{+++} and sal^{--}, the same ratios of the equil. consts. are assumed as those detd. for the Fe^{+++}-sal^{--} complexes, it would be expected that $[Al(sal)^+][sal^{--}]/[Al(sal)_2^-] \sim 10^{-6}$ and $[Al(sal)_2^-][sal^{--}]/[Al(sal)_3^{---}] \sim 10^{-6}$. The existence of $[Al(sal)_3]^{---}$ and $[Al(sal)_2]^-$ anions was confirmed by transference expts. in which, in the presence of equil. amts. of Al^{+++} and sal^{--}, $H_2\ sal$ was found in the cathodic compartment from pH 5 upwards, but passed into the anodic compartment in the presence of a 45-50-fold excess of NaH *sal*, pH 6-7; under these conditions, neither Al^{+++} nor sal^{--} was detected in the cathodic compartment.

N. Thon

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Inst. Gen. + Inorg. Chem.
Ukr. Acad. Sci.

CA BABKO, A.K.

6

Physicochemical analysis of complex compounds in solution. A. K. Babko (Inst. of General and Inorg. Chem., Acad. Sci. Ukrainian SSR, Kiev). *Invest. Sektora Fiz.-Khim. Anal., Inst. Obshchei i Neorg. Khim., Akad. Nauk S.S.S.R.* 19, 235–40 (1949). —In complex compds. the relation of complex groups to other ions, the relation between coordinating and coordinated groups, the strength of the complex in soln., and the energy of the chem. bonds between the central and coordinated ions are revealed by physicochem. analysis. General examples are given.

M. Hosch

BABKO, A. K.

CA

Cobalt thiocyanate complexes in solution. A. K. Babko and O. F. Drako. *Zhur. Obshchei Khim.* (J. Gen. Chem.) 19, 1809-15(1949).—Compns. of complexes formed in Me_2CO soln. between Co^{++} and CNS^- were detd. by photometric measurements of the extinction $E = \log I_0/I$, along definite sections across the triangular state diagram Co^{++}:CNS^-:s (= solvent). In Me_2CO, no deviations from Beer's law were found with the mol. ratios $r = Co^{++}$:CNS^- = 4:1 to 1:10, on up to 32-fold dilns., which proves absence of dissocn. (1) At const. total $Co^{++} + CNS^-$ = 0.05 *M*, with *r* varying from 4:1 to 1:9, the position of the max. *E* depends on the wave length of the light. At 535 mμ, *r* = 4:1, 1:1, 1:2, 1:4, 1:9, *E* = 0.27, 0.70, 1.10, 1.22, 1.0; 570 mμ, 0.40, 0.92, 1.22, 1.05, 0.66; 530 mμ, 0.54, 0.70, 0.64, 0.35, 0.24; 500 mμ, 0.55, 0.52, 0.40, 0.34, 0.21. The max. *E* shifts to longer waves as the concn. of CNS^- is increased. The variation of the position of *E* max. with the wave length indicates formation of several complexes. If, from the values of *E* at 530 mμ, the nonnegligible extinction of $Co(NO_3)_2$ at the corresponding concns. is deducted the thus corrected *E* (i.e. the pure deviations from additivity) are (for the above *r*) 0.37, 0.58, 0.56, 0.30, 0.21, with a max. at 1:1, i.e. at the compn. $CoCNS^+$. The diminution of *E* with further decreasing *r* (increasing CNS^-) indicates gradual disappearance of that complex, and formation of complexes with greater nos. of CNS^-. The complex $Co(CNS)_2$ dets. the max. in 570 mμ, situated at *r* = 1:2, and the blue complex $Co(CNS)_4^{--}$ dets. the max. in 630 mμ. (2) These results are confirmed by similar dets. at const. concn. of Co^{++} = 0.01 *M*, with *r* varying from 50:1 to 1:20. In 500-530 mμ, decrease of *r* to 1:1 and 1:2 deepens the color; further decrease weakens it. This indicates disappearance of $CoCNS^+$ and $Co(CNS)_2$ and formation of $Co(CNS)_3^-$ and $Co(CNS)_4^{--}$, which absorb in the red. Further increase of the excess of CNS^- causes no change; consequently no complexes are formed higher than $Co(CNS)_4^{--}$, and, the latter complex requiring no excess CNS^-, has evidently no tendency to dissoc. in Me_2CO. (3) The existence of intermediate complexes appears particularly clearly in series with a const. concn. of CNS^- = 0.01 *M*, and variable concn. of Co^{++}, *r* from 1:0 to 4:1. In 630 mμ, the color intensity first increases with increasing Co^{++}; further increase, beyond the compn. $Co(CNS)_4^{--}$, weakens the color, owing to the reactions $3Co(CNS)_4^{--} + Co^{++} \rightarrow 4Co(CNS)_3^-$, and $2Co(CNS)_3^- + Co^{++} \rightarrow 3Co(CNS)_2$. In 530 mμ, *E* (corrected for the proper extinction of $Co(NO_3)_2$) increases up to *r* = 1:1, then weakens with further increasing Co^{++}, owing no doubt to further interaction between $CoCNS^+$ and $Co(NO_3)_2$, resulting in complexes still poorer in CNS. (4) The existence of such complexes is demonstrated by the spectroscopically ascertained nonadditivity between $CoCNS^+$ and $Co(NO_3)_2$. The extinction curve of a soln. *r* = 2:1 is not intermediate between the curves of $CoCNS^+$ and $Co(NO_3)_2$, but shows a max. at 530 mμ. This is most probably due to a complex of $Co(CNS)^{+++}$ with the solvent. In an acid soln. ($HClO_4$ 0.1 *M*) additivity is preserved, the position of the max. for *r* = 2:1 being the same (~540 mμ) as for 1:1. The intensity of the color is lower, owing to a lowering of the dissocn. of HCNS by $HClO_4$. (5) Formation of the blue $Co(CNS)_4^{--}$ ion is further confirmed by transference dets.

N. Thon

CA BABKO, A. K.

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Reaction of chromate with diphenylcarbazide. A. K. Babko and L. A. Palil (Inst. of Gen. and Inorg. Chem., Acad. Sci. U.S.S.R.). *Zhur. Anal. Khim.* 5, 272-80 (1950).—Three sections on the triangle diphenylcarbazide (I)-CrO_4^{--}-H_2O were studied: Parallel to the I-CrO_4^{--} side, i.e. a series of solns. where the relative quantities of I and CrO_4^{--} varied but their sum remained const., parallel to the I-H_2O side, i.e. a series of solns. in which the CrO_4^{--} concn. was const. and the concn. of I varied, and parallel to the CrO_4^{--}-H_2O side, i.e. solns. in which I remained const. and CrO_4^{--} varied. The highest color intensity was obtained at a CrO_4^{--}:I ratio of 1:2. The curves of concn. vs. color intensity had a rounded max. The colored reaction product was extd. with AmOH; it contained no Cr. The results indicate that no complex is formed in this reaction and that the colored product is an oxidation product of I by CrO_4^{--}. The oxidizing effect of CrO_4^{--} is specific; neither $KMnO_4$ nor H_2O_2 produced the colored product. In the presence of reducing agents such as $TiCl_3$, $CrCl_2$, and Na_2SO_3, CrO_4^{--} reacted with them and the colored product did not form. The conditions most favorable for this reaction are: (1) in combining the CrO_4^{--} soln. and the reagent, the former should be added to the latter; (2) the reagent should be taken in 1.5–2.0 times the theoretical value; and (3) the concn. of H^+ should be 0.5–5.0 *N*. The sensitivity of this method is approx. 3.5×10^{-6} mol./l. M. Hosch

BABKO, A. K.

A.K. Babko and O.F. Drako. Colorimetric determination of cobalt as a rhodanide complex. P. 1162.

Inst. of General and
Inorganic Chemistry
Acad. of Sci.,
Ukrainian SSR

SO: Factory Laboratory, No. 10, 1950

C. A. BABKO, A. K.

Application of extraction in chemical analysis. A. K. Babko (Acad. Sci. Ukrain.S.S.R.). *Zavodskaya Lab.* 16, 327–36(1950).—Review of principles, advantages, and applications of extn. procedures in analytical work. 10 references. G. M. Kosolapoff

Use of nonaqueous solvents for the thiocyanate method of colorimetric determination of iron. A. K. Babko and V. S. Kudenskaya. *Zavodskaya Lab.* 16, 443–8(1950).—Org. solvents miscible with H_2O reduce the dissocn. of the complex and increase the color intensity. Solvents immiscible with H_2O also give the same final result largely owing to concn. of the complex in the small vol. Sulfate ion reduces the color very much and the use of Me_2CO as the solvent causes still further color loss, but H_2O-insol. solvents eliminate this interference by sulfate. In the presence of HCl or H_2SO_4 and with excess thiocyanate the loss of color is slight. If the soln. is more than normal in acidity, CNS ion is removed from the aq. phase to some extent and reduces the concn. of the complex in the org. layer. G. M. K.

Inst. Gen & Inorg Chem
AS Ukr SSR

CA BABKO, A.K.

The lime method for determination of alkali metals in silicates. A. K. Babko and R. V. Romanishina. *Zavodskaya Lab.* 16, 1417–19(1950).—The principle of the method was given earlier (*Collection of the Works of Constructional Materials Research Inst.*, 1950). The sample in a Pt dish is treated with HF and the evapn. residue consists of fluorides and silicofluorides of the metals. Treatment with $Ca(OH)_2$ leads to conversion of some fluorides to hydroxides, others are unchanged while the silicofluorides form insol. CaF_2 and $CaSiO_3$, with alkali metals giving hydroxides. The $Ca(OH)_2$ is added in sufficient quantity to turn phenolphthalein red and the mass is kept 1 hr. on a steam bath, after which the mixt. is filtered, the filtrate is treated with CO_2 5–10 min., boiled 5–10 min., filtered ($CaCO_3$), and the filtrate contg. Na_2CO_3 and K_2CO_3 is analyzed either by titration with 0.1 *N* HCl or by acidification with HCl, and evapn. and weighing. The results are within a few tenths of a percent from conventional methods. G. M. K.

Inst. Gen. + Inorg. Chem., Ukr. AS USSR

CA BABKO, A.K.

Effect of the solvent on the dissociation of the cobalthiocyanate complex. A. K. Babko and O. F. Drako. (Acad. Sci., Ukr. S.S.R.) *Zhur. Obshchei Khim.* (J. Gen. Chem.) 20, 228-34(1950); cf. *C.A.* 44, 1355h.—The equil. const. $K = [B][A]/[BA]$ of the colored complex BA formed between the central cation B and the anion B is evaluated from the excess of [A] necessary for the optical d. D of the soln. to attain half the max. $D_{max.}$ corresponding to a very large excess of A; at $D = 1/2\ D_{max.}$, $[BA] = [B]$, and $K = [A]$. By photocolorimetry of solns. of $Co(NO_3)_2$ + KCNS, in 610 mμ, in mixts. of H_2O + Me_2CO contg. 10, 25, 50, 75, and 100 vol. % H_2O, − log K (for the complex ion $[Co(CNS)_4]^{--}$) = 2.4, 2.0, 1.6, 1.15, and ~0.5, resp.; the dielec. consts. of these solns., calcd. by the additivity rule, are 27, 38, 51, 66, and 81, resp. In the range 10-75 vol. % H_2O, there is a near proportionality between − log K and 1/ε. The same holds approx. for mixts. of H_2O with AcOH, dioxane, EtOH, and HCO_2H. However, there is no such proportionality from one solvent to another; examples of data of − log K (in parentheses, 1/ε), are: AcOH + 10, 25, 50, 75 vol. % H_2O, 2.1 (0.071), 1.7 (0.043), 1.4 (0.023), 1.3 (0.016); dioxane + 10, 25, 75, 100 vol. % H_2O, 2.2 (0.100), 1.8 (0.045), 1.6 (0.024), 1.4 (0.016); EtOH + 10, 25, 50, 75 vol. % H_2O, 2.1 (0.031), 1.7 (0.020), 1.5 (0.010), 1.1 (0.015); HCO_2H + 10, 25, 50, 75 vol. % H_2O, 1.7 (0.020), 1.4 (0.010), 1.0 (0.016), 0.9 (0.014). If − log K is plotted against the H_2O content of the solvent, the curves for Me_2CO, AcOH, dioxane, EtOH, and HCO_2H are of the same shape and lie closely together. This similarity indicates a common mechanism, whereby the nonaq. component of the solvent promotes removal of H_2O from the inner sphere of the complex and thus facilitates complex formation according to $[Co.4H_2O]^{++}$ + $4CNS^- \rightarrow [Co(CNS)_4]^{--} + 4H_2O$. This accounts for the absence of any marked specificity of the nonaq. solvent. N. Thon

BABKO, A. K.

Colorimetric analysis. Modkva, Gos. nauchno-tekhn. izd-vo khim. lit-ry, 1951. 408 p. (52-36879)

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CA BABKO, A.K.

2

Solubility and acid properties of dimethylglyoxime. A. K. Babko and P. B. Mikhelson (Kiev State Univ.). *Zhur. Anal. Khim.* 6, 267-72(1951).—The soly. of dimethylglyoxime (H_2Dm) in H_2O was detd. at 18–100°. It increased with the temp. from 0.04 g./100 g. soln. at 18° to 0.93 g. at 100°. The soly. was also detd. in NH_4OH taken in concns. of 0.2–0.8 *M* at 18°. The soly. was very small. From these detns. the dissocn. const. defined as $K' = ([H^+][HDm^-]/[H_2Dm])$ was calcd. to be 8×10^{-12}. Similar detns. were made in 8×10^{-4} – 1 *M* NaOH. At 8×10^{-4} – 4×10^{-3} *M* NaOH the ratio $[OH^-]/[HDm^-]$ was const., indicating the formation of HDm^-. At 1 *M* NaOH this ratio became 1, indicating the formation of the neutral salt Na_2Dm. The dissocn. const. calcd. from these data was 8×10^{-12}. The soly. was further detd. in Na and K carbonates. The soly. of H_2Dm increased with the CO_3^{--} concn. up to a certain value after which it declined. This value was 0.1 *M* Na_2CO_3 and 0.2 *M* K_2CO_3. This is attributable to formation of a difficultly sol. double salt composed of the Na or K salt of H_2Dm and the resp. carbonate. The exact compn. of this salt was not ascertained. K_2CO_3 also decreased the soly. of H_2Dm in KOH. M. Hoseh

A note on Hildebrand's approximation for thermal pressures in solids. K. Huang (Liverpool Univ., Engl.). *Phil. Mag.* 42, 202–6(1951).—The distinction between the "vibrational" pressure and the thermal pressure is stressed. The accuracy of the approx. expression improves with increasing temp. The linearly extrapolated vol. from any temp. to the abs. zero lies intermediate between the real vol. at abs. zero of temp. and the vol. corresponding to static equil. If it is extrapolated from a temp. comparable to or higher than the Debye temp. of the solid, the result is expected to lie much nearer to the static equil. value.

S. Tolansky

BABKO, A.K.; KHODULINA, P.V.

Fluorescent reactions for the fluorine ion. Ukr.khim.zhur.17 no.2: 191-197 '51. (MLRA 9:9)

1.Institut obshchey i neorganicheskoy khimii AN USSR.
(Fluorescence) (Fluorine)

BABKO, A.K.; RYCHKOVA, T.N.

Molybdenum pyrocatechin complexes. Ukr.khim.zhur.17 no.2:198-208 '51. (MLRA 9:9)

1. Institut obshchey i neorganicheskoy khimii AN USSR.
(Molybdenum) (Pyrocatechol)

CA BABKOV, A.

The binary systems constituted by stannic chloride, antimony trichloride, and arsenic trichloride. VI. The arsenic trichloride-trichloroacetic acid system. T. Sumarokova and A. Babkov. *J. Gen. Chem. U.S.S.R.* 21, 1383–4(1951)(Engl. translation); *Zhur. Obshchei Khim.* 21, 1373(1951).— Measurement of the viscosity and d. at 20, 35, and 60° reveals no interaction in the system $AsCl_3$-CCl_3COOH. The components are mutually sol. at all compns. at 60°, from 100 to 22.1 mole % $AsCl_3$ at 35°, and from 100 to 30.2 mole % at 25°. Limiting viscosities and ds. are as follows:

Mole % $AsCl_3$	20°		35°		60°	
	$\eta \times 10^4$	d	$\eta \times 10^4$	d	$\eta \times 10^4$	d
100	12.26	2.1624	10.80	2.1231	8.05	2.0924
39.24	35.44	1.8279	25.92	1.8043	15.95	1.7709
22.11	crystals	crystals	40.39	1.7258	22.76	1.6872
0	"	"	crystals	crystals	38.65	1.6051

CA BABKO, A.K.

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The colored complex of titanium with hydrogen peroxide.

A. K. Babko and A. I. Volkova (Acad. Sci. Ukrain. S.S.R., Kiev). *Zhur. Obshchei Khim.* (J. Gen. Chem.) 21, 1949–56 (1951).—(1) Optical densities $D = \log I_0/I$ were detd. in the 465-mμ range in mixts. of equimol. (10^{-3} *M*) solns. of $TiCl_4$ and H_2O_2 taken in varying proportions, at const. total vol., at const. acidity. Similar measurements were made with $Ti(SO_4)_2 + H_2O_2$ and with 10^{-1} *M* solns. (the latter in very thin troughs of 0.05 mm.). In all cases, *D* passed through a max. at a mol. ratio $Ti^{++++}:H_2O_2 = 1:1$; consequently, that is the compn. of the colored yellow complex. In a series of measurements with const. Ti^{++++} concn. (2×10^{-3} *M*) and H_2O_2 concn. varying from 0.9×10^{-3} to 5.0×10^{-3} *M*, a bend of the *D* curve was found at around the mol. ratio $Ti:H_2O_2 = 1:1$. With further increasing H_2O_2, the color remains unchanged. A bend of the *D* curve at the same mol. ratio 1:1 was found in a 3rd series of measurements, at const. H_2O_2, 2×10^{-3} *M*, and the $TiCl_4$ concn. varied from 0.6×10^{-3} to 3.0×10^{-3} *M*. (2) For the compn. of the complex, there are 3 possibilities, (*a*) $Ti^{4+} + H_2O_2 = [Ti(H_2O_2)]^{4+}$, (*b*) $Ti^{4+} + H_2O_2 = [Ti(HO_2)]^{3+} + H^+$, (*c*) $Ti^{4+} + H_2O_2 = [Ti(O_2)]^{2+} + 2H^+$. In the alternative *a*, change of the H-ion concn. should have no effect on the color, whereas in the alternatives *b* and *c* the color should become weaker with increasing acidity. At const. concn. of the complex, 2.25×10^{-3} *M*, the color remained up to pH = 3, and faded at pH = 5 and above, without pptn. of $Ti(OH)_4$. In a series of expts. at the same const. concn. of the complex, in the high-acidity range of $[H^+]$ from 10^{-4} to 7 *N*, the color remained unchanged from $[H^+]$ = 0.1 to 6 *N*. The conclusion in favor of the alternative *a* was further corroborated by electrolytic transference expts., which showed no change of the charge of the complex ion in the presence or absence of H_2O_2. (3) That the disappearance of the color at pH > 3 is due not to a decompn. of the complex, but to formation of another, colorless complex, was demonstrated by a study of the system of Ti salicylate (orange complex) + H_2O_2, buffered to pH = 5 (or 6), with varying proportions of the components, at const. total vol. The color decreases with increasing amt. of H_2O_2. Similarly, the color decreases with increasing dilu. of the Ti salicylate with H_2O. The difference between the *D* of the mixts. with H_2O_2 and with H_2O passes through a max. at the mol. ratio $Ti:H_2O_2 = 1:1$. Calcns. of the equil. const. of $Ti\ sal_4 + x\ H_2O_2 \rightleftarrows Ti(H_2O_2)_x + n\ sal$ (where *sal* = salicylate), gave a const. for $x = 1$. This proves that the colorless complex present in weakly acid to nearly neutral soln., pH = 5–6, has also the compn. $Ti:H_2O_2 = 1:1$. It has probably the structure $[Ti(HO_2)]^{3+}$ or $[Ti(O_2)]^{2+}$, as against the structure $[Ti(H_2O_2)]^{4+}$ of the colored complex present in acid soln. (4) The dissocn. const. $K = [Ti^{4+}][H_2O_2]/[Ti(H_2O_2)]^{4+}$ of the colored complex was detd. by means of calibration curves, in solns. contg. varying amts. of $TiCl_4$ and H_2O_2, to be 0.9×10^{-4}.

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USSR

Ternary complexes in the system; metal ion–pyridine–salicylate ion. A. K. Babko. *Izvest. Sektora Fiziny i Fiz.-Khim. Analiza, Akad. Nauk S.S.S.R., Inst. Obshchei i Neorg. Khim.* No. 26, 163–8(1951).—In the system Cu^{++}–Py–Sal^{--} the one ternary compd. may dissociate in 3 ways: (*a*) $CuPy_2Sal \rightleftharpoons CuPy_2^{++} + Sal^{--}$; (*b*) $CuPy_2Sal \rightleftharpoons CuSal + 2\,Py$; (*c*) $CuPy_2Sal \rightleftharpoons Cu^{++} + 2Py + Sal^{--}$. Products of these reactions undergo further reactions with the H ion of the H_2O, etc. The dissocn. consts. are 8×10^{-3} for $CuPy_2^{++}$ and 2.3×10^{-11} for CuSal. From these values and the stabilities of the bonds (the Cu^{++}—Sal bond being much stronger than the Cu^{++}—Py bond) it is concluded that Py cannot displace Sal bound to Cu. Thus reaction (*b*) is favored. In the system Fe^{+++}–Py–Sal^{--} at pH 1 to 3 a ternary complex will form from Py and $FeSal^+$, because Py is present then as a salt. At pH >3, $FeSal_2^-$ will form, and will react with the free Py to form $PyHFeSal_2$ (I), but the linkages are not as strong as those found with Cu, and I will be stable only in the presence of 0.2 to 0.5 mole/l. of Py. I is readily sol. in $CHCl_3$, sparingly in CCl_4 and $C_2H_4Cl_2$. The Cu complex, and similar complexes of Ni and Co show the same behavior. Complex formation in all these solns. is easily observed, as the metal complexes are all deeply colored. Sulfosalicylic acid also gives ternary complexes, as shown by the deep colorations produced. This is true for nitrosalicylic acid also, and the complexes of the latter are sparingly sol. in water. In all these complexes (also those contg. aminosalicylic acid) it is never possible to replace one anion by another, i.e. an anion bound in the coördination sphere stays fixed. Under conditions where the coördination sphere can be filled with anions, the formation of the ternary complexes can no longer occur. Werner Jacobson

BABKO, A. K., PILIPENKO, A. T., REVIEWED BY KUZNETSOV, V. I.

Chemistry, Analytic

Calorimetric analysis., Zhur. anal. khim., 7, No. 1, 1952.

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

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AA BABKO, A. K.

A1-9
Physical Properties
Molecular Structure
of Solutions

Solubility of precipitates in presence of common and extraneous ions. A. K. Babko. *J. gen. Chem. USSR*, 1952, **7**, 3—13).—The ionic strength of the solution has, in general, a relatively small effect on the solubility of ppt., and its influence can usually be eliminated in analytical work. Chemical interaction between solid phase and dissolved ions is of major importance. The use of the principles of physico-chemical analysis with a solution composition ppt. solubility diagram for studying solubility changes in presence of excess of common ions, etc., is of considerable value. It is shown thereby that ppt. can be referred to four classes: (1) absence of complex formation, characterised by a max. solubility at the equivalence point (the "ideal" type for use in chemical analysis), (2) strong complex formation with a ppt. not co-ordinatively saturated, *e.g.*, HgI_2, characterised by a min. at the equivalence point (no excess of common ions), (3) complex formation where the ppt. is a co-ordinatively saturated compound, *e.g.*, Na_3AlF_6, characterised by a reduction in solubility with excess of common cations, and (4) weak complex formation between the ions of the ppt. (the majority of real ppt. conform to this type), *e.g.*, PbI_2 ppt'd. by KI, characterised by a curve showing a max. where there is no excess of common ions and two min.

G. S. SMITH.

BABKO, A. K. 261T27

USSR/Chemistry - Analytical, Meeting

"Conference on Analytical Chemistry in the City of Gor'kiy," V.I. Kuznetsov

Zhur Anal Khim, Vol 7, No 4, pp 253, 254 - 1952.

Regional conference held 4 - 6 June 52, called by Gor'kiy State U. Forty reports were heard, a number of them devoted to the theory of the action of org reagents, and to their utilization in analysis. V.I. Kuznetsov and L.M. Kul'berg reported on the effect of the peculiarities of the molecular structure of an org reagent on that reagent's reaction capability. B.A. Platunov pointed out that the completeness of the pptn of W by org reagents is detd by the nature of the precipitator and the state of the W in soln. V. M. Peshkova spoke on the ease with which dioxime complexes of Ni could be extracted during the colorimetric detection of Ni in the presence of Co and other elements. A.K. Babko reported on utilizing silocomolybdic acid and phosphomolybdic acid in analysis. V.B. Avilov was heard on the physicochem bases of the iodometric detection of As, Sb, Fe, Sn, Cr, and V, and on the theoretical bases of certain oxidizing-reducing reactions. A.M. Vasil'ev, V.F. Torpova and A.A. Busygina reported on the possibility of separating Cu, Cd, and Zn by ionic exchange on Wofatit R with solns containing thiosulfate and acetates. Reports were also presented on sanitation-hygienic analysis.

BABKO, A. K.

Color Reaction on the Fluroine Ion With Ti-tan-o-chromotropic Reagent, A.K.Babko, P.V.Khodulina, Inst of General and Inorg Chem., Acad Sci Ukr SSR, Kiev. Zhur Anal Khim, Vol 7,No 5, pp 281-284, Sep/Oct 52

Presented a new color reaction on the F ion with the aid of the titanochromotropic complex. This recation permitted the detection of 0.2 to 2 mg/l of F ion. The reaction was accomplished by drops on cellophane. The sensitivity is one microgram of F ion at a limiting dilution of 1:50,000. The reaction can be achieved in the presence of a large amount of sulfates but not always in the presence of phosphates.

261T30

BABKO, A. K.

Chemical Abst.
Vol. 48 No. 8
Apr. 25, 1954
Analytical Chemistry

Color test for fluoride with titanium-chromotropic acid reagent. A. K. Babko and P. V. Khodulina (Inst. Chem., Acad. Sci. Ukr. S.S.R., Kiev). *J. Anal. Chem.* (U.S.S.R.) 7, 317-20(1952)(Engl. translation).—See *C.A.* 47, 1540h.
H. L. H.

9-2-54

BABKO, A.K.

Chemical Abst.
Vol. 48 No. 8
Apr. 25, 1954
Analytical Chemistry

Volumetric acidimetric determination of nickel with dimethylglyoxime. A. K. Babko and P. N. Mikhailova (Kiev State Univ.). *Ukrain. Khim. Zhur.* 8, 285–7 (1940; Am. Russian).—Under specific conditions the Ni dimethylglyoxime ppt. when heated with acid until dissolved then refluxed 5 min. reacts stoichiometrically with 2 equivs. of acid. The free dimethylglyoxime reacts under the same conditions with somewhat less than 1 equiv. of acid. Hence the Ni ppt. after washing free of dimethylglyoxime can be used for the volumetric detn. of Ni. The deviation from the gravimetric method is usually under 1%. The reaction appears to be caused by the interaction of 1 mole of the Ni deriv. with 1 moles of HCl, yielding $NiCl_2$, 2 moles $NH_2OH \cdot HCl$, and 2 moles AcCMe:NOH. J. M. Kozelapoff

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CA BREKO, A.N.

Solubility of acetylides of copper, silver, and mercury. A. K. Babko and M. I. Grelzel'skaya. *Zhur. Obshchei Khim.* (J. Gen. Chem.) 22, 66-76(1952).- Inasmuch as acetylides of alkali metals are hydrolyzed by H_2O, but C_2H_2 displaces alkali metals from their amides, C_2H_2 is a weak acid, weaker than H_2O but stronger than NH_3. Of the acid dissocn. const. K of C_2H_2 it is thus known only that it is smaller than 10^{-14} but greater than 10^{-26}. The soly. of acetylides is characterized by the "hydrolytic soly. product" $L_A = [M^+]^2[C_2H_2][OH^-]^2$. Rapid detns. of the soly. of C_2Ag_2 in $HClO_4$, HNO_3, and H_2SO_4, with the concn. of H^+ ions varied between 0.1 and 1.0 M, gave L_A values of 1.0×10^{-37} to 9.7×10^{-37}, i.e. consistent with respect to the order of magnitude. The lowest values of L_A (1.0-1.1×10^{-37}) were found in H_2SO_4 (on the assumption of complete dissocn.). On the av., 10-fold dilu. of the acid lowers the soly. by a factor of 5; this is consistent with the soly. $s = [Ag^+]$ calcd. from $L_A = s^2 0.5\, s\, [OH^-]^2 = 0.5\, s^3\, [OH^-]^2$, which calls for 4.6-fold decrease of s on 10-fold dilu. of the $[H^+]$ ions. In soln. of C_2Ag_2 in AcOH, at $[H^+] = 4.2 \times 10^{-3}$, no Ag^+ ions were detected. With C_2Cu_2, in HNO_3 and $HClO_4$, the results are less consistent; at $[H^+] = 1.0$ and 0.1, in HNO_3, $L_A = 1.2 \times 10^{-27}$ and 6.7×10^{-28}, and in H_2SO_4, 1.2×10^{-27} and 2.8×10^{-28}; in AcOH, $[H^+] = 0.0042$ and 0.0013, $L_A = 3.8 \times 10^{-28}$ and 1.2×10^{-28}. In HCl, the soly. of C_2Cu_2 is 30 times as great as in HNO_3 and H_2SO_4, owing no doubt to formation of complex Cu chlorides. On the whole, L for C_2Cu_2 is greater than for C_2Ag_2. No Hg is detected in the soln. on treatment of C_2Hg with H_2SO_4, HNO_3, or AcOH; some Hg goes into soln. in HCl, apparently in the form of complex ions $HgCl_4^{--}$ and $HgCl_4^-$. The latter is considered more probable, and the soln. equation is written $C_2Hg + 2\,H^+ + 3\,Cl^- = HgCl_4^- + C_2H_2$. With Abegg's value of the dissocn. const. of $HgCl_4^-$, 10^{-15}, one calcs., for C_2Hg in HCl 1.0 and 0.1, $L_A = 1 \times 10^{-40}$ and 2×10^{-40}. The order of decreasing L_A is $C_2Cu_2 > C_2Ag_2 > C_2Hg$. This is further confirmed by the reaction $Cu_2C_2 + 2Ag^+ = C_2Ag_2 + 2\,Cu^+$, which takes place completely on 2 hrs.' shaking solid Cu_2C_2 with a soln. of $AgNO_3$; the Cu^+ is further oxidized to Cu^{++} while Ag^+ is reduced to metallic Ag. The ppt., originally red-brown (C_2Cu_2), becomes white (C_2Ag_2). The reverse exchange, between solid C_2Ag_2 and a soln. of Cu^+, does not take place. On treatment of solid C_2Cu_2 with 0.05 N soln. of $HgCl_2$, the ppt. becomes white (C_2Hg), and contains no Cu. Similarly, solid C_2Ag_2 treated with a soln. of $Hg(NO_3)_2$ gives a ppt. contg. only Hg, with all the Ag going into soln. Treatment of solid C_2Hg with either Cu^+ or Ag^+ produces no change in the ppt. By the definition of L_A, one should expect, at const. $[H^+]$, $[Ag^+]^2[C_2H_2] =$ const., i.e. excess Ag^+ should depress the soly. of C_2Ag_2 strongly, and excess of C_2H_2 in soln. less strongly. This was confirmed by expts. A soln. of KI should decomp. C_2Ag_2 according to C_2Ag_2 (solid) $+ I^- + 2\,H_2O \rightleftarrows 2\,AgI$ (solid) $+ C_2H_2 + 2\,OH^-$, with the equil. const. $K = [C_2H_2][OH^-]^2/[I^-]^2 = 4 \times 10^{-4}$. With a 1 N soln. of KI,

over

BABKO, A. K.

Jul 52

USSR/ Chemistry - Vanadium

"The Study of Colored Complexes of Vanadium With Hydrogen Peroxide," A. K. Babko, A. I. Volkova, Inst of Gen and Inorg Chem, Acad Sci, Ukrainian SSR

"Zhur Obshch Khim" Vol 22, No 7, pp 1108-1116

States that a study of the optical properties of solns showed that vanadium forms 2 colored compds with hydrogen peroxide. Notes that in a strongly acid medium, where [H+] is 0.6—6 of N, an intensely colored compd is formed with a compn corresponding to $V:H_2O_2$:1:1. In an alk medium, a weakly colored peroxide compd is formed with a compn corresponding to $V:H_2O_2$ = 1:2. Says that a comparison of the visible dissocn of the vanadium complex, formed in relation to medium, with its great stability in relation to acids, indicates that the vanadium dyed complex with hydrogen peroxide, formed in an acid medium, does not contain a bond like Me-O but represents an addn compd of the type $[VO_x(H_2O_2)](5-2x)$.

229T30

BABKO, A. K.

Chemical Abst.
Vol. 48 No. 6
Mar. 25, 1954
Inorganic Chemistry

(2)4

Colored complexes of vanadium and hydrogen peroxide. A. K. Babko and A. I. Volkova. *Zhur. Obshchei Khim.* 22, 1108-16; *J. Gen. Chem. U.S.S.R.* 22, 1149-55(1952).—Colored solns. were prepd. by combining a soln. of 8×10^{-3} *M* NH_4VO_3 and a soln. of 8×10^{-3} *M* H_2O_2. Color intensities were measured with the Pulfrich colorimeter at 465 mμ. Vanadium forms with H_2O_2 (1) in strongly acidic solns., an intensely colored stable compd. in which the ratio $V:H_2O_2$ = 1:1, and (2) in basic solns. a less intensely colored compd. with the ratio $V:H_2O_2$ = 1:2. Dissocn. const. of the first compd. is $K = 3 \times 10^{-4}$. M. G. Holowaty

11-5-54

Babko, A. K.

✓ Bismuth halide complexes. A. K. Babko and A. M. [redacted] Ohio State Univ. [redacted] The potentials of a Ag\AgX electrode [redacted] (NaClO4 soln. with 0.6 and [redacted] M HNO3 and a variable concn. of KX (0.01–1.6 M) were detd. at 20°. The equil. reaction is expressed as log $[BiX_4^{(4-n)+}]/[Bi^{3+}] = -\log K - n\log[X^-]$. From the slope of $\log[X^-]$ plotted against $\log[BiX_4^{(4-n)+}]$, n was detd. and the equil. const. K calcd. For $[X^-]$ was obtained from the potential of Ag-AgX (for Cl and Br but not for I), $[Bi^{3+}]$ from the potential of the Bi electrode, and $[BiX_4^{(4-n)+}]$ was assumed to be equal to the total Bi concn. The following equil. consts and the corresponding complexes are given: $K_1 = [Bi^{3+}][X^-]^3/[BiX_4^-]$ are 3.8×10^{-7} for Cl, 2×10^{-18} for Br, and 3.1×10^{-19} for I; $K_4 = [Bi^{3+}][X^-]^4/[BiX_4^-]$ are 3.8×10^{-4} for Cl and 1.5×10^{-4} for Br; $K_3 = [Bi^{3+}][X^-]^3/[BiX_3]$ is 2×10^{-4} for Cl. I. Bencowitz

BABKO, A. K.

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(1) Chem.

485. Determination of tervalent iron by means of tetraborate. A. K. Babko (*J. Anal. Chem., U.S.S.R.*, 1953, 8 [2], 127–128).—The paper of Schigol *et al.* (*Brit. Abstr. C*, 1953, 167) is strongly and adversely criticised. The experiments were badly arranged and the results were inadequate to give the conclusions stated.
G. S. SMITH

MA=
9-22-54

Babko – reviewer & article