

PA 196T18

MATEROVA, Ye. A.

USSR/Chemistry - Glass Electrodes

Nov 51

"Theory of the Glass Electrode. IV. Experimental Verification of the Exchange Nature of the Glass Electrode Potential," B. P. Nikol'skiy, Ye. A. Materova, Leningrad State U imeni A. A. Zhdanov

"Zhur Fiz Khim" Vol XXV, No 11, pp 1335-1346

Investigated interaction of glass powders of electrode glass (No 1), boron glass (No 2), and glass No 23 "Druzhnaya Gorka" (contg small amt of Al, Fe, Mg, K oxides) with alk solns contg Na⁺, K⁺, Ba ions by potentiometric method. By analytical method investigated absorption of Li, K, Na

196T18

USSR/Chemistry - Glass Electrodes (Contd)

Nov 51

ions in dependence on pH of soln by glasses Nos 1 and 2. Compared properties of different glasses. Found analytical method more reliable than potentiometric. Results verify exchange of cations between glass and soln and are in full agreement with theory of glass electrode based on exchange concept.

196T18

MATEBOVA, Ye.A.; YEVNINA, S.B.; TSUBINA, Ye. I.

Cation exchange on synthetic resins. Part 1. Acidic properties of
ion exchanging resins having various active groups. Uch.zap.Len.un.
163:93-111 '53. (MLRA 9:6)

(Resins, Synthetic) (Ion exchange)

MATEROVA, E.A.

USSR/Chemistry - Ion Exchange

Card 1/2

Authors : Materova, E. A., Vert, Zh. L., and Grinberg, G. P.

Title : Ion exchange in organo-aqueous solutions

Periodical : Zhur. Ob. Khim, 24, Ed. 6, 953 - 965, June 1954

Abstract : The process of ion exchange was investigated in alcohol-water and acetone-water solutions. It is shown that B. P. Nikol'skiy's isotherm equation is well applicable to exchange processes in organo-aqueous solutions. The ions exchange process was investigated in dynamic conditions in aqueous and organo-aqueous solutions. The exchange process in an organo-aqueous medium has a much higher rate than in water and the rate increases with the increase in the content of the organic substance in the solution. The swelling of SES cationate was determined in relation to the composition of the solution. It was found that the swelling increases linearly

Zhur. Ob. Khim., 24, Ed. 6, 953 - 965, June 1954

(Additional Card)

Card 2/2

Abstract : with the increase in the content of the organic component (acetone or alcohol) in the solution. Seven references. Tables, graphs.

Institution : State University, Leningrad

Submitted : January 29, 1954

MATEKOVA, Ye. A.

U/2-1
JPRS: L-974-S
CSO: 1743-S

THEORY AND PRACTICE OF THE APPLICATION OF ION-
EXCHANGE MATERIALS

Teoriya i Praktika Primeneniya
Ionobmennykh Materialov, Moscow,
1955, pp 1-164. K. V. Chumtsov

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MATEROVA, Ye. A.

USSR/Chemistry - Physical chemistry

Card 1/1 Pub. 147 - 13/26

Authors : Materova, Ye. A.; Kozhakina, F. A.; and Nikol'skiy, B. P.

Title : Research of electrode characteristics of ionite membranes

Periodical : Zhur. fiz. khim. 29/1, 105-110, Jan 1955

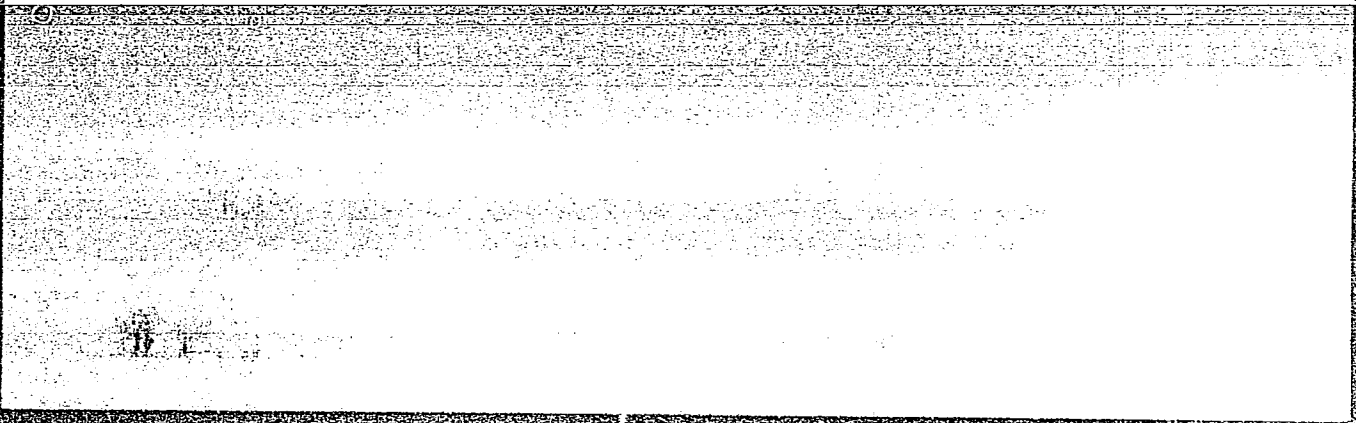
Abstract : Efforts were made to obtain electrodes from technical ion-exchange resins reversible with respect to anions and cations. A method was developed for the preparation of the most perfect membranes and for the study of their electrode characteristics. The results obtained by studying the cationite and anionite membranes are described. In order to make the best possible practical application of membrane electrodes it is necessary to know their behavior in mixed solutions. Three references: 2 USA and 1 USSR (1942-1954). Tables; diagram.

Institution : The A. A. Zhdanov State University, Institute of Chemistry, Leningrad

Submitted : May 3, 1954

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APPROVED FOR RELEASE: 06/14/2000

CIA-RDP86-00513R001032820014-0"

MATELOVA, E.A.

Distr: LR43/453a/

Application of ultraviolet rays in chromatography. E. M. Brumbers and E. A. Matkova. *Khromatografiya*, Leningrad, Gosudarstvennyi Nauchnyi Tsentr, Seriya Khimicheskaya, 1960, No. 1, p. 1-4. Series of inorg. salts and org. acids were

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Matenova, A.

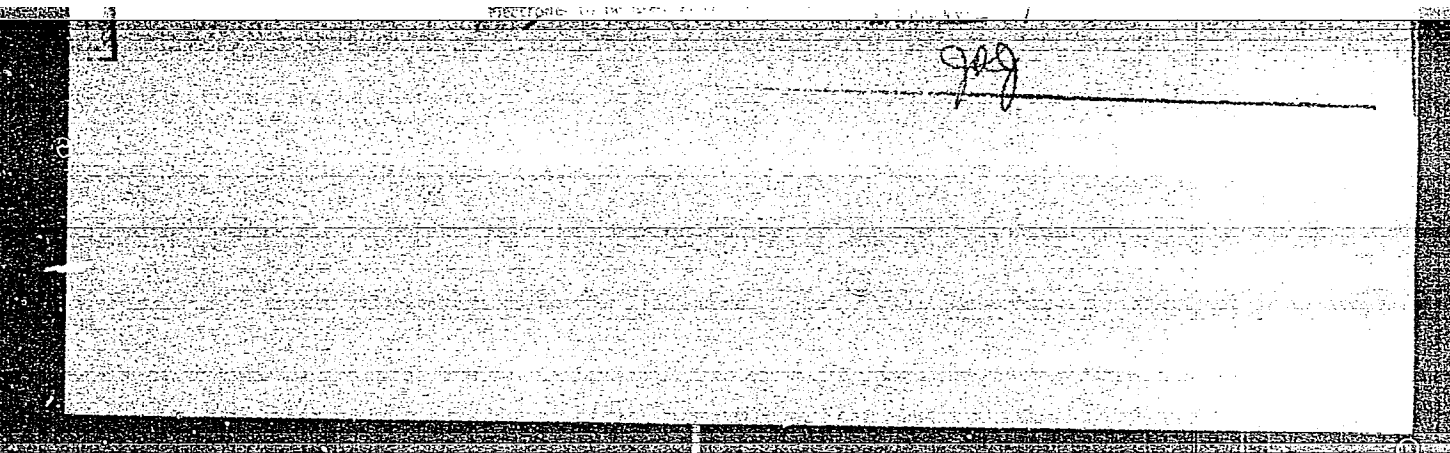
Electrode properties of ion-exchange membranes. *Dokl. Akad. Nauk SSSR*, 1967, No. 16, Ser. 118, *Khim.*, No. 3, 35-102 (1967). The behavior of electrodes prepd. from different cation-exchange resins in HCl, NaCl solns., and mixed solns. contg. H⁺ and Na⁺ was studied. The comparison of behavior of electrodes in mixed solns. with potentiometric titration curves of resins shows that the electrode behavior of membranes contg. strong cationic and carboxylic acid resins is comb-

Distr: $HCl/HE2c$ (j)

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"APPROVED FOR RELEASE: 06/14/2000

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МАТЕРИАЛ № 11
MOISEYEV, Y.V.; MATEROVA, Ye.A.; BELYUSTIN, A.A.

Production of rubidium and cesium glasses and investigation of some
of their properties. Dokl. AN SSSR 113 no.4:824-827 Ap '57.
(MLRA 10:6)

1. Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova.
Predstavleno akademikom A.N. Terent'ym.
(Glass) (Rubidium) (Cesium)

The Production of Rubidium and Cesium Glasses and Investigation of
Some of their Properties. PA - 2763

2% MgO, 3% CaO and 50% SiO₂; 30% B₂O₃, 15% R₂O, 2% MgO and
3% CaO, where R₂O = Rb₂O. Also with 25% B₂O₃ and CaO it is possible to pro-
duce glass of intermediary composition. All types of glass produced
refract light considerably (crystal lustre). When comparing values
characterizing chemical continuity, we find that, in the case of a
high content of B₂O₃ sodium- and potassium glasses are of approxi-
mately equal constancy. The results obtained have only qualitative
character as the measuring error amounted to about 25%.
(1 Illustration, 2 Tables, 4 Citations from Slav Publications).

ASSOCIATION: Leningrad State University "A.A.ZHDANOV"
PRESENTED BY: A.N.TERENIN, member of the Academy
SUBMITTED: 19.11.56
AVAILABLE: Library of Congress

Card 2/2

MATEKOVA, Y.F.H.

USSR/Physical Chemistry - Kinetics, Combustion, Explosions, Topo-chemistry, Catalysis.

B-9

Abs Jour: Referat. Zhurnal Khimiya, No 3, 1958, 7248.

Author : Ye. A. Materova, N.G. Klyukina.

Inst : Leningrad State University.

Title : Dependence of Catalytic Activity of Aluminosilicate Catalysts on Their Exchange Capability and Structure.

Orig Pub: Uch. zap. LGU, 1957, No 211, 179-187.

Abstract: The magnitudes of the exchange capability (determined by the absorption of Ba ions), specific surface (determined by the adsorption of methylene blue), porosity (from the curves of steam and toluene sorption), and catalytic activity (determined by the cracking of solar at 450 and 475°) of Saratov glauconite (I), clay (II), foundry loam (III), Glukhovskiy kaolin (IV) and artificial permutite (V) preliminarily treated with 0.1 n. solution of HCl and of the industrial catalysts of Gudri [the trans-

Card : 1/2

-30-

M. LEROVA, Ye. A.; B. MINSKAYA, N. S.

Electrochemical properties of ion exchange membranes. Vest. LGU
no. 22:112-120 1969. (LI : 11)
(Ion exchange) (Membranes (Chemistry))

5(4)

SOV/76-33-4-22/32

AUTHORS: Materova, Ye. A., Moiseyev, V. V., Shmitt-Fogelevich, S. P.

TITLE: Comparative Study of the Electrode and Exchange Properties of Glass Electrodes by the Use of Radioactive Indicators (Sravnitel'noye issledovaniye elektrodnykh i obmennykh svoystv steklyannogo elektroda s primeneniye radioaktivnykh indikatorov). Behavior of Sodium Glass Electrode in Solutions of Silver Nitrate (I. Povedeniye natriyevogo steklyannogo elektroda v rastvorakh azotnokislogo serebra)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 4, pp 893-902 (USSR)

ABSTRACT: With reference to various data found in publications concerning the behavior of glass electrodes (Refs 1-12) it may be assumed that owing to the similarity of the ion radii of sodium and silver, the sodium glass electrode (GE) may be easily converted to the function of a silver electrode. In the work under review, the authors measured on the one hand the quantity of silver ions absorbed by the sodium glass as a function of time, and on the other hand they investigated the process of the passage of (GE) to the function of a silver electrode.

Card 1/3 Three different galvanic cells were applied. The glass electrode

SOV/76-33-4-22/32

Comparative Study of the Electrode and Exchange Properties of Glass Electrodes by the Use of Radioactive Indicators. I. Behavior of Sodium Glass Electrode in Solutions of Silver Nitrate

(GE) was prepared from glass having the following composition: SiO_2 - 71mol%, B_2O_3 - 11 mol%, Al_2O_3 - 3 mol%, Na_2O - 15 mol% (glass Nr 2 (Ref 3)), whereas the metallic silver- and silver chloride electrodes were prepared in the usual way (Ref 20). The cation absorption through glass was determined radiometrically by the aid of isotopes Ag^{110} and Na^{24} (Ref 23) with an aluminum β -counter (AS-2) on the instrument of the B type. The spherical shaped (GE) were left 1 month in a 10% silver nitrate solution, and the electromotive force (emf) was measured with two galvanic cells in 0.1 to 0.001 m AgNO_3 -solution (Table 1). The (GE) were found to behave like silver electrodes as early as after 18 hours in AgNO_3 -solution. Experiments were carried out with the (GE) in solution mixtures of $\text{AgNO}_3 + \text{NaNO}_3$ and it was observed that with a concentration ratio $\text{Na}^+ : \text{Ag}^+ = 1 : 1$, the Na-glass electrode acts like a silver electrode (an approximate constant (emf) was observed also by A. N. Mosevich on Na-glass electrodes in Na -Ag⁺ solution mixtures).

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SOV/76-33-4-22/32

Comparative Study of the Electrode and Exchange Properties of Glass Electrodes
by the Use of Radioactive Indicators. I. Behavior of Sodium Glass Electrode
in Solutions of Silver Nitrate

Radiation data showed that the absorption rate of Ag-ions on (GE) surpasses considerably that of Na-ions. The constant of the exchange reaction $Na_{glass} + Ag_{sol} = Na_{sol} + Ag_{glass}$ was computed according to an equation by B. P. Nikol'skiy (Refs 1,24) (Table 2), and is in the order of magnitude of 10^9 , which fact points to the considerably higher solidity of the bond Ag^+ glass, as compared to Na^+ glass. On the reaction of glass with aqueous salt solutions, the ion diffusion in the glass plays a major role (Ref 25), which also applies to the present case (Fig 5). In this connection, an initially rapid absorption of the Ag-ions takes place at the glass surface and this "silver layer" diffuses into the glass (Figure 6 diagram of the Ag distribution in the glass). In conclusion, gratitude is expressed to Professor B. P. Nikol'skiy. There are 9 figures, 2 tables, and 26 references, 12 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova
(Leningrad State University imeni A. A. Zhdanov)

SUBMITTED: October 1, 1957
Card 3/3

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Card 20/22		

MATERKOVA, YE. A.

5.4600

S/054/60/000/003/008/021
B020/B067

AUTHORS: Materova, Ye. A., Alagova, Z. S. 82088
TITLE: An Attempt of Using Membrane Electrodes in Hydrofluoric Acid Solutions
PERIODICAL: Vestnik Leningradskogo universiteta. Seriya fiziki i khimii, 1960, No. 3, pp. 80-84

TEXT: In the present paper the authors try to use membrane electrodes consisting of ion exchanger resins to investigate HF-solutions. It is known that electrodes consisting of cation exchanger resins give a theoretical hydrogen function in acid solutions in a wide concentration range; in fluoride solutions electrodes consisting of anion exchanger resins show opposite behavior with respect to the F⁻ ion. Hence reasons exist to assume that membrane electrodes in HF-solutions can be used for measuring the pH and for determining the anion composition. The equilibrium in HF-solutions was investigated by many authors, and it was found that hydrofluoric acid dissociates according to the following scheme:

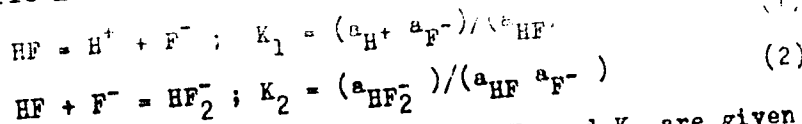
Card 1/3

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B020/B067
R2088

An Attempt of Using Membrane Electrodes in Hydrofluoric Acid Solutions



The methods of determining the quantities K_1 and K_2 are given in the monograph by I. G. Ryss (Ref. 5). The authors determined the values of these activity coefficients at 15, 25 and 35°C in a concentration range from 0.001 to 1.0 M. To investigate the hydrogen function in HF-solutions, membrane electrodes consisting of sulfocationites CBC(SBS) and KY-2(KU-2) were used. The fluorine function was investigated by means of electrodes made of the monofunctional anionite AB-17(AV-17) and the polyfunctional anionites $\Delta\Delta$ -10П (EDE-10P), AH-2Ф(AN-2F), and MMГ-1(MMG-1). The hydrogen function of the membrane electrodes was studied in HF-solutions by means of the galvanic cells I and II. The pH values measured for the e.m.f. of cells I and II and for those measured with a hydrogen electrode are listed in Table 1, and graphically shown in Fig. 1. The table shows that, in the concentration range investigated, E_1 remains constant with an accuracy of ± 1 mv. Table 2 shows that

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An Attempt of Using Membrane Electrodes in
Hydrofluoric Acid Solutions

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82088

ΔE_{exp} agrees with ΔE^{theor} with an accuracy of some millivolts in the entire concentration range investigated which confirms the hypothesis of the mixed function of membrane electrodes consisting of anion exchanger resins in HF-solutions. There are 1 figure, 2 tables, and 9 references: 5 Soviet, 2 USA, 1 British, and 1 German.

LH

Card 3/3

86332

S/054/60/000/004/003/015
B004/B056

26.2510

AUTHOR:

Materova, Ye. A.

TITLE:

Ion Exchange and Electrode Properties of Ion Exchangers

PERIODICAL:

Vestnik Leningradskogo universiteta. Seriya fiziki i khimii,
1960, No. 4, pp. 26-39

TEXT: The present paper gives a report on research work carried out at the kafedra fizicheskoy khimii Leningradskogo universiteta (Chair of Physical Chemistry of Leningrad University) concerning the ion exchange and electrode properties of various ion exchangers. This work is based upon B. P. Nikol'skiy's conceptions of the occurrence of potential on glass films. For various types of cation exchangers, such as KY-2 (KU-2), KMA(KMD), KΦY(KFU), CBC(SBS), PΦ(RF), MCΦ(MSF), P (R), and Φ(F), the exchange constants K_{Na-K} , K_{Na-H} , K_{Na-HN_4} , K_{Na-Ca} , K_{Na-Ba} , K_{H-Ag} , K_{H-Pb} were determined. The theory by K. H. Meyer, I. F. Sievers, and T. Teorell (Refs. 12, 13) on membranes made from ion exchangers is discussed. The preparation and study of membrane electrodes is explained. The resin

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86332

Ion Exchange and Electrode Properties of Ion Exchangers S/054/60/000/004/003/015
B004/B056

powder saturated with the ion is poured into the binding agent (polystyrene in toluene) dissolved in an organic solvent. The mass which is thickened by heating is dried on a metal foil. It is then cut into slices which are glued onto a polystyrene tube by means of polystyrene dissolved in toluene. The tube is filled with a 0.1 M electrolyte, and the reference electrode is made of AgCl. The Na, K, Li, Ba, Ca, Ag, and NH₄ functions are determined for cation-exchanger, and the Cl, Br, and F functions, for anion-exchanger. By means of a membrane-hydrogen electrode, the pH of acid solutions, including HF, can be determined up to high concentrations. Determination of the cation function of a membrane electrode made from an SBS sulfo-cation exchanger within certain ranges of concentration showed that the function $E = f(-\log a_{\pm})$ is linear. At a high concentration

(more than 0.2 - 0.5 M) deviations from linearity occur due to the diffusion of anions. Membranes with anion functions may be used in fluoride solutions of up to 0.8 M, in chlorides, up to 0.5 M, and in bromides, up to 0.2 M. Deviations from linearity are here due to the diffusion of cations. The more mobile the anion, the wider is the linear range of the function. The electrode properties of cation exchangers are compared with those of glass electrodes, the similar nature of the ion exchange potential being

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Ion Exchange and Electrode Properties of Ion Exchangers

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B004/B056

pointed out. The use of membrane electrodes for potentiometric titration is then described. Further, the interactions between glasses and solutions are studied by means of radioactive indicators. For the sodium glass electrode, a direct interrelation between the potential of the glass and the quantity of silver absorbed by the glass was disclosed by means of

¹¹⁰Ag. Electrodes are now being developed, which are specially designed for certain ions. M. M. Shul'ts and F. A. Belinskaya are mentioned. There are 9 figures, 4 tables, and 22 references: 17 Soviet, 1 US, 2 British, 1 German, and 1 Swiss. X

Card 3/3

MATEROVA, Ye.A.; ALAGOVA, Z.S.

Experiment in using membrane electrides in hydrofluoric acid solutions.
Vest. IGU 15 no.16:80-84 '60. (MIRA 13:8)
(Hydrofluoric acid) (Electrodes)

MATEROVA, Ye.A.

Ion-exchange and electrode properties of ionites [with summary
in English] Vest. LGU 15 no.22:26-39 '60. (MIRA 13:11)
(Ion exchange)

88259

S/076/60/034/012/011/027
B020/B067

26.1610

AUTHORS: Materova, Ye. A. and Alagova, Z. S.

TITLE: Study of the Electrode Properties of Anion-exchanging Membranes

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 12, pp. 2752-2758

TEXT: The authors attempted to study the electrode properties of the anion exchangers of different basicity and different chemical character in halide solutions with special consideration of the chlorine-, bromine, and fluorine functions of the anionite membranes. The electrode membranes were produced from the resins AB-17 (AV-17), OAL, AB-16 (AV-16), ЭДЭ-10П (EDE-10P), АН-2Ф (AN-2F) and ММГ-1 (MNG-1). To study the chlorine function, electrodes were produced from resins saturated with chlorine ions. The bromine electrode membranes and some fluorine electrodes were produced from chlorine electrodes by introducing them into a 1.0 NaBr or NaF solution. The remaining fluorine electrodes were produced from resins which had been converted into the fluorine form. An AgCl-, AgBr-

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88259

Study of the Electrode Properties of
Anion-exchanging Membranes

S/O76/60/034/012/011/027
B020/B067

X

and a sodium-glass electrode served as reference electrodes. The emf of the current circuit with electrode membrane was measured by an ordinary potentiometer. An amplifier with electrometric tube was connected to the current circuit when using glass electrodes. The measuring accuracy was 0.2 - 0.5 mv. Usually, 10 to 12 electrodes of each resin were studied. All experiments were made at room temperature. The results of measurement of the membrane potentials with different galvanic cells are illustrated in Figs. 1-3, by representing emf as a function of the negative logarithm of the mean activity of the electrolyte. The figures on the axis of ordinates refer to the lower curve. For better illustration each of the following curves is displaced in upward direction by 40 mV as compared to the preceding one. The membrane potentials measured by some galvanic cells are given in Tables 1-4. The chlorine function of the anion-exchanging membranes was studied in KCl, NaCl and HCl solutions. Fig. 1 shows that the linear relation obtained between the potential and logarithm of the mean activity of NaCl for all electrodes within the limits of measuring errors holds in a concentration range of 0.005 to 0.5 M with the angular coefficient of the straight line corresponding to the theoretical value. The bromine function of the electrode membranes was studied in NaBr

Card 2/3

Study of the Electrode Properties of
Anion-exchanging Membranes

S/076/60/034/012/011/027
B020/B067

solutions. As is shown by Fig. 2 a linear dependence of the electrode potential on the logarithm of the mean activity of NaBr was obtained in the concentration range of from 0.005 to 0.2 mole. The same holds for the fluorine function in the concentration range from 0.05 to 0.8 mole. There are 3 figures, 4 tables, and 12 references: 3 Soviet, 3 US, 4 British, 1 German, and 1 Indian.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova
(Leningrad State University imeni A. A. Zhdancv) X

SUBMITTED: March 19, 1959

Card 3/3

S/078/61/006/001/008/019
B017/B054

AUTHORS: Materova, Ye. A., Rozhanskaya, T. I.

TITLE: Potentiometric and Ion-exchange Investigations of the State of Boron in Fluoboric Acid Solutions

PERIODICAL: Zhurnal neorganicheskoy khimii, 1961, Vol. 6, No. 1, pp. 177 - 181

TEXT: Tetrafluoboric acid solutions of different concentrations were studied by potentiometric titrations and anion exchange. Fig.1 shows the potentiometric titration curves for 0.016, 0.13, and 0.11 molar solutions. The curves show jumps suggesting the existence of various forms of fluoboric acid. Tetrafluoboric and hydroxy fluoboric acids are neutralized at pH = 2-5, hydroxy fluoborates are neutralized at pH = 6-8. Table 1 gives the hydrolysis constants calculated on the basis of the potentiometric titration curves. Figs.2 and 3 show the adsorption of the boron ion from 0.13 molar solutions of HBF_4 on the anion exchanger ЭДЭ-10π (EDE-10p). Adsorption of the boron ion from tetrafluoboric

Card 1/2

Potentiometric and Ion-exchange Investigations of the State of Boron in Fluoboric Acid Solutions S/078/61/006/001/008/019 B017/B054

solutions is complete in the acid region. Adsorption of boron from tetrafluoboric acid solutions is 5.5 times greater than from aqueous solutions. Adsorption of boron on strongly basic anion exchangers increases with the addition of hydrofluoric acid to the boron solutions to form fluoboric acid complexes. N. V. Gortikova assisted in the experiments. There are 3 figures, 2 tables, and 8 references: 5 Soviet, 2 US, and 1 British.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet, Kafedra fizicheskoy khimii (Leningrad State University, Department of Physical Chemistry)

SUBMITTED: October 8, 1959

Card 2/2

MATEROVA, Ye.A.; YURCHENKO, V.S.

Use of membrane electrodes made of ion exchange resins for potentiometric titration. Zhur. anal. khim. 16 no. 4:388-394 J1-Ag '61.

(MIRA 14:7)

1. A.A. Zhdanov Leningrad State University,
(Ion exchange resins) (Potentiometric analysis)

MATEROVA, Ye.A.; VALYUSHKO, M.G.; PARSHIKOVA, Ye.V.; YEVNINA, S.B.

Investigating borate solutions by the ion exchange method. Vest.
IGU 16 no.10:125-132 '61. (MIRA 14:5)
(Borates) (Ion exchange)

ARKHANGEL'SKIY, L.K.; VOYEVODINA, A.A.; MATEROVA, Ye.A.

Interaction of ion exchange resins with water. Vest LGU 16 no.22:
102-110 '61. (MIRA 14:11)
(Ion exchange resins) (Water vapor)

~~MASTENKO~~, Ye.A.; BELINSKAYA, F.A.

Electrode properties of ion exchange membranes. Usp.khim.
30 no.7:914-931 JI '61. (MIRA 14:8)

1. Leningradskiy gosudarstvennyy universitet, kafedra
fizicheskoy khimii.
(Ion exchange) (Electromotive force)

MATEROVA, Ye.A.; MOISEYEV, V.V.; HELYUSTIN, A.A.

Comparative study of the electrode and exchange properties of the glass electrode by use of radioactive tracers. Part 2: Behavior of the potassium glass electrode in alkali metal salt solutions. Zhur.fiz.khim. 35 no.6:1258-1264, Je '61. (MIRA 14:7)

1. Leningradskiy gosudarstvennyy universitet imeni A.A.Zhdanova.
(Electrodes, Glass) (Alkali metal salts)

MATEROVA, E. A. [Materova, Ye. A.]; BELINSKAIA, F. A. [Belinskaya, F. A.]

Electrode properties of the iron-exchanging membranes. Analele
chimie 17 no.1:23-43 Ja-Mr '62.

CHERNOBROV, S.M., otv. red.; LASKORIN, B.N., red.; KLYACHKO, V.A., red.; MATEROVA, Ye.A., red.; LANGE, A.Z., red.; VITTIKH, M.V., red.; SHOSTAK, F.T., red.; SAVENKO, O.D., red.; ZYKOVA, V.V., red.; GLAZYRINA, D.M., red.; ALFEROVA, P.F., tekhn. red.

[Theory and practice of ion exchange] Teoriia i praktika ionnogo obmena; trudy. Alma-Ata, Izd-vo AN Kaz.SSR, 1963. 186 p. (MIRA 17:3)

1. Kazakhstanskoye respublikanskoye nauchno-tekhnicheskoye soveshchaniye po ionnomu obmenu. 1962. (MIRA 17:3)

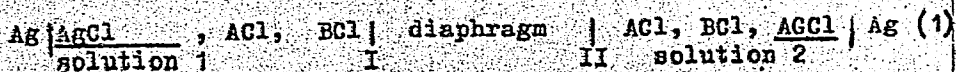
S/054/63/004/001/010/022
B101/B215

AUTHORS: Stefanova, G. K., Shul'ts, M. M., Materova, Ye. A.,
Nikol'skiy, B. P.

TITLE: The e. m. f. of galvanic cells containing ion exchange
diaphragms

PERIODICAL: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii,
no. 1, 1963, 93-98

TEXT: The galvanic cell



where A and B are univalent metals or hydrogen, is studied. The diaphragm is taken as being permeable only to cations. The change in free energy caused by the transport of solvent is not taken into consideration. Based on a paper by G. Scatchard (J. Amer. Chem. Soc., 75, 2883, 1953),
Card 1/3

The e. m. f. of galvanic cells ...

S/054/63/001/001/010/022
B101/B215

$$E = \frac{RT}{F} \ln \frac{a_{\pm}^2(BC)_1 + \frac{u_A}{u_B} K a_{\pm}^2(AC)_1}{a_{\pm}^2(BC)_2 + \frac{u_A}{u_B} K a_{\pm}^2(AC)_2} \quad (6)$$

is obtained for the e. m. f.; a being the activity coefficients of the ions and \bar{u} being their mobility in the diaphragm. The effect of incomplete dissociation on the validity of Eq. 6 is discussed, and the equation whose validity can be determined qualitatively by plotting the curve e. m. f. versus composition of solution is checked experimentally. Substitution of the transport numbers t_1' and t_1'' of ions in the surface layer of the diaphragm in Eq. 6 yields

Card 2/3

S/054/63/004/001/010/022
B101/B215

The e. m. f. of galvanic cells ...

$$E = \frac{RT}{F} \ln \frac{a_{\pm}^2(\text{BCl})_1 + \frac{i_A}{i_B} a_{\pm}^2(\text{BCl})_2}{a_{\pm}^2(\text{BCl})_1 + \frac{i_A}{i_B} a_{\pm}^2(\text{BCl})_2} \quad (9)$$

$$= \frac{RT}{F} \ln \frac{a_{\pm}^2(\text{BCl})_1}{a_{\pm}^2(\text{BCl})_1} \cdot \frac{1 + \frac{i_A}{i_B}}{1 + \frac{i_A}{i_B}} = \frac{RT}{F} \ln \frac{a_{\pm}^2(\text{BCl})_1}{a_{\pm}^2(\text{BCl})_2} \cdot \frac{i_B}{i_B}$$

Hence it follows that there is no need to measure the mobility of ions within the diaphragm nor to study the equilibrium in the membrane - solution system for calculating the e. m. f. of cell (1). It is quite sufficient to determine the number of transport of A⁺ and B⁺ ions through the membrane.

SUBMITTED: October 1962

Card 3/3

STEFANOVA, O.K.; SHUL'TS, M.M.; MATEROVA, Ye.A.; NIKOL'SKIY, B.P.

Electromotive force of galvanic cells with ion exchange membranes.
Vest. LGU 18 no.4:93-98 '63. (MIRA 16:3)
Electric batteries) (Electromotive force) (Ion exchange)

MATEROVA, Ye.A.; ROZHANSKAYA, T.I.

Electrode properties of anion exchange membranes in alkaline solutions. Zhur. fiz. khim. 37 no.12:2668-2671 D '63.
(MIRA 17:1)

1. Leningradskiy gosudarstvennyy universitet.

STEFANOVA, O.K.; MATEROVA, Ye.A.; NIKOL'SKIY, B.P.

Ion-exchange and electrochemical properties of sulfo cation
exchangers in solutions of some 1-1 charge electrolytes,
Dokl. AN SSSR 150 no.3:604-607 My '63. (MIRA 16:6)

1. Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova.
2. Chlen-korrespondent AN SSSR (for Nikol'skiy).
(Ion exchange)
(Electrolyte solutions)

NIKOL'SKIY, B.P.; MATEROVA, Ye.A.; SKABICHEVSKIY, P.A.

Ion exchange and the electrochemical properties of zirconyl phosphates. Dokl. AN SSSR 152 no.6:1360-1362 0 '63. (MIRA 16:11)

1. Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova.
2. Chlen-korrespondent AN SSSR (for Nikol'skiy).

ACCESSION NR: AP4041835

S/0054/64/000/002/0065/0073

AUTHOR: Materova, Ye. A.; Skabichevskiy, P. A.

TITLE: Ion exchange properties of zirconyl phosphate. I. Investigation of the dependence of ion exchange properties of zirconyl phosphate on the conditions of its production.

SOURCE: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 2, 1964, 65-73

TOPIC TAGS: zirconyl phosphate, ion exchange property, production condition, preparation method, titration curve, ion exchange capacity, drying, precipitation condition, component ratio

ABSTRACT: The effects of the precipitation conditions (concentrations, acidity, ZrO_2/P_2O_5 ratio, temperature) in the preparation of zirconyl phosphate on its composition and ion exchange properties were studied. From the potentiometric titration curves of zirconyl phosphates which differ in their properties it was shown that the ion exchange capacity of zirconyl phosphate is a function of the sample composition. Samples having a molar ratio of ZrO_2/P_2O_5 much greater than 1 have a

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ACCESSION NR: AP4041835

smaller number of functional strongly acid ionogen groups with a reduced ability to dissociate and hence a lower ion exchange capacity. The conditions for obtaining zirconyl phosphate samples having maximum ion exchange capacity, i.e., ZrO_2/P_2O_5 closest to 1, include the use of freshly prepared zirconium salt solutions (0.2-0.5M) containing 4-5M HNO_3 or HCl, and 0.2-1M H_3PO_4 . More concentrated zirconium solution or higher acidity causes formation of a precipitate which is hard to filter. The rate and order of pouring the solutions does not affect the properties of the precipitated zirconyl phosphate. Increasing the temperature of drying the zirconyl phosphate precipitate up to 300C has no effect on the ion exchange properties, but drying at higher temperatures (500-850C) causes irreversible changes (probably formation of -P-O-P- bonds) which sharply reduce the ion exchange capacity of zirconyl phosphate. "In conclusion the authors express their sincere appreciation to AN SSSR associate member B. P. Nikol'sk for valuable advice in the course of the work and in preparing the manuscript for printing." Orig. art. has: 5 figures.

ASSOCIATION: None

SUBMITTED: 07May63

ENCL: 00

Card 2/3

POSTCARD

ACCESSION NR: AP4041835

SUB CODE: IC, GC

NO REF SOV: 001

OTHER: 016

Card 3/3

ACCESSION NR: AP4041836

8/0054/64/000/002/0074/0083

AUTHOR: Materova, Ye. A.; Skabichevskiy, P. A.

TITLE: Ion exchange properties of zirconyl phosphate. II. Investigation of exchange of a series of mono- and divalent cations for the zirconyl phosphate hydrogen ions.

SOURCE: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 2, 1964, 74-83

TOPIC TAGS: zirconyl phosphate, ion exchange capacity, monovalent ion sorption, divalent ion sorption, zirconyl phosphate composition, phosphate content

ABSTRACT: The sorption by zirconyl phosphate of a series of mono- and divalent ions in a wide concentration range (0.02-1.0M for alkali, and 0.02-0.5M for alkaline earth compounds) and in the pH range of 1-12 was investigated to establish a relationship between the sorption of these ions and the zirconyl phosphate composition. Samples of zirconyl phosphate having a molar ratio of ZrO_2/P_2O_5 of 1.07, 1.44 and 1.89 were used. The amount of sorption at the same pH and the same solution concentration depended on the zirconyl phosphate sample composition and

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ACCESSION NR: AP4041836

the nature and the charge of the ion. In samples low in phosphate the absorption curves for the divalent ions differ sharply from curves with samples where the ratio approaches 1; the phosphate-poor samples do not have strongly acid phosphate groups. The sorption of divalent ions decreased in the series: $\text{Cu} > \text{Zn} > \text{Ba} > \text{Ca} > \text{Mg}$. The sorption of K, Na, Li, Ca and Ba ions by zirconyl phosphate having the ratio approaching unity obey the principal equations of ion exchange: plotting the pH vs. activity of the metallic ions in acid media gave a straight line with an inclination near theoretical ($\alpha = -1$ for monovalent, $-\frac{1}{2}$ for divalent ions); at higher pH there are deviations. In acid media the exchange constant for $\text{Ba}^{++} - \text{Na}^+ = 8.1$, for $\text{Ca}^{++} - \text{Na}^+ = 6.4$. "In conclusion the authors express their sincere appreciation to AN SSSR associate member Nikol'sk B. P. for valuable information in the course of the work and for preparing the manuscript for publication." Orig. art. has: 3 tables, 4 figures and 6 equations.

ASSOCIATION: None

SUBMITTED: 07May63

ENCL: 00

SUB CODE: IC, GC

NO REF SOV: 001

OTHER: 007

Card 2/2

ACCESSION NR: AP4041836

S/0054/64/000/002/0074/0083

AUTHOR: Materova, Ye. A.; Skabichevskiy, P. A.

TITLE: Ion exchange properties of zirconyl phosphate. II. Investigation of exchange of a series of mono- and divalent cations for the zirconyl phosphate hydrogen ions.

SOURCE: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 2, 1964, 74-83

TOPIC TAGS: zirconyl phosphate, ion exchange capacity, monovalent ion sorption, divalent ion sorption, zirconyl phosphate composition, phosphate content

ABSTRACT: The sorption by zirconyl phosphate of a series of mono- and divalent ions in a wide concentration range (0.02-1.0M for alkali, and 0.02-0.5M for alkaline earth compounds) and in the pH range of 1-12 was investigated to establish a relationship between the sorption of these ions and the zirconyl phosphate composition. Samples of zirconyl phosphate having a molar ratio of ZrO_2/P_2O_5 of 1.07, 1.44 and 1.89 were used. The amount of sorption at the same pH and the same solution concentration depended on the zirconyl phosphate sample composition and

Card 1/2

51
ACCESSION NR: AP4041836

the nature and the charge of the ion. In samples low in phosphate the absorption curves for the divalent ions differ sharply from curves with samples where the ratio approaches 1; the phosphate-poor samples do not have strongly acid phosphate groups. The sorption of divalent ions decreased in the series: $\text{Cu} > \text{Zn} > \text{Ba} > \text{Ca} > \text{Mg}$. The sorption of K, Na, Li, Ca and Ba ions by zirconyl phosphate having the ratio approaching unity obey the principal equations of ion exchange: plotting the pH vs. activity of the metallic ions in acid media gave a straight line with an inclination near theoretical ($\alpha = -1$ for monovalent, $-\frac{1}{2}$ for divalent ions); at higher pH there are deviations. In acid media the exchange constant for $\text{Ba}^{++} - \text{Na}^+ = 8.1$, for $\text{Ca}^{++} - \text{Na}^+ = 6.4$. "In conclusion the authors express their sincere appreciation to AN SSSR associate member Nikol'sk B. P. for valuable information in the course of the work and for preparing the manuscript for publication." Orig. art. has: 3 tables, 4 figures and 6 equations.

ASSOCIATION: None

SUBMITTED: 07May63

ENCL: 00

SUB CODE: IC, GC

NO REF SOV: 001

OTHER: 007

Card 2/2

ACCESSION NR: AT4042426

S/0000/63/000/000/0075/0081

AUTHOR: Materova, Ye. A., Belinskaya, F. A., Militsina, E. A.

TITLE: Some of the electrochemical properties of ion exchange membranes

SOURCE: Respublikanskoye nauchno-tekhnicheskoye soveshchaniye po ionnomu obmenu. Alma-Ata, 1962, Teoriya i praktika ionnogo obmena (Theory and practice of ion exchange); trudy* soveshchaniya. Alma-Ata, Izd-vo An KazSSR, 1963, 75-81

TOPIC TAGS: ion exchange membrane, ion exchange resin, polymer film, electro-chemistry, membrane potential, resorcinol exchange resin, pH measurement, galvanic cell

ABSTRACT: The difference between the membrane potentials of various ion exchange diaphragms prepared from sulfocarboxyl resins, hydroxyl cation exchange resins, basic anion exchange resins and some inorganic ionites was investigated at the ion exchange laboratory of Leningrad University. The membranes were prepared in the form of small disks either by pressing a fine powder with polystyrene, polyethylene or polymethylmethacrylate as the binders, or by molding a binder with the dispersed powder of an exchange resin

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ACCESSION NR: AT4042426

from an organic solvent. Technical ion exchange membranes prepared in the laboratory of Ye. B. Trostyanskaya at MkhTI and at the NIIPM were also studied. The galvanic cells $Ag | AgCl, M^+Cl |$ ion exchange membrane $| M^{++}Cl, AgCl | Ag$ and $Ag | AgCl, M^+Cl |$ ion exchanges membrane $| M^{++}Cl, sat'd. KCl, Hg_2Cl_2 | Hg$ were used to measure the membrane potentials in a variety of electrolytes. Despite a relatively low selectivity with respect to hydrogen ions, membrane electrodes were found to match the glass electrode in measuring pH in aggressive media. Thus, a resorcinol cation exchange resin was able to measure the pH of 0.015 — 13.7 N HF. The investigation of ion exchange resin membrane potentials shows them to be an important characteristic of the chemical and electrochemical properties of ion-exchange materials. "Some of the experimental data were obtained by A. Zub, P. Skabichevskiy and T. I. Rozhanskaya." Orig. art. has: 6 figures, 1 table and 2 equations.

ASSOCIATION: Leningradskiy gosuniversitet im. A. A. Zhdanova (Leningrad State University)

SUBMITTED: 13Nov63

ENCL: 00

SUB CODE: MT

NO REF SOV: 007

OTHER: 000

Card 2/2

MATHEMATICS, Ye.A.; ANALYSIS, Ye.A.; RESEARCH, I.I.

...entirely similar in nature... certain electrical... with... three... 19... 102... 104.

MATEROVA, Ye.A.; SKABICHEVSKIY, P.A. (Leningrad)

Electrochemical properties of zirconyl phosphate. Part 1. Zhur.
fiz. khim. 38 no.3:676-680 Mr '64. (MIRA 17:7)

1. Leningradskiy gosudarstvennyy universitet imeni A.A. Zhdanova.

ACCESSION NR: AP4034585

S/0076/64/038/004/0985/0989

AUTHORS: Materova, Ye.A.; Skabichevskiy, P.A.

TITLE: Electrochemical properties of zirconyl phosphate, II. Relationship between the electric conductivity of zirconyl phosphate samples and their composition.

SOURCE: Zhurnal fizicheskoy khimii, v. 38, no. 4, 1964, 985-989

TOPIC TAGS: zirconyl phosphate, composition, ZrO_2 P_2O_5 ratio, electrochemical property, ion exchange capacity, electric conductivity, water sorption, zirconyl phosphate H^+ form, zirconyl phosphate Na^+ form, energy of activation, hydrogen ion mobility

ABSTRACT: The dependence of the electric conductivity of zirconyl phosphate on the sample composition was investigated. The electric conductivity of the granular ionite was determined by finding the point at which it was equal to the conductance of a solution in equilibrium with the ion exchanger, and measuring the electric conductivity of the zirconyl phosphate-solvent system. Work was done at 25C, pH = 3, using and HCl solution and silver chloride electrodes; for determinations on the ionite in the Na^+ form the solution con-

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ACCESSION NR: AP4034585

taining 0.1 equivalents/liter of Na^+ was buffered to pH 4.94 with acetic acid and sodium acetate. It was found the electric conductivity of zirconyl phosphate decreased as the amount of phosphorus in the sample decreased (i.e., as the $\text{ZrO}_2/\text{P}_2\text{O}_5$ ratio k increased). As the value of k approached 1, the number of strongly acid ionogen groups increased; increasing the ZrO_2 content decreased the ability of the phosphate groups to dissociate. Water sorption by different samples of zirconyl phosphate was a factor which, in addition to the composition of the sample, determined the electric conductivity. The greater the ability to absorb water the greater the electric conductivity. However, samples with anomalously high conductivity did not have greater exchange capacity, so the dissociation of the phosphate groups was not increased; the electric conductivity was therefore caused by the greater mobility of the hydrogen ions in the samples containing more water. The mobility of the sodium ion in zirconyl phosphate was considerably less than of the hydrogen ions: the conductance of zirconyl phosphate in the Na^+ form ($k = 1.11$) was 0.7×10^{-4} compared to $2.29 \times 10^{-3} \text{ ohm}^{-1} \text{ cm}^{-1}$ for the H^+ form. The energy of activation of the electric conductivity (calculated by the method of P.F. Hamlen, J. Electrochem. Soc.; 109, 8, 746 (1962)) for

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Card

ACCESSION NR: AP4034585

samples where $k = 1.20, 1.65$ and 1.07 was $2.6, 2.5,$ and 0.9 kcal/
mol. Orig. art. has: 2 tables and 3 figures.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A.A.
Zhdanova (Leningrad State University)

SUBMITTED: 15Apr63

ENCL: 00

SUB CODE: IC

NR REF SOV: 002

OTHER: 003

Card 3/3

L 31997-55 EWT(m)/EPT(n)-2/ETG(m)/EAP(t)/EAP(t) Pu-4 IOP(c) HIR/JD/WW/
ACCESSION NR: AT5002303 JG/GS/RM S/0000/64/000/000/0096/0103

AUTHOR: Materova, Ye. A., Skabichevskiy, P. A.

TITLE: Ion exchange properties of zirconyl phosphate

AN SSSR. Institut fizicheskoy khimii. Issledovaniye svoystv ionobmennyykh

material (Research on the properties of ion exchange
Nauka, 1964, 95-103

TOPIC TAGS: zirconyl phosphate, ion exchange capacity, column chromatography,
polymethylmethacrylate, polystyrene

ABSTRACT: In a study of the ion exchange behavior of the compound as a function of the
mm ZrO_2 ratio in its molecule, the authors prepared 20 varieties of zirconyl phosphate
mm P_2O_5

of different composition by reacting different molar proportions of ZrO_2 and P_2O_5 (1:7,
1:5, 1:4, 1:2, 1:1.5, 1:1.1, 1.5:1, 1.75:1, 2:1, 3:1). Compounds with a ratio
of 1.07, 1.09, 1.12, 1.16, 1.20, 1.23, 1.27, 1.55, 1.65, 1.89, 2.01 and 2.98 were pre-
pared from zirconium tetrachloride, zirconium trichloride, zirconium dichloride, zirconium
chloride to zirconium chloride, chloride

and nitrate, after which the precipitates, Ca^{2+} and Mg^{2+}

Card 1/2

31997-65

ACCESSION NR: AT5002303

and dried at 120C for 8 hrs. With some exceptions, absorption of Ba^{2+} , Ca^{2+} , Na^+ and Mg^{2+} by the zirconyl phosphates was found to diminish in that order at PH < 7, but the con-
ditions of drying were

...dried at 120C for 8 hrs. with some exceptions, ...
... by the zirconyl phosphates was found to diminish in that order at PH < 7, but the con-
centration of the cation in the equilibrium solution and the temperature of drying were
also found to be factors in the process. The ion exchange capacity of samples dried at
500, 700 and 850C dropped sharply. Heterogeneous membranes were prepared from
samples of the zirconyl phosphates with polymethylmethacrylate and polystyrene as the
binders and their potential was measured. "In conclusion, the authors thank B. P.
Nikol'skiy, corresponding member of the AN SSSR, for valuable advice on the experi-
mental work and on the manuscript." Orig. art. has: 1 table, 7 figures and 3 formulas.

ASSOCIATION: None

SUBMITTED: 06Aug64

ENCL: 00

SUB CODE: IC

NO REF SOV: 002

OTHER: 013

Card 2/2

L 31992-65 EWT(m)/EAD(m)/T RWH/GS/RM
ACCESSION NR: AT5002306 S/0000/64/000/000/0198/0207

23
20
B7

AUTHOR: Belinskaya, F. A., Matorova, Ye. A., Zub, A. I.

TITLE: Membrane electrodes made of some inorganic cation exchange resins in solutions of monovalent electrolytes

SOURCE: AN SSSR. Institut fizicheskoy khimii. Issledovaniye svoystv ionoobmennyykh (Properties of ion-exchange materials). Moscow, Izd-vo

materialov (Research on the properties of ion-exchange materials)
Nauka, 1964, 198-207

TOPIC TAGS: exchange resin, cation exchange resin, membrane electrode, electrode potential, electrolyte concentration, phosphomolybdate electrode, synthetic zeolite, glauconite, polystyrene, polymethacrylate, polyethylene

ABSTRACT: The authors studied the effect of the concentration of NH_4Cl (0.001-3 M), KCl (0.001-3 M), NaCl (0.001 - 3 M), LiCl (0.001 - 2 M), and CsCl (0.001 - 1 M) electrolytes and NaCl (0.001 - 1 M) - KCl (0.01 or 0.1 M), NaCl (0.001 - 1 M) - LiCl (0.01 or 0.1 M), CsCl (0.001 - 1 M) - NaCl (0.01 M), NaCl - HCl , and NaCl - NaOH binary electrolytes on the potential of membrane electrodes, using the ammonium salt of complex phosphomolybdate $(\text{NH}_4)_3[\text{PMo}_{12}\text{O}_{40}] \cdot n\text{H}_2\text{O}$, synthetic NaA and NaX zeolites, and

phosphoric acid (NH₄)₂P₂O₇

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I. 31992-65

ACCESSION NR: AT5002306

3
glaucinite as the electrode membrane material. The 0.5 - 1.0 mm thick high quality electrode membranes were prepared by pressing mixtures of 40-80% of the inorganic material on polyethylene as inactive binders at 150

4 formulas

ASSOCIATION: None

SUBMITTED: 06Aug64

ENCL: 00

SUB CODE: CC, MT

NO REF SOV: 008

OTHER: 009

Card 2/2

MATEROVA, Ye .A.; ROZHANSKAYA, T.I.; SIROTA, Z.M.

Electrochemical properties of membranes from anion exchangers with different ionogenic group structure. Part 1: Nonexchange absorption of electrolytes by membranes. Elektrokhimia 1 no.7: 794-799 J1 '65. (MIRA 18:10)

L. Leningradskiy gosudarstvennyy universitet imeni Zhdanova.

MATEROVA, Ye.A.; ROZHANSKAYA, T.I.

Electrochemical properties of anion-exchange membranes with different structure of the ionogenic group. Part 3: Electroconductivity of membranes in solutions of hydrochloric acid and sodium chloride. Elektrokimiya 1 no.8:916-921 Ag '65. (MIRA 18 9)

1. Leningradskiy gosudarstvennyy universitet imeni A.A.Zhdanova.

I 27144-66 EWT(m)/ETC(f)/EWG(m)/EWP(j)/T/ETC(m)-6 DS/WW/RM

ACC NR: AP6017110

SOURCE CODE: UR/0054/65/000/003/0074/0082

AUTHOR: Arkhangel'skiy, L. K.; Materova, Ye. A.; Kisel'gof, G. V.

ORG: none

TITLE: Study of ion-exchange equilibrium. Exchange of ions on sulfocation-exchange resins with varying divinylbenzene content

SOURCE: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 3, 1965, 74-82

TOPIC TAGS: ion exchange resin, ion exchange

ABSTRACT: The number of studies containing data on ion-exchange equilibrium for singly charged ions is very large, and somewhat less than large for the exchange of doubly charged and diversaly charged ions. Available data permits several qualitative conclusions of the effect on ion-exchange equilibrium of the nature of the exchanged ions and the divinylbenzene (DVB) content present. However, a qualitative explanation of ion-exchange regularities can be equally satisfactory from the point of view of several models. More information can be anticipated through evaluation of data on ion-exchange equilibrium quantitatively. The present study examines ion-exchange equilibrium in the systems HCl -

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UDC: 541.123

L 27144-66

ACC NR: AP6017110

LiCl , $\text{HCl} - \text{TlCl}$, $\text{HCl} - \text{Mg}^{2+}$, and $\text{HCl} - \text{BaCl}_2$. Selection of the system is governed by the desire to study the effect on ion-exchange equilibrium both of the value of the charge of one of the replaced. In order to study the effect of the amount of crosslinking bonds on ion-exchange equilibrium, experiments were conducted with three samples of the KU-2 sulfo-cation-exchange resin, containing different amounts of DVB. It was concluded that variation in the value of the equilibrium coefficients with change in ion-exchange resin content within the limits of the simplest presuppositions are accounted for by different factors for ion-exchange resins with a low and those with a high DVB content. In order to elucidate the minimum on the curve describing the equilibrium coefficient versus composition, characteristic for exchange of $\text{Mg}^{2+} - \text{H}^+$ on a cation-exchange resin containing 8% DVB, it must be assumed that the non-uniformity of the established ion with respect to bonding energies with the counterion cannot exist in an ion-exchange resin with a low DVB content and appears with an increase in the DVB content. Then, curves with a minimum can be viewed transitional, from functions characteristic of ion-exchange resins with energetically equivalent fixed ions, to functions characteristic of ion-exchange resins containing fixed ions which differ in bonding energy. Orig. art. has: 3 figures, 4 formulas, and 1 table. [JPRS]

SUB CODE: 07 / SUBM DATE: 12Apr65 / ORIG REF: 009 / OTH REF: 021
Card 2/2

L 27125-66 EWT(m)/ETC(r)/EWG(m) RM/DS

ACC NR: AP6017111

SOURCE CODE: UR/0054/65/000/003/0083/0089

AUTHOR: Arkhangel'skiy, L. K.; Materova, Ye. A.; Kisel'gof, G. V.

3/
B

ORG: none

TITLE: Methods of calculating activity coefficients for ion-exchange resin components

SOURCE: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 3, 1965, 83-89

TOPIC TAGS: ion exchange resin, ion exchange

ABSTRACT: A method of calculating the activity coefficients of ion-exchange resins containing single charged counterions. In the calculations the following assumptions were made:

- 1) the nonexchange absorption of electrolytes on diluted water solutions can be neglected;
- 2) water-saturated ion-exchange resin containing two kinds of counterions can be regarded as a bicomponent system.

Relationships affording calculation of activity coefficients for ionexchange resins containing singly charged counterions can be readily derived for the case when the ion-exchange resin contains polycharged counterions. Comparison of calculation results for

Card 1/2

UDC: 541.121:536.7

2

L 27125-66

ACC NR: AP6017111

a different method of selecting ion-exchange components was made of the KU-2 sulfo-cation exchange resin containing 8% DVB on the system HCl - MgCl₂. In calculating activity coefficients two goals can be aimed at

1) Systematization of information on the appearance of interactions in the ion-exchange resin phase. In this case, a system in which the interactions are most fully suggestive of interactions in the ion-exchange resin is selected in preference over others. From this point of view, both the standard systems examined in the study must be regarded as unsuccessful: their properties differ too much from the properties of actual ion-exchange resins. It would be useful, for example, to have standard systems in which the chemical potentials of components as functions of their concentration would take into account electrostatic interactions in the ion-exchange resin, into a Debye approximation. Orig. art. has: 26 formulas and 1 table. [JPRS]

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