Compounds of Beryllium Hydroxy Acetate With Sulfur Dioxide

decomposition of the first was observed in the system. The stability of the compounds decreases with the increase in temperature. It is remarkable that in this case the values of the heats of formation (on the average 9,22 kcal per 1 g mol SO_2) are lower than in the normal case of coordination compounds. Furthermore, it is of interest that at -10° (boiling point of SO_2) the discussed compounds have the characteristic features of solid solutions and can exist only at increased pressure. According to radiographic analyses $Be_4O(CH_3COO)_6 \cdot 2SO_2$ crystallizes in a cubic diamond-like lattice with a period of the elementary cell of a = 17,1 Å. The density at -12° = 1,43, roentgen density = 1,42. In conclusion a rough outline of the structure of this substance is given. There are 2 figures and 7 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

3(8) SOV/7-59-1-3/14

AUTHORS: Sobolev, B. P., Novoselova, A. V.

TITLE: On the Role of Fluoride Compounds in the Transport of Beryllium and the Formation of Phenacite (O roli ftoristykh soyedineniy v perenose berilliya i obrazovanii fenakita)

PERIODICAL: Geokhimiya, 1959, Nr 1, pp 20-28 (USSR)

ABSTRACT: The authors synthesized phenacite from beryllium - and silicon oxide. The following materials served as mineralizers: NaF, BeF_2 and the fluoberyllates of alkalis. The latter preparations were supplied by N. S. Tamm and L. M. Mikheyeva. A carefully produced mixture was sealed in quartz ampoules (Figs 2 and 3) and heated in shaft furnaces. The temperature regulators ERM-47 and EPD-17 were used in this process. Experiments at different temperatures and with different mineralizers (Tables 1 to 3) gave the following results: the formation of phenacite from BeO and SiO_2 in the presence of fluoberyllates is a heterogeneous reaction, i.e. via the gaseous state. The authors assume the following mode of formation:

(1) $SiO_2 + 2\ NaBeF_3 \rightleftharpoons SiF_4 + 2\ BeO + 2\ NaF$

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SOV/7-59-1-3/14

On the Role of Fluoride Compounds in the Transport of Beryllium and the Formation of Phenacite

(2) $SiF_4 + BeO \rightleftharpoons SiOF_2 + BeF_2$

(3) $4\ SiOF_2 + 2\ NaBeF_3 \rightleftharpoons Be_2SiO_4 + 3\ SiF_4 + 2\ NaF$

Because of the transport reactions phenacite can be "over-distilled". The paragenesis of phenacite in the various deposits and the morphological similarity of synthetic and natural crystals (Figs 4 to 7) suggest that fluoberyllates play a leading part in the endogeneous formation of phenacite. The authors express their gratitude to A. A. Beus for reviewing the results. There are 7 figures, 3 tables, and 25 references, 11 of which are Soviet.

ASSOCIATION: Kafedra neorganicheskoy khimii Moskovskogo gosudarstvennogo universiteta im. M. V. Lomonosova (Chair of Inorganic Chemistry of Moscow State University imeni M.V. Lomonosov)

SUBMITTED: September 24, 1958

Card 2/2

NOVOSELOVA, A.V.

SOV/156-59-1-15/54

5(2)
AUTHORS: Ukrainskiy, Yu. M., Novoselova, A. V., Simanov, Yu. P.

TITLE: Investigation of the System Vanadium - Tellurium (Issledovaniye sistemy vanadiy - tellur)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1959, Nr 1, pp 62 - 66 (USSR)

ABSTRACT: Unlike vanadium sulfides and selenides the system of tellurides has not yet been investigated in its entirety. The synthesis of vanadium-tellurium compounds: V and Te in various ratios were heated for 500 hours up to 800° in quartz ampoules which were closed by melting in vacuum. Temperature gradually decreased to room temperature for a period of 400 hours. This was done in order to cause the formation of compounds which are unstable at higher temperatures. The samples obtained were radiographically investigated. The V lines disappear already with a composition $VTe_{0.20}$. The roentgenogram of this α phase remains unchanged up to $VTe_{0.77}$. Even with a wide arc of traverse a shift of the interference lines

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does not occur. Hence a tetrahedral coordination of the atoms in this phase is assumed. Since the atom radii of Te and V are almost similar one can be substituted for the other in the crystal system without the interference lines being shifted. At $VTe_{0.82}$ the diffraction picture changes suddenly. The β phase is formed, the range of which lies between $VTe_{0.82}$ and $VTe_{1.27}$. At $VTe_{1.50}$, corresponding to V_2Te_3, the next phase follows the width of which, however, could not be found because the roentgenograms of the next sample ($VTe_{1.63}$) were useless. VTe_2 is characterized by its angles of reflection. With a higher tellurium content there are again lines of elementary tellurium. Thus the sample with the stoichiometric ratio VTe_3 indicates only the lines of VTe_2 and Te. Consequently, higher tellurides are not formed. The Debye roentgenograms of the α and β phase could not be explained. The α phase showed more than 100 lines, the β phase 60 - 65. Consequently, a less symmetrical (monoclinic or triclinic)

structure of these phases is to be assumed. V_2Te_3 probably is monoclinic. At VTe_2 2modifications were found; the one is scale-like, the other forms elastic threads. Debye diagrams of these thread-like crystals were plotted (Table) and the axes were measured. It was found: a = 6.47 kx, b= 7.28 kx and c= 6.26 kx (rhombic syngony). Diagrams of the conductivity and thermo-electromotive force (Fig) show characteristic maxima for the phases α and β and for VTe_2. The conductivity of all samples decreased after three months, however, it remained so high that a metallic character of the bond in the vanadium tellurides may be presumed in view of the weak electromotive force. There are 3 figures, 1 table, and 9 references, 4 of which are Soviet.

ASSOCIATION: Kafedra neorganicheskoy khimii Moskovskogo gosudarstvennogo universiteta im. M. V. Lomonosova (Chair of Inorganic Chemistry of Moscow State University imeni M. V. Lomonosov)

SUBMITTED: October 1, 1958

A.V. Novoselova

5(0)
AUTHOR: None Given SOV/62-59-5-36/37

TITLE: General Meetings of the Department of Chemical Sciences of the Academy of Sciences, USSR on October 23 and November 27-28, 1958 (Obshchiye sobraniya Otdeleniya khimicheskikh nauk Akademii nauk SSSR 23 oktyabrya i 27-28 noyabrya 1958 g.)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk, 1959, Nr 5, pp 944-948 (USSR)

ABSTRACT: This is a report on the General Meetings of the Department of Chemical Sciences, AS USSR, on October 23, 1958 the General Meeting of the Department of Chemical Sciences of the AS USSR took place under the chairmanship of Academician S. S. Semenov. A. V. Novoselova delivered a lecture on the "Investigations in the Field of Tellurium Chemistry". She emphasized the fact that the interest in tellurium has considerably increased in the course of the last years because of the valuable semiconductor properties of tellurium and numerous tellurides. In her lecture Novoselova reported on the production of pure tellurium, on the investigations of the behavior of admixtures and on investigations of numerous tellurides. The lecturer has answered numerous questions. M. A. Porai-Koshits, Candidate of Physical and Mathematical Sciences spoke on the "Stereochemistry of Complex Compounds of Divalent Nickel". On the basis of direct X-ray structural analyses carried out at the Institut obshchey i neorganicheskoy khimii AS USSR (Institute of General and Inorganic Chemistry, AS USSR) and the MGU it was found that all ammonia thiocyanate compounds of nickel which are separated from the solution at different concentrations represent, according to their structural character, complex six-coordination compounds. The analysis of the crystalline structures makes it possible to set up common crystallochemical rules in the series of ammonia thiocyanate compounds. G. B. Bokiy and Z. V. Zvonkova, Corresponding Members, AS USSR, took part in the discussion. N. V. Belov, Member, AS USSR, Doctor of Chemical Sciences spoke on the "Application of High Pressure in the Investigation of the Transition State and the Mechanism of Reaction". By means of experimental data the lecturer proved that the application of high pressure opens new prospects in this field. S. S. Batsanov, Doctor of Physical and Mathematical Sciences spoke on the "Stereochemistry of Complex Compounds of Bivalent Nickel". On the basis of direct X-ray structural analyses carried out at the Institut obshchey i neorganicheskoy khimii AS USSR (Institute of General and Inorganic Chemistry, AS USSR) and the MGU it was found that all ammonia thiocyanate compounds of nickel which are separated from the solution at different concentrations represent, according to their structural character, complex six-coordination compounds. The analysis of the crystalline structures makes it possible to set up common crystallochemical rules in the series of ammonia thiocyanate compounds. G. B. Bokiy and Z. V. Zvonkova, Corresponding Members, AS USSR, took part in the discussion. N. V. Belov, Member, AS USSR, Doctor of Chemical Sciences spoke on the "Application of High Pressure in the Investigation of the Transition State and the Mechanism of Reaction". By means of experimental data the lecturer proved that the application of high pressure opens new prospects in this field. S. S. Batsanov, Doctor of Chemical Sciences took part in the discussion. On the occasion of the general meeting held under the chairmanship of Academician A. P. Vinogradov from November 27 to 28, 1958 E. I. Kitaiia, Corresponding Member, AS USSR and G. A. Shchembelov, Candidate of Technical Sciences spoke on the "Properties of Low-substituted Cellulose Nitrates and Their Solutions". The following scientists took part in the discussion: Z. A. Rogovin, Corresponding Member; O. P. Golova, Doctor of Chemical Sciences, et al. G. V. Samsonov, Doctor of Chemical Sciences spoke on the "Specific Sorption of Ions of Organic Substances". The synthesis of weakly swelling ion-exchange resins, which cannot absorb certain ions of organic substances also the establishment of a new effective method of producing chemically pure streptomycin and penicillin. The lecturer was asked many questions. M. V. Tol'kanshteyn, Doctor of Physical and Mathematical Sciences dealt with the "Problems of Statistical Physics of the Polymer Chains". The lecturer and his collaborators have developed a general statistical method of computing the properties of macromolecules which is based on the application of the rotational isomer model. The following scientists took part in the discussions: V. Z. Ivanov, Doctor of Chemical Sciences B. V. Deryagin and V. G. Lavrik, Corresponding Members, AS USSR. V. N. Tsvetkov, Doctor of Physical and Mathematical Sciences spoke on the "Intermolecular Interaction and the Form of Macromolecules in Solutions". The lecturer demonstrated that the molecular weight of the fraction may be determined by a joint determination of the characteristic viscosity and diffusion. B. V. Deryagin, Corresponding Member, AS USSR, M. V. Tol'kanshteyn, Doctor of Physical and Mathematical Sciences and A. I. Kitaygorodskiy, Doctor of Chemical Sciences took part in the discussion.

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CHZHOU-SIN [Chou-hsing]; [redacted] F.SH.; NOVOSELOVA, A.V.

Determination of beryllium oxide impurties in a copper-beryllium alloy. Zav.lab. no.11:1292-1293 '59. (MIRA 13:4)

1.Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Copper-beryllium alloys - Analysis) (Beryllium oxides)

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67036

AUTHORS: Batsanova, L.R., Novoselova, A.V. SOV/153-2-5-20/31

TITLE: On the Glass-like Beryllium Fluoride and Several Glass Types Based on It

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1959, Vol 2, Nr 5, pp 751-754 (USSR)

ABSTRACT: In the state diagrams of systems containing beryllium fluoride, some ranges are known within the limits of which the melts harden like glass when cooling (Refs 1-5). The authors investigated the optical properties of several types of glass of beryllium fluoride. The pure glass type of beryllium fluoride was compared in a chemical and optical respect with the above types of glass. A platinum crucible was used for melting which was placed into a closed steel- or quartz container. At a high temperature (1,000°C) a glass is formed which has a higher degree of transparency, and is free of air bubbles. The authors also prepared glasses by addition of magnesium-, calcium-, strontium-, barium- and aluminum fluorides. They did not succeed in producing glass without the addition of potassium fluoride. The glass formation succeeds when a sufficient quantity of BeF_2 (at least 45% by

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On the Glass-like Beryllium Fluoride and Several Glass Types Based on It

weight) are added. One may start from a mixture of fluorides as well as from fluorine beryllates, i.e. from K_2BeF_4, $KBeF_3$ or $(NH_4)_2BeF_2$, mixed with fluorides of other metals. Glass containing beryllium and potassium fluoride can also be molten in an open dish. If keeping these glass types in open air for a longer period, a thin dull film forms. Both the glass-like BeF_2 and glass types containing only BeF_2 and KF are very unstable, and become rapidly dull in open air. The hygroscopy of these glass types can be considerably reduced by the addition of fluorides of bivalent metals. The forming of the dull film can be prevented by storing in a dry place and by using rubber gloves. The film can also be ground off. Figure 1 shows the light permeability curves in the ultraviolet range (wave length 220-320 mμ). BeF_2 glass is impermeable to short waves (220-230 mμ). It becomes more permeable with increasing wave length. The remaining glass types are permeable in the whole 220-320 mμ range. BeF_2 glass is permeable in the whole infra-

Card 2/3 red range up to 5.5μ (Fig 2, Curve 1) and has its minimum

On the Glass-like Beryllium Fluoride and Several Glass Types Based on It

light permeability at 2.8μ. It is impermeable between 5.5 and 15μ. The permeability curves of the glass types of three components are similar to the curve of BeF_2. The table (p 753) contains the refractive indices of the glass types examined. The last-mentioned measurements were carried out by Ye.P. Markin and V.P. Cheremisinov, staff members of the Fizicheskiy institut AN SSSR (Physics Institute of the AS USSR). There are 2 figures, 1 table, and 10 references, 5 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova; Kafedra neorganicheskoy khimii (Moscow State University imeni M.V. Lomonosov; Chair of Inorganic Chemistry)

SUBMITTED: June 11, 1958

5(2), 18(6)

AUTHORS: Ukrainskiy, Yu. M., Novoselova, A. V. Simanov, Yu. P.

SOV/78-4-1-28/48

TITLE: Investigation of the Tantalum-Tellurium System (Issledovaniye sistemy tantal - tellur)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 1, pp 148-152 (USSR)

ABSTRACT: The tantalum tellurides were investigated. For the production of tantalum tellurides pure tantalum powder with slight impurities (niobium 0.5% and titanium 0.1%) and pure tellurium (99.99%) were used. Ba means of the differential thermic analysis it was found that the reaction between tantalum and tellurium begins at 450°. The sintering of tellurides was carried out at 800°. X-ray analyses and determinations of the electric conductivity and of the thermo-electromotive force were carried out. In the system Ta-Te the compound $TaTe_3$ and two compounds of varying composition were found as follows: α phase $TaTe_{0.85-1.2}$ and β phase $TaTe_{1.5-2.0}$. A diagram of the phase composition of the system Ta-Te which had been obtained by sintering the com-

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ponents during a period of 400 hours at 900° and hardening during a period of 150 hours at 500° was plotted. The curve of the specific electric conductivity shows a maximum at the $TaTe_3$ composition. The electric conductivity of the samples varies considerably depending on the conditions under which the samples have been prepared. The curve of the dependence of the thermo-electromotive force on the composition shows a minimum with $TaTe_3$. The high value of the specific electric conductivity and the low value of the thermo-electromotive force show that the chemical bond in $TaTe_3$ is semi-metallic. The preparations with the composition $TaTe_{0.8-0.5}$ are unstable in air. Lower tellurides were not found in the tantalum-tellurium system. There are 5 figures and 4 references, 2 of which are Soviet.

SUBMITTED: October 1, 1957

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SOV/78-4-3-10/34

5(2)
AUTHORS: Turova, N. Ya., Novoselova, A. V., Semenenko, K. N., Savost'yanova, R. I.

TITLE: On the Phenolates of Beryllium (O fenolyatakh berilliya)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 3, pp 549-552 (USSR)

ABSTRACT: The interaction between beryllium chloride and β-naphthol and p- and m-cresols has been investigated and the properties of the resulting phenolates have been described. The reaction of beryllium chloride with o-, p-, m-cresol takes place at 90-100°C. The interaction of p- and m-cresol with $BeCl_2$ takes place under a strong development of HCl. The phenolates of beryllium are white, amorphous, hygroscopic substances, which slowly hydrolize in air. Thermographic and radiographic investigations were carried out. The following phenolates have been prepared: β-naphthol beryllium $(Be(OC_{10}H_7)_2$ and $Be(p\text{-}OC_7H_7)_2$ and $Be(m\text{-}OC_7H_7)_2$. The phenolates of beryllium are slightly soluble in benzene and xylene, stable in ether. Decomposition occurs under the action of methyl alcohol.

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On the Phenolates of Beryllium

There are 1 figure and 7 references, 2 of which are Soviet.

SUBMITTED: January 4, 1958

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5(4) SOV/78-4-3-27/34

AUTHORS: Breusov, O. N., Trapp, G., Novoselova, A. V., Simanov, Yu. P.

TITLE: Thermal and X-ray Phase Analysis of the System SrF_2 - BeF_2 (Termicheskiy i rentgenofazovyy analiz sistemy SrF_2 - BeF_2)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 3, pp 671-677 (USSR)

ABSTRACT: The system SrF_2-BeF_2 was investigated by the method of differential-thermal and X-ray phase analysis. Beryllium fluoride was produced by thermal decomposition of ammonium beryllium fluoride and strontium fluoride from strontium carbonate and hydrofluoric acid. For the production of melts with a content of 0-50 mole % BeF_2 SrF_2 and strontium beryllium fluoride were used. For alloys with 50-97 mole % BeF_2 melts from strontium chloride and ammonium beryllium fluoride were used. Melts with more than 50 mole % BeF_2 are hygroscopic. The phase diagram of the system SrF_2-BeF_2 was

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Thermal and X-ray Phase Analysis of the System SrF_2 - BeF_2

plotted. At 883±18° beryllium strontium fluoride forms a eutectic with strontium fluoride. Strontium beryllium fluoride melts congruently at 954±10°, and at 923±3° a polymorphic transformation occurs. $SrBeF_4$ forms with beryllium fluoride a eutectic at 582±27°. On the thermogram of the melt with 65 % BeF_2 effects occur at 384±13° and 334±5°, the nature of which could not be found by X-ray analyses. The compound $SrBeF_4$ was determined by X-ray analysis. This compound occurs in three modifications: α, β, and γ. From an aqueous solution the β form of $SrBeF_4$ precipitates with impurities of the γ form. Thermal and X-ray investigations of strontium beryllium fluoride were carried out and two schemes were given for the formation of the modification;

$$\text{melt} \xrightleftharpoons{954^\circ} \alpha\text{-}SrBeF_4 \xrightleftharpoons{923^\circ} \beta_B\text{-}SrBeF_4 \xrightleftharpoons{664^\circ} \gamma\text{-}SrBeF_4$$

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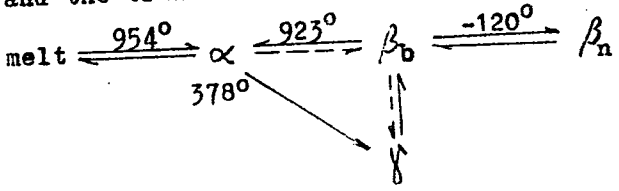
Thermal and X-ray Phase Analysis of the System SrF_2 - BeF_2

and the transformation:



There are 1 figure, 3 tables, and 10 references, 5 of which are Soviet.

SUBMITTED: March 1, 1958

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5(2) SOV/78-4-5-10/46

AUTHORS: Turova, N. Ya., Novoselova, A. V., Semenenko, K. N.

TITLE: On the Alcoholates of Beryllium (Ob alkogolyatakh berilliya) Communication I.

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 5, pp 997-1001 (USSR)

ABSTRACT: The syntheses for the preparation of the alcoholates of beryllium were investigated and some properties of beryllium ethylate were discussed. The reaction between metallic beryllium and absolute ethyl alcohol was recommended in the presence of $BeCl_2$, $HgCl_2$ or J for the purpose of synthetizing beryllium ethylate. Beryllium ethylate of the composition $Be(OC_2H_5)_2$ is a white amorphous substance. The product is not soluble in water and in the usual organic solvents. Several properties of beryllium ethylate, especially its behavior with respect ot absolute ethyl alcohol, anhydrous acetic acid, and alcoholic $BeCl_2$-solution were investigated. In the interaction between beryllium ethylate and anhydrous acetic acid in an ether medium an insoluble compound with the composition $Be(OC_2H_5)(OCOCH_3)$ is formed after some hours with a molar ratio of components of 1:1. In the interaction of beryllium

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On the Alcoholates of Beryllium SOV/78-4-5-10/45

ethylate with 0.5 N beryllium chloride solution, beryllium ethylate dissolves completely in absolute ethyl alcohol within two hours. With the evaporation of this solution a syrup-like mass is formed. The dissolution process of beryllium ethylate is connected with the formation of complex compounds of the type $Be(OR)_2 \cdot BeCl_2$ or $Be(BeCl_2(OR)_2)$ in alcoholic $BeCl_2$-solution. The interaction between beryllium and absolute methyl alcohol shows that, in the presence of $BeCl_2$, $HgCl_2$ and J, a compound of variable composition is formed, for which the general formula $\left[xBe(OCH_3)_2 \cdot yBe(OCH_3)Hal\right]_n$ holds. In the interaction between $BeCl_2$ and $Na\left[Be(OCH_3)_4\right]$ a mixture of NaCl and $Be(OCH_3)_2$ is formed. There are 13 references, 3 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: February 3, 1958

Card 2/2

5(2) SOV/78-4-5-45/46

AUTHORS: Turova, N. Ya., Novoselova, A. V., Semenenko, K. N.

TITLE: The Synthesis of the Etherates of Beryllium Halides (Sintez efiratov galogenidom berilliya)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 5, pp 1215-1216 (USSR)

ABSTRACT: The synthesis of the etherates of beryllium chloride and beryllium bromide is carried out by the direct interaction between the metallic beryllium and halogens or hydrogen chloride in an absolute ether medium. The syntheses of the etherates of bromides and iodides of beryllium are carried out in the nitrogen flow. The following compounds were isolated: $BeCl_2 \cdot 2(C_2H_5)_2O$ and $BeBr_2 \cdot 2(C_2H_5)_2O$. The melting temperatures of the etherates of beryllium chloride and beryllium bromide agree well with the data given by the authors for preparations produced by the interaction of anhydrous halides with ether. It was not possible to represent etherate of beryllium iodide in the purest form. The method described for the synthesis of the etherates of beryllium halides is of a general character and may be used for the production of

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The Synthesis of the Etherates of Beryllium Halides

etherates of other metal halides. There are 2 references, 1 of which is Soviet.

SUBMITTED: December 15, 1958

SOV/78-4-10-7/40

5(2)

AUTHORS: Breusov, O. N., Vagurtova, N. M., Novoselova, A. V., Simanov, Yu. P.

TITLE: On the Thermal Decomposition of Ammonium-fluoro-beryllate $(NH_4)_2BeF_4$

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 10, pp 2213-2219 (USSR)

ABSTRACT: Since the reaction under review represents the principal method for the production of crystalline beryllium fluoride, the course of this process was investigated. The authors mention in brief the publications available so far on this problem and especially point out the paper by A. V. Novoselova and M. Ya. Averkova (Ref 14) who first obtained the ammonium-meta-fluoro-beryllate NH_4BeF_3 in addition to the ammonium-ortho-fluoro-beryllate $(NH_4)_2BeF_4$. The thermal decomposition of the ortho-compound in the inert gas current gives only low yields, where-fore this reaction was investigated under decreased pressure. Figure 1 shows the decomposition curve at continuous increase in temperature where no breaks can be seen. On gradual heating

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On the Thermal Decomposition of Ammonium-fluoro-beryllate $(NH_4)_2BeF_4$

up to 165, 180, 205, 220 and 240° (Figs 2 and 3) it becomes evident that the decomposition takes place in three stages: $(NH_4)_2BeF_4 \rightarrow NH_4BeF_3 \rightarrow NH_4Be_2F_5 \rightarrow BeF_2$. Table 1 presents the analysis of $(NH_4)_2BeF_4$, table 2 that of $NH_4Be_2F_5$. The lattice constants of $NH_4Be_2F_5$ were calculated on the basis of a radiogram obtained by means of the RKU-86 chamber and found to belong to the hexagonal syngony (Table 3). In the same way the corresponding lattice constants were calculated from the radiograms of KBe_2F_5 (Table 4) and α-$CsBe_2F_5$ (Table 5). The radiograms are shown in figure 4. Table 6 presents the data for the compounds of the $Me^{I}Be_2F_5$ type, table 7 compares the lattice constants of $NH_4Be_2F_5$, KBe_2F_5 and α-$CsBe_2F_5$. There are 4 figures, 7 tables, and 12 references, 8 of which are Soviet.

SUBMITTED: June 19, 1958

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SOV/78-4-10-8/40

5(2)

AUTHORS: Korneyeva, I. V., Novoselova, A. V.

TITLE: On the Thermal Decomposition of Selenites and Selenates of Zinc and Cadmium

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 10, pp 2220-2227 (USSR)

ABSTRACT: The thermal stability of the compounds mentioned in the title is important with respect to the production of luminophoric material and to the glass industry. Since there are no data available in publications on this problem, these compounds were investigated by means of thermographic, thermogravimetric, and X-ray analysis. The initial products corresponded with the composition $ZnSeO_3$; $CdSeO_3$; $ZnSeO_4 \cdot 3H_2O$ and $CdSeO_4 \cdot H_2O$ (Tables 1 and 2). The Debye powder method of analysis was carried out by means of a BSV tube and different cameras of the RKD type. The heating curves were determined by means of the pyrometer of N. S. Kurnakov. The thermal analysis indicates that the selenates of zinc and cadmium are less stable than the selenites and thus behave in an opposite way as compared to the corresponding sulfates and sulfites. The conversion

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On the Thermal Decomposition of Selenites and Selenates of Zinc and Cadmium

$Se^{4+} \rightarrow Se^{6+}$ is more difficult than the conversion $S^{4+} \rightarrow S^{6+}$: $H_2SeO_3 \rightarrow H_2SeO_4$ requires -1.15 v, whereas for $H_2SO_3 \rightarrow H_2SO_4$ -0.17 v are sufficient. A further difference lies in the nature of the decomposition by temperature influence. While the sulfates decompose according to the equation $MeSO_4 \rightarrow MeO + SO_2 + \frac{1}{2}O_2$, the selenates of Zn and Cd form the corresponding selenites under polymorphic transformations, similar to the selenates of Ba, Sr, Pb. Zinc selenate and zinc selenite yield basic salts on decomposition. There are 10 figures, 2 tables, and 8 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: April 12, 1959

SOV/78-4-1o-38/4o

5(2)

AUTHORS: Turova, N. Ya., Novoselova, A. V., Semenenko, K. N.

TITLE: On Compounds of Beryllium Chloride With Tetrahydrofuran

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 1o, pp 241o - 2411(USSR)

ABSTRACT: The system $BeCl_2$ - tetrahydrofuran was investigated in the temperature range - 78 up to +150° (Table 1: Solubility, Fig 1: Phase Diagram, Fig 2: Dependence of logC on $\frac{1}{T}$). At low temperature $BeCl_2 \cdot 3C_4H_8O$ is formed as solid phase at the bottom which decomposes at -2° to yield $BeCl_2 \cdot 2C_4H_8O$. This melts at 150° without decomposition, is more stable than the etherate of beryllium chloride when exposed to air, well soluble in benzene and insoluble in petroleum ether. There are 2 figures, 1 table, and 4 references, 3 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: May 22, 1959

Card 1/1

05692
SOV/78-4-11-45/50

5(2),5(3)
AUTHORS: Grigor'yev, A. I., Novoselova, A. V.

TITLE: On the Interaction of Beryllium Oxyformiate and -oxypropionate With Ammonia

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 11, pp 2640-2641 (USSR)

ABSTRACT: Previous papers (Refs 1-3) dealt with the reaction of beryllium oxyacetate, a compound of the type Be_4OR_6, in which R denotes the radical of a monobasic organic acid, with ammonia and amines. With respect to the kind of production and chemical behaviour, the oxypropionate now investigated differs little from the oxyacetate compound. The oxyformiate, however, cannot be produced - like these compounds - directly from the organic acid and the beryllium hydroxide or -carbonate, but is only obtained after a vacuum distillation of the normal beryllium formiate. The reaction of the Be-oxypropionate and -oxyformiate with ammonia was investigated under equal conditions as they are applied in preparing the compound $Be_4O(CH_3COO)_6 \cdot 4NH_3$. The oxypropionate yielded the

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05892

SOV/78-4-11-45/50

On the Interaction of Beryllium Oxyformiate and -oxypropionate With Ammonia

compound $Be_4O(C_2H_5COO)_6 \cdot 5NH_3$. The $Be_4O(HCOO)_6$, however, reacts with NH_3 to form a finely crystalline precipitate the analysis of which is given, but for the composition of which no formula is set up. The filtrate was evaporated in the vacuum for several days, and formed a viscous noncrystallizing mass. There are 4 Soviet references.

SUBMITTED: July 9, 1959

Card 2/2

66293
SOV/78-4-12-1/35

5.4210(A)
5(2), 5(4)

AUTHORS: Pashinkin, A. S., Novoselova, A. V.

TITLE: Measurement of the Pressure of Saturated Vapor of Solid Lead Telluride

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 12, pp 2657-2660 (USSR)

ABSTRACT: Commercial tellurium always contains lead impurities, probably in the form of telluride. The authors of this article measured the lead-telluride vapor pressure to make sure whether tellurium might be purified by sublimation or vacuum distillation. Moreover, they attempted to produce photoelectrically active films from PbTe through evaporation. PbTe resulted from fusion of the two components in stoichiometric ratio. Analysis and X-ray pictures confirmed the degree of purity of the resulting compound. The PbTe was sublimated at 800°C and 10^{-4} - 10^{-5} torr. Analyses and X-ray pictures of the sublimates

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vapor

ΔH_T was 53.3 kcal/mol. Calculation of

Measurement of the Pressure of Saturated Vapor of Solid Lead Telluride

ΔH_T was based upon the assumption that ΔH_T be constant within the narrow temperature range of the experiment. PbTe is thus a fairly volatile substance. Hence, it is possible that impurities be added to the condensate by sublimated PbTe in vacuum distillation of tellurium, as is confirmed by S. A. Semenkovich , N. N. Astashev (Ref 18), M. P. Smirnov , and G. A. Bibenina (Ref 19). The authors thank Yu. P. Simanov for advice given in X-ray examinations. There are 2 figures, 4 tables, and 19 references, 10 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

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66293
SOV/78-4-12-1/35

Measurement of the Pressure of Saturated Vapor of Solid Lead Telluride

SUBMITTED: September 6, 1958

4

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66294

~~5(2), 5(4)~~ 5.4210(A) SOV/78-4-12-2/35

AUTHORS: Zlomanov, V. P., Popovkin, B. A., Novoselova, A. V.

TITLE: Measurement of the Pressure of Saturated Vapor of Solid Lead Selenide

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 12, pp 2661-2664 (USSR)

ABSTRACT: Photoelectrically active PbSe films were produced by vacuum evaporation of PbSe and subsequent heating in an atmosphere of low oxygen pressure (Ref 2). For this procedure it is essential to know the vapor pressure of PbSe at different temperatures. The authors made this investigation within the temperature range 501-668°C. The PbSe was obtained by fusion of the two components in stoichiometric ratio. Analysis and X-ray pictures confirmed the degree of purity of the resulting compound. It was further shown that PbSe is identical with its sublimate (Table 1). The pressure of the saturated vapor was measured (Table 2) by a method earlier described (Ref 10). Vapor pressure measurement was also made according to Knudsen within the temperature range 641-718° (Table 4). The opening of the effusion chamber was gauged (Table 3) by means of potassium chloride evaporation according to data published by A. N.

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66294

SOV/78-4-12-2/35

Measurement of the Pressure of Saturated Vapor of Solid Lead Selenide

Nesmeyanov and L. A. Sazonov (Ref 11). The vapor pressure of PbSe follows the equation:

$$\log p\,[\text{torr}] = -\frac{11032}{T} + 10.084.$$

The sublimation heat ΔH_T was 50.47 kcal/mol. There are 1 figure, 4 tables, and 11 references, 5 of which are Soviet.

SUBMITTED: September 16, 1958

Card 2/2

5(2) SOV/74-28-1-2/5

AUTHOR: Novoselova, A. V. (Moscow)

TITLE: Beryllium Fluoride and Fluoroberyllates
(Ftoristyy berilliy i ftoroberillaty)

PERIODICAL: Uspekhi khimii, 1959, Vol 28, Nr 1, pp 33-43 (USSR)

ABSTRACT: In this paper the authoress reports her investigations on beryllium fluoride compounds. Beryllium fluoride can be prepared in various ways. The simplest of these is the thermal decomposition of ammonium fluoroberyllate $(NH_4)_2BeF_4$ (Ref 2). BeF_2 is a poor conductor of electricity in the molten state (Ref 4). Its structure is different from that of other bivalent metals which crystallize in the same manner as fluorite (CaF_2) or rutile (TiO_2). All known modifications of BeF_2 are similar to the structure of SiO_2. Contradictory data are given in publications for their relative melting temperatures. This is because of the fact that the melting process for BeF_2 is very complex. The most probable phase diagram for BeF_2 is given (Fig 1) on the basis of known melting temperatures and

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polymorphic transformations. For the thermogram for heating the BeF_2 a definite endothermic effect has been observed at 545 - 550°. It has been found by visual observation that a partial melting of the BeF_2 takes place at this temperature. Apparently there are polymeric molecules of varying composition present in the molten BeF_2 which are very slowly transformed from one form to another. On the basis of the phase rule this does not represent a one-component system. Possibly 545° is the eutectic temperature in this system. $MeF-BeF_2-H_2O$ systems. BeF_2 is easily soluble in water. Because of its small size the beryllium ion has a very strong electrical field and therefore form numerous complex compounds. With fluorides of alkali metals BeF_2 forms fluoroberyllates of several types: Me_2BeF_4, $MeBeF_3$, $MeBe_2F_5$. BeF_4^{2-} ion has a tetrahedral structure (hybridization Sp^3)(Ref 15). The solubility of fluoroberyllates increases with increase in the cation radius (Table 2). In aqueous solution the BeF_4^{2-} ion is partially dissociated. Beryllium hydroxide precipitates from solutions of BeF_2 and

and barium fluorides. Beryllium is in the first place of the II. group of the periodic system of Mendeleyev. Its chemical properties are similar to those of aluminum, and in the second group it is most similar to zinc; it differs strongly from the earth alkali metals. Many compounds of Zn and Be are very similar: hydrides, oxides, silicates, and oxyacetates. Of particular note is the similarity between the structures and properties of the oxyacetates $Be_4O(CH_3COO)_6$ and $Zn_4O(CH_3COO)_6$.

The tendency for Zn and Be to form complex compounds arises from the appreciable sizes of their ion potentials. These can be estimated by comparing their crystal-chemical electronegativities. Figure 9 lists the values of the electronegativities of the group II. metals (Ref 49). The first striking thing is the periodic variation shown, and secondly, that the electronegativities of Zn and Be are very close. This also seems to be the reason why Be is more similar chemically to Zn than to the earth alkali metals. There are 9 figures, 3 tables, and 72 references, 35 of which are Soviet.

SOV/20-125-3-25/63

5(2)

AUTHORS: Grigor'yev, A. I., Novoselova, A. V., Corresponding Member AS USSR, Semenenko, K. N.

TITLE: On the Compound Formed by Beryllium Oxy-acetate and Nitrogen Dioxide (O soyedinenii oksiatsetata berilliya s dvuokis'yu azota)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 3, pp 557-559 (USSR)

ABSTRACT: It was found that $Be_4O(CH_3COO)_6$ forms adducts with NO_2, similar to those formed with SO_2 ($Be_4O(CH_3COO)_6 \cdot 2SO_2$ and $Be_4O(CH_3COO)_6 \cdot SO_2$). The mentioned oxy-acetate is well soluble in liquid nitrogen dioxide at room temperature. If this solution is vaporized achromatic needlelike anisotropic crystals are separated. They decompose quickly in air under formation of brown NO_2-vapors. After this decomposition beryllium oxy-acetate is left back in its cubical basic modification. The composition of the crystals may be approximately described by the following formulas: $Be_4O(CH_3COO)_6 \cdot 3NO_2$ or

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On the Compound Formed by Beryllium Oxy-acetate and Nitrogen Dioxide

$Be_4O(CH_3COO)_6 \cdot 1,5N_2O_4$. By means of the measurement of the magnetic susceptibility was found that N_2O_4 probably takes part in the mentioned compounds. In order to define their composition precisely as well as in order to determine the possibility of formation of other compounds in the system beryllium oxy-acetate - nitrogen dioxide the diagrams: composition - vapor pressure at constant temperature were plotted. The tensiometer of Hüttig (Khyuttig) served for this purpose. Its main parameters and the method were the same, as in reference 1 with the exception of a small modification which takes the aggressiveness of the gas into account because it reacts with mercury. After 2-3 hours the equilibrium in the system was established. Figure 1 shows isothermal lines at 10.0 and 19.0°C. Their general shape shows that the compound $Be_4O(CH_3COO)_6 \cdot 1,5N_2O_4$ is separated by the evaporation of the saturated $Be_4O(CH_3COO)_6$ solution in the liquid NO_2. No other compounds were found to exist in the system. The last mentioned compound dis-

On the Compound Formed by Beryllium Oxy-acetate and Nitrogen Dioxide

sociates as a true chemical compound in contrast to the two compounds formed with SO_2 (mentioned above). The decomposition of the two last mentioned compounds proceeds by the formation of phases of variable composition. This contrast is assumed to explain the quicker establishment of the dissociation equilibrium of the compound with NO_2. The dependence of the dissociation pressure was explained by the isothermal lines (Table 1, Fig 2). Furthermore the compound obtained was investigated radiographically, its density and crystalline structure determined. There are 2 figures, 1 table, and 4 references, 1 of which is Soviet.

ASSOCIATION: Moskovskiy gosudarstvenny universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: January 2, 1959

5 (2)

AUTHORS: Novoselova, A. V., Corresponding Member AS USSR, Orlova, Yu. V., Simanov, Yu. P., Kovba, L. M.

SOV/20-126-1-25/62

TITLE: A New Series of Polymorphous Transformations of Na_2BeF_4 (O novom ryade polimorfnykh prevrashcheniy Na_2BeF_4)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 1, pp 93 - 96 (USSR)

ABSTRACT: After a survey of publications (Refs 1-8) concerning sodium-fluoro-beryllate the authors found that the needlelike Na_2BeF_4 crystals obtained from an aqueous solution represent an independent modification of this compound. They call the latter δ-Na_2BeF_4. The authors drew this conclusion on the strength of a thermographic and X-ray investigation. Figure 1 shows the radiogram at 20,360,410,470 and 510°, figure 2 the heating-thermogram and figure 3 the thermogram of the mentioned modification. The diffraction class of the crystals could not be determined since the latter is not complete. The comparison of all "cold"

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A New Series of Polymorphous Transformations of Na_2BeF_4 SOV/20-126-1-25/62

and "hot" radiograms confirms the phase transformations shown in figure 2, furthermore their irreversibility. The δ-phase can be considered as an initial phase of a series of polymorphous varieties formed by it. These latter do not agree with those of the series γ-Na_2BeF_4 (Table 1). The transformation series described here is not similar at all to the transformations of Ca_2SiO_4. There are 3 figures, 1 table, and 12 references, 3 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: January 21, 1959

Card 2/2

66737

15.2220
~~5(2)~~ 5.4220

SOV/20-129-2-27/66

AUTHORS: Muratov, F. Sh., Novoselova, A. V., Corresponding Member, AS USSR

TITLE: Investigation of the Equilibrium in the Reduction-reaction of Beryllium Oxide by Carbon at High Temperatures

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 2, pp 334-336 (USSR)

ABSTRACT: The reaction mentioned in the title carried out at high temperatures in the air or in a protection gas leads to the formation of beryllium carbide (Refs 1-3). In vacuum, reduction begins at 1315°C. In a reaction carried out at 1500°C metallic beryllium was found in the condensate. The authors investigated the reaction mentioned in the title in the range between 1400 and 2000°C by means of the manometric method which is the best suited at high temperatures (Refs 6-7). The reduction agent was charcoal freed from the ash by hydrofluoric and hydrochloric acid. The minutely sifted initial substances were roasted in vacuum at 2,000°C, stoichiometric amounts were carefully mixed, and were then pressed to rodlets under a pressure of 300 kg/cm^2. The reaction equilibrium was investigated with an arrangement similar to the one described in reference 9. It was ascertained that an equilibrium pressure may be attained only between 1700° and 1950° K, as was concluded from

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Investigation of the Equilibrium in the Reduction-reaction of Beryllium Oxide by Carbon at High Temperatures

the linear dependence: free energy - temperature and from the analysis of the reaction products. Apart from the non-reacted initial substances, beryllium carbide was contained in the reaction products at these temperatures. At higher temperatures the carbon oxide pressure, after first attaining a maximum (Fig 2 $T = 2160^{\circ}$ K), begins to drop rapidly without attaining any definite final value. Table 1, figure 1 shows the changes in pressure and free energy of reaction. The dependence ΔZ_T (free energy in the range 1700-1950°) on temperature is expressed, for reaction (1) by equation $\Delta Z_T = 50864 - 19.22\ T$. The reaction products (Fig 2) corresponding to the rise in the curve contain Be_2C, BeO and C.

An almost pure carbon corresponds to the dropping part of the curve. The time during which the maximum pressure is maintained, depends on the amount of the reaction mixture. The smaller the weighed amount, the shorter is this time span. A considerable quantity of sublimate deposits on the cool parts of the system. According to radiographic analysis (made by K. N. Semenenko) it shows, apart from lines of beryllium oxide and oxygen, a scanty

SOV/20-129-5-26/64

5(2)

AUTHORS: Muratov, F. Sh., Novoselova, A. V., Corresponding Member, AS USSR, Chou Hsin

TITLE: Determination of the Solubility of Beryllium Oxide in the Liquid Copper - Beryllium Alloy

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129. Nr 5, pp 1057 - 1059 (USSR)

ABSTRACT: Opinions concerning the form in which beryllium oxide is contained in metallic beryllium are contrasting. According to reference 1 beryllium forms an eutectic with beryllium oxide. Other researchers deny this (Refs 2,3) and hold beryllium oxide to occur in beryllium in the form of inclusions only. Also concerning the places in which the oxide concentrates, i.e. whether at the grain boundaries only (Ref 4) or also inside the grains (Ref 5) there is no uniform opinion. The authors investigated the subject under review on alloys with 2% Be at 1254-1517°. An adequate mixture of copper, beryllium, and beryllium oxide powders (0.5-1% of the weight of the alloy) was pressed to briquettes and annealed in

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vacuum at 800° for 8h. Figure 1 shows the apparatus used for determining the solubility under vacuum in argon atmosphere. On melting, the Cu-Be alloy collects in the lower part of the pot (1). On the alloy surface there is a layer of the beryllium oxide contained in high excess in the briquettes. The alloy is vigorously stirred by way of high-frequency currents. In time, an equilibrium is brought about between the oxide solved in the alloy and the one on its surface. This equilibrium is attained between 0.5 and 2 h at 1254° for the system BeO-CuBe (2%) when the BeO content in the alloy is from 0.010 to 0.039%. The latter was measured according to the method of references 7 and 8. At the same time, the total Be content was determined. This Be content agreed on principle without divergences with the calculated content. Table 1 shows the determination results of the solubility mentioned in the title as lying between 1254° and 1517° C. The system beryllium oxide - copper - beryllium alloy is pseudo-binary with a constant Be content. In the case of BeO actually solving in the alloy, and the solution being an

ideal one, the dependence of the solubility value on temperature must then obey the equation by Schroeder (Ref 9). It may be observed from figure 2 that the said dependence is linear and can be expressed by equation (1), with N_{Be_O} being the mol content of beryllium oxide in the alloy. The coefficients in equation (1) were determined by the method of the least squares. It follows from solution (1) that the solution heat of BeO in the Cu-Be alloy is $\Delta H(1527\text{-}1790^{\circ})$ = 16430 cal/mol. Figures 3 a and 3 b show the microstructure of the Cu-Be alloys: a - not annealed; no BeO inclusions are visible; b - annealed in vacuum at 800° for 15h. BeO was separated in the latter case. The grains of the α-phase (Ref 10) and BeO inclusions are visible here. There are 3 figures, 1 table, and 10 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: August 14, 1959

NOVOSELOVA, A.V., BATSANOVA, L.R.

Reaction of sphene (titanite) with sodium fluosilicate. Izv.Sib. otd.AN SSSR no.8:142-143 '60. (MIRA 13:9)

1. Institut neorganicheskoy khimii Sibirskogo otdeleniya AN SSSR.
(Sodium fluosilicate) (Titanite)

MURATOV, F.Sh.; NOVOSELOVA, A.V.; CHZHOU-SIN [Chou Hsing]

Reduction of beryllium oxide by carbon and heat in the presence of copper. Izv.vys.ucheb.zav.; tsvet.met. 3 no.2:113-118 '60. (MIRA 15:4)

1. Moskovskiy gosudarstvennyy universitet, kafedra neorganicheskoy khimii.

(Beryllium--Metallurgy)

5.2600
5.4210(A)
~~5 (2), 5 (4)~~

68102
SOV/78-5-1-1/45

AUTHORS: Korneyeva, I. V., Belyayev, A. V., Novoselova, A. V.

TITLE: Determination of the Pressure of Saturated Vapor of Solid Tellurides of Zinc and Cadmium

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol 5, Nr 1, pp 3 - 7 (USSR)

ABSTRACT: The authors point out that publications give no data on the pressure of saturated vapor of ZnTe and CdTe. In the experimental part they report on the preparation of the two compounds from zinc of the type TsO (GOST 3640-47), cadmium of the type KgO (GOST 1467-42), and pure tellurium which had been obtained according to references 4,5. The components were fused in stoichiometric ratio in evacuated quartz ampoules. The vigorous reaction of Zn with Te is referred to. Tables 1,2 show the analysis data of the two tellurides. The lines of the radiographs (taken by Yu. P. Simanov) agreed with the data of publications and showed no lines of the free components. The investigation of the compounds sublimed at 700° showed that their composition is not changed by sublimation. The vapor pressure of ZnTe was determined within the temperature range 520 - 720°, that of

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Determination of the Pressure of Saturated Vapor of Solid Tellurides of Zinc and Cadmium

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CdTe within the range 450 - 660°; the method of determination described in reference 9 was used. The results are shown in tables 4,5 and figure 1. The simultaneous determination by the effusion method yielded corresponding results. The opening of the effusion chamber was calibrated with KCl (Table 3). The following computations were made: ΔH of ZnTe = 48.65 kcal/mol, ΔH of CdTe = 43.46 kcal/mol, assuming that the sublimation heat ΔH does not depend on temperature in the temperature range investigated. The resultant values of the pressure of the saturated vapor of these tellurides speak in favor of the possibility of purifying these compounds by sublimation and of using them in semiconductor technique. There are 1 figure, 5 tables, and 13 references, 9 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: October 6, 1958

Card 2/2

TUROVA, N.Ya.; NOVOSELOVA, A.V.; SEMENENKO, K.N.

Solubility in the system beryllium chloride diethereate-ethyl ether. Zhur.neorg.khim. 5 no.1:117-123 Ja '60. (MIRA 13:5)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Beryllium compounds) (Esther)

S/078/60/005/02/001/045
B004/B016

5(2)
AUTHORS: Korneyeva, I. V., Sokolov, V. V., Novoselova, A. V.

TITLE: Pressure of Saturated Vapor of Solid Zinc- and Cadmium Selenide

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol 5, Nr 2, pp 241-245, (USSR)

ABSTRACT: It was the purpose of this paper to obtain data on the behavior of ZnSe and CdSe since they are not available in publications. These substances might in future play a part in the transformation of nuclear energy into electric energy, as photomultipliers, etc. The authors describe the preparation of the selenides from Ts-0 zinc (GOST-3640-47), Kg-0 cadmium (GOST-1467-42), and selenium, especially used for rectifiers (GOST-6738-53) by fusing them together in quartz vials in a stoichiometric ratio. Since the molten components do not mix, and the strongly exothermal reaction takes place only in the gaseous phase, and on the interface at temperatures near the melting point, explosions of the vials occurred frequently so that it was necessary to operate with small quantities. Tables 1 and 2 give the analyses of the resultant selenides. ZnSe was ob-

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Pressure of Saturated Vapor of Solid Zinc- and Cadmium Selenide

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B004/B016

tained only in the cubic modification of the sphalerite type, CdSe only in the hexagonal modification of the wurtzite type. Analysis and radiograms confirmed that the sublimation takes place without decomposition. The vapor pressure was determined according to the method described in reference 8, and according to Knudsen (Tables 4,5). Table 3 gives the calibration of the effusion chamber by means of KCl vapor. Figure 1 shows the linear dependence of log p on $\frac{1}{T} \cdot 10^3$. The following sublimation heats were determined: $\Delta H_{subl\ ZnSe} = 65.0$ kcal/mol; $\Delta H_{subl\ CdSe} = 50.1$ kcal/mol. The authors quote a paper by N. A. Goryunova (Ref 4), and express their gratitude to Yu. P. Simanov for advice in evaluating the radiograms. There are 1 figure, 5 tables, and 10 references, 6 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: October 6, 1958

Card 2/2

69047

5.3700(B)

AUTHORS: Makeimov, V. N., Semenenko, K. N., Naumova, T. N., Moyseyeva, A. V.

S/078/60/005/03/009/048
B004/B002

TITLE: Aluminum Acetates

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol 5, Nr 3, pp 558 - 564 (USSR)

ABSTRACT: After a brief survey of publications, the authors report on their investigation of aluminum acetates. They produced aluminumtriacetate from aluminum ethylate and acetic anhydride. $Al(CH_3COO)_3$ is easily soluble in liquid ammonia under the development of $Al(CH_3COO)_3 \cdot 3NH_3$. During thermal decomposition, the triacetate gradually passes over into di- and monoacetate (Figs 1,2). The data of the radioanalysis taken by means of an RKD camera and Fe radiation of the BSV tube are given by table 2. The authors also investigated basic aluminum acetates. From $Al(OH)_3$ plus acetic acid and also from $AlCl_3$ plus acetic acid they obtained the same compound $Al(OH)(CH_3COO)_2$ whose radioanalysis is given in table 1. The basic diacetate has a rhombic, face-centred lattice with the lattice constants being $a = 13.62 \pm 0.01$ Å, $b = 14.40 \pm 0.01$ Å, $c = 12.60 \pm 0.01$ Å. On the basis

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Aluminum Acetates

of the density being 1.67, a lattice cell contains 16 molecules. The basic diacetate is little soluble in water, chloroform and liquid SO_2, and insoluble in alcohol, acetone, ether, and liquid ammonia. On the basis of the thermogram (Fig 3) taken by means of the Kurnakov pyrometer type PK-42, the formula $Al(OH)(CH_3COO)_2$ was found to be right, not $Al_2O(CH_3COO)_4 \cdot H_2O$. During the reaction of sodium acetate (or barium acetate) and aqueous solutions of $AlCl_3$, a basic salt was obtained whose composition is between $Al(OH)(CH_3COO)_2 \cdot 2H_2O$ and $Al(OH)(CH_3COO)_2 \cdot 2.5H_2O$, and whose radiogram (Table 2) differs from that of $Al(OH)(CH_3COO)_2$. The thermogram of figure 4 shows the water separation of this salt during heating. The nonaqueous salt thus developing, however, radiographically differs from the salt produced by means of free acetic acid, despite the same stoichiometric composition. By the influence of sodium acetate on aluminum sulphate, the compound $Al(OH)(CH_3COO)_2 \cdot 2.5H_2O$ was obtained, and during the reaction of sodium acetate and aluminum nitrate, $Al(OH)(CH_3COO)_2$ developed; both were radiographically identified. Aluminum nitrate with acetic anhydride developed a

Aluminum Acetates

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B004/B002

compound of varying composition which always contained up to 3% NO_3^-, and whose radiogram was identical with that of aluminum triacetate. There are 2 figures, 4 tables, and 22 references, 4 of which are Soviet.

SUBMITTED: November 22, 1958

Card 3/3

TUROVA, N.Ya., NOVOSELOVA, A.V., SEMENENKO, K.N.

Solubility in the system beryllium bromide dietherate - ether.
Zhur. neorg. khim. 5 no.4:941-944 Ap '60. (MIRA 13:7)

1. Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova.
(Beryllium compounds)

9,4300 (1150, 1160 only)
5.2100 1043, 1136, 1273
18.3100 1087 1208 1454

20620
S/063/60/005/005/009/021
A051/A029

AUTHORS: Novoselova, A.V., Corresponding Member of the USSR Academy of Sciences, Pashinkin, A.S., Candidate of Chemical Sciences, Popovkin, B.A.

TITLE: On the Production of Particularly Pure Selenium and Tellurium

PERIODICAL: Zhurnal Vsesoyuznogo Khimicheskogo Obshchestva im. D.I. Mendeleyeva, 1960, No. 5, Vol. 5, pp. 557-562

TEXT: Selenium, tellurium and also selenides and tellurides of certain metals are used in the production of semiconductors, rectifiers, valve-type photocells and sensitive electro-photographic layers, etc. Pure selenium is expected to be used in the future in the synthesis of other selenides for luminophors, photo-resistors, crystal counters, etc. The semiconductor properties of tellurium and tellurides are the subject of intensive studies. In the present article the authors describe and comment on the various methods developed for the production of pure selenium and tellurium from

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commercial products. It is mentioned that the technology of selenium and tellurium production from raw materials and their primary purification methods have been described in detail in Soviet literature (Ref. 1-4). The main raw material for selenium production are the by-products of non-ferrous metallurgy plants and of the sulfuric acid production. Commercial selenium contains usually up to 98.5 % of the basic substance and admixtures of tellurium, sulfur, oxygen, arsenic, phosphorus, chlorine, silicon, sodium, copper, silver, magnesium, cadmium, mercury, aluminum, tin, lead, antimony, bismuth, iron and nickel. Penin (Ref. 5) studied the effects of admixtures on the electrical properties of selenium rectifiers. It was found that the admixtures of many metals introduced in the form of selenides in relatively low concentrations (0.1-0.01 at. %) cause a weakening of the rectifying action of the rectifiers. Copper and nickel were found to cause a decrease of the rectification coefficient. Abdullayev and Shapiro (Ref. 7, 8) found that the introduction of halides (up to 0.15%) and thallium improve the

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rectification characteristics. Other Soviet authors, such as Putseyko (Ref. 9), Kozlovskiy (Ref. 10), Luk'yanov (Ref. 11) and Nasledov (Ref. 12) dealt with the effects of admixtures on the photosensitivity of selenium photocells. The effects of non-metallic and metallic admixtures on the conductivity of selenium were investigated in Ref. 13-15. Foreign admixtures in selenium were found to affect the rate of crystallization of the latter. Alkaline metals, halogens, tellurium and thallium increase the rate of crystallization (Ref. 16, 17). The volatility of selenium is used in its purification and in the purification of its compounds (peroxides, halides). Other factors used in this connection are the high solubility of selenious acid, ease of reduction of its compounds to elementary selenium, the ability of selenium, contrary to tellurium, to form various addition products, which decompose under certain conditions forming pure selenium. Other methods are connected with the oxidation of commercial selenium, purification of the obtained peroxide and reduction to elementary selenium. The oxidation of commercial selenium to peroxide with subsequent sublimation was recommended by

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Lobanov and Tabunin (Ref. 20, 22). In Ref. 23 Alekseyev reports that by a single distillation of selenium peroxide containing 10% of admixtures at 400°C a product can be obtained containing admixtures of iron 0.0003%, nickel 0.00003%, copper 0.0002%. Purification of selenium peroxide from admixtures of heavy metals is carried out by precipitation of these from the solutions of selenious acid in the form of selenites. This method is also recommended for purification from tellurium, the peroxide of which is very poorly soluble in water (Ref. 24). It is suggested that selenious acid should be purified by using ion-exchange resins instead of the method recommended in Ref. 25-28, which involves the coprecipitation of admixtures with aluminum hydroxide or iron hydroxide, leading to a significant drop in the admixture content of arsenic, antimony, lead, titanium, manganese and silver, but causing a certain pollution by iron and aluminum. By distilling a solution of selenious acid at 330°C a separation of selenium peroxide from admixtures of tellurium, iron, aluminum, magnesium, silicon, mercury and arsenic can be accomplished after oxidizing it to a pentavalent state (Ref.21).

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One of the simplest methods for reducing the purified selenium peroxide is the reduction with sulfur dioxide in a hydrochloric acid solution. Other reducing agents used are formic acid, ammonium sulfide, hydrazine and its derivatives. The tendency of selenium to addition reactions is used in producing pure selenium. Commercial selenium dissolves in solutions of cyanide, sulfide or sodium sulfite when heated, or in concentrated sulfuric acid with the following reactions taking place:

$$Se + KCN \longrightarrow KCNSe$$
$$Se + Na_2S \longrightarrow Na_2SSe$$
$$Se + Na_2SO_3 \longrightarrow Na_2SeSO_3$$
$$Se + H_2SO_4 \longrightarrow SeSO_3 + H_2O$$

Pure selenium is then produced by dissolving or solidifying the resultant solutions. The sulfite-cyclic method for the production of pure selenium is one of the most widely used in the Soviet Union (Ref. 34, 35). Other methods recommended are based on the chlorination of selenium with subsequent hydrolysis of the chloride in the gaseous phase with water vapors (Ref. 36) and by thermal decomposition of hydrogen selenide (Ref. 37). The latter method is

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based on the different tendencies toward hydration of selenium and the admixture elements and the different thermal stability of selenium hydride and the hydrides of the other elements which are formed. Methods involving sublimation and distillation are widely used as methods for purifying selenium (Ref. 14, 37-40). The behavior of the different admixtures in the sublimation process was studied in a number of works (Ref. 37, 39, 42). An investigation was conducted of the distribution of the admixtures of sulfur, thallium and mercury in the zones of condensation during the evaporation of selenium at 200-275°C. It was found that at 250°C the thallium admixture hardly volatilizes at all with selenium, but at 275°C, in addition to selenium, thallium starts volatilizing noticeably. It is pointed out here that the presence of mixed molecules of sulfur and selenium in the gaseous phase is a great obstacle in the purification of selenium from sulfur admixtures at low temperatures (Ref. 43). Vacuum distillation was found to have little effect in the purification of selenium from mercury admixtures (Ref. 42).

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It is suggested to heat selenium in evacuated ampoules at 700°C with subsequent sharp cooling in order to purify it of oxygen (Ref. 40). Pure selenium was obtained in this way with a specific resistance in the order of 10^{-8} ohm·cm. Distillation with a fractionating column was also used for the same purpose. Zonal liquefaction for purifying selenium has proven unsuccessful due to severe overcooling of the liquid selenium and solidification of it into the vitreous state (Ref. 36). Kozyrev (Ref. 47) pointed out that purification by the zonal liquefaction method can give positive results under high pressure. In the latter case the rate of crystallization is said to increase. In referring to the methods for producing pure tellurium the following facts are listed: the raw-materials used are by-products of the nonferrous metallurgy, particularly electrolyte copper slurry. Commercial tellurium usually contains 95-99 % of the basic substance with a great deal of admixtures of tellurium peroxide, selenium, sulfur, chlorine, sodium, copper, silver, lead, bismuth, etc. The latter are in the bound state, forming tellurides, oxides, chlorides. An admixture of selenium forms a solid solution with tellurium. Pure tellurium is used in the semiconductor

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industry for the production of alloys with optimum thermo-electrical properties. The works of Ref. 46-53 are dedicated to the study of the effect of various admixtures and activating additions on the thermoelectrical properties of the alloys. Lead and tin are the most undesirable admixtures in tellurium. Methods for its purification are physical and chemical in nature or a combination of both. The chemical methods are based on the recrystallization or reprecipitation of tellurium and its compounds. Reduction potentials of tetravalent tellurium and selenium are different and depend on the acidity of the medium (Ref. 29, 54, 46). It was shown recently that this method is unsuitable for separating out small admixtures of selenium. Tellurium can be purified of heavy metals and selenium by applying the properties of the amphoteric nature of the tellurium peroxide and its low solubility (Ref. 24). Tellurium peroxide is purified of iron or heavy metals by being dissolved in sodium hydroxide. At a pH = 10 precipitation of the hydroxide or that of the tellurites of various compositions is accomplished (Ref. 56, 57). Solovushkov discusses in Ref. 55 the means by

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which tellurium peroxide can be purified of copper, magnesium, aluminum, lead, antimony, bismuth, viz., using the low solubility of tellurium peroxide in nitric acid. The purification of tellurium by recrystallization of the compounds is used more rarely than other methods at the present time (Ref. 59, 60). Tellurium can be purified of selenium and sulfur admixtures by melting with potassium cyanide (Ref. 64). The physical methods of purification are considered: the sublimation and distillation of metallic tellurium in a vacuum, distillation in a flow of hydrogen or of an inert gas, distillation of tellurium compounds, zonal liquefaction and directed crystallization (Ref. 58, 65, 66). A study of the admixture behavior in vacuum distillation has revealed that the chloride admixtures condense in the colder sections of the zone of condensation (Ref. 66, 68) and their content in the main zone of condensation can be reduced (Ref. 68) by 300-400 times. The author has established that the selenium admixture in tellurium, both in sublimation and distillation, condenses actually together with tellurium (Ref. 70). It is recommended that tellurium be chemically purified prior to

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vacuum sublimation, in order to eliminate the selenium admixture. However, the authors doubt the need for eliminating the selenium admixture in the case of semiconductor manufacture. Sublimation in a hydrogen or inert gas flow is another effective method suggested for purifying tellurium (Ref. 71-73). The sublimation and distillation of tellurium compounds, like tetrachloride and peroxide, have only a limited significance (Ref. 60, 75, 77). A high difference in the vapor pressure of the selenium peroxide and the tellurium peroxide could be used for separating tellurium from selenium admixtures (Ref. 78). Due to the complexity of the apparatus needed the recently suggested method of tellurium purification based on the thermal dissociation of tellurium hydride is unpractical. Besides, the latter method would give a low yield of the pure product, viz., 24 % and less (Ref. 79). Tellurium is subjected to zonal liquefaction when it is necessary to have a product of the highest purity. This is necessary for research purposes (Ref. 83). Zonal liquefaction is uneffective in the case of eliminating selenium and magnesium admixtures (Ref. 46, 80). The direct crystallization

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method is simple but not very effective when purifying tellurium from admixtures in the order of 0.001 at.% (Ref. 63) and selenium admixtures. In conclusion the authors point out that a summary of all the existing methods of purification both in the Soviet Union and other countries has shown that the purest samples of these elements can be obtained by the combination of physical and chemical methods of purification under the condition that the physical methods are used in the last stage. There is 1 table and 83 references: 54 are Soviet, 9 German, 20 English.

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BOSIK, I.I.; VOROB'YEVA, O.I.; NOVOSELOVA, A.V.

System Li_2SO_4 - $BeSO_4$ - H_2O at 25°. Zhur.neorg.khim. 5 no.5:1157-1162 My '60. (MIRA 13:7)
(Lithium sulfate) (Beryllium sulfate)

BOSIK, I.I.; VOROB'YEVA, O.I.; NOVOSELOVA, A.V.

Fusibility in the system Li_2SO_4 - $BeSO_4$ - H_2O at 75°. Zhur. neorg.khim. 5 no.5:1174-1175 My '60. (MIRA 13:7)
(Lithium sulfate) (Beryllium sulfate)

S/078/60/005/007/043/043/XX
B004/B060

AUTHORS: Zlomanov, V. P., Tananayeva, O. I., Novoselova, A. V.

TITLE: Vitrification in the TeO_2 - Al_2O_3 System

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 7, pp. 1632-1633

TEXT: After giving a survey of Western literature concerning tellurium glass, the authors report on results reached by them so far. They melted TeO_2, supplied by the khimicheskiy zavod im. Voykova (Chemical Works imeni Voykov), which in conformity with BTY PY 1131-55 (VTU RU 1131-55) contained 99.0 - 99.5% TeO_2, in a temperature renge of 750-800°C in alundum crucibles supplied by the Podol'skiy zavod ogneuporov (Podolian Plant of Refractories). The time of heating depended on the weighed portion (30 min for 20 g, 120 min for 150 g). Glasses with 93.3-93.9% TeO_2 and 6.4% Al_2O_3 were obtained (Table 1). The aluminum passed over from the crucible material into the melt. Moreover, mixtures of 100 - 85% TeO_2 and

Vitrification in the TeO_2 - Al_2O_3 System

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B004/B060

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: January 28, 1960

Legend to the figure: Absorption curve of glasses in the infrared range of the spectrum (thickness of specimens 2 mm), 1) glass with 6% Al_2O_3 and 94% TeO_2 from alundum crucible, 2) glass of same composition but melted in porcelain crucible.

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B023/B066

15.8117 2209, 2109, 2808, 3215

AUTHORS: Turova, N. Ya., Novoselova, A. V., Semenenko, K. N.

TITLE: Compounds of Beryllium Chloride With Ethers

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 8, pp. 1705-1709

TEXT: The authors report on their synthesis and investigation of new compounds of beryllium chloride with dimethyl ether, dibutyl ether, tetrahydropyran, and ethylene glycol dimethyl ether (1,2-dimethoxy-ethane). The following rules were established: 1) The thermal stability of beryllium chloride complexes with ethers of monovalent radicals increases rapidly on transition of compounds of the aliphatic series to cyclic ethers. 2) The melting point of $BeCl_2 \cdot 2R_2O$ (R = alkyl radical) decreases considerably in the homologous series of aliphatic ethers (at R = CH_3, C_2H_5, n-C_4H_9, the melting point is 63°, 43°, and <-70°C, respectively). 3) The largest difference may be seen in beryllium chloride compounds with ethers

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of mono- and divalent alcohols. Complexes with monoethers form well crystallizable compounds which melt congruently (except $BeCl_2 \cdot 2(CH_3)_2O$) and are soluble in the corresponding ethers, in aromatic hydrocarbons, carbon tetrachloride, and carbon disulfide, but insoluble in paraffin hydrocarbons. On the other hand, compounds of the beryllium halides with ethers of divalent alcohols are decomposed on heating without melting. They are insoluble in all organic solvents, except in alcohols, and are inert to a higher degree than compounds with ethers of monovalent alcohols. All these properties indicate that compounds of beryllium chloride with ethers of divalent alcohols have a polymeric character. Beryllium chloride dioxanate is assumed to have a chain structure formed by the coordination bonds of both oxygen atoms in dioxane. Well soluble and crystallizable monodioxanates, such as chloride, bromide, and iodide dioxanates of divalent mercury are, apparently, polymers with a low association degree. The formation of didioxanates is particularly characteristic of halides of divalent metals having the coordination number 6. The properties of magnesium, nickel, and iron halides, as well as of calcium, strontium, and barium bromides and iodides are similar to those of monodioxanates.

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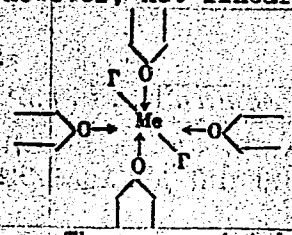
They are insoluble in dioxane and organic solvents, and separate in the form of a fine crystalline powder. They also have a polymeric structure which is, however, not linear but reticular:

ZNC 1960, Vol 5, No 8, pp. 1705-1709



Г = Halogen. There are 4 tables and 14 references: 8 Soviet, 1 US, and 5 German.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: May 22, 1959

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85606

S/078/60/005/010/026/030/XX
B017/B067

26.2420

AUTHORS: Popovkin, B. A., Zlomanov, V. P., and Novoselova, A. V.

TITLE: Study of the Thermal Decomposition of Lead Selenate and Lead Selenite

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 10, pp. 2261-2264

TEXT: In the present paper, the authors studied the thermal decomposition of lead selenite and lead selenate by means of thermogravimetric and thermographic methods of analysis. The phases obtained on the thermal decomposition were examined by chemical analysis and by X-ray phase analysis. The interplanar spacings (d) and the relative lines of intensity of the X-ray pictures of lead selenite and lead selenate are given. The thermal stability of lead selenate and lead selenite was examined by continuous photography. The thermograms of lead selenite showed that it melts at 675°C under decomposition. When this compound melts, selenium dioxide vapors are formed. Two endothermic effects at 645 and 715°C were observed on the thermograms of lead selenate. The first thermal effect at 645°C

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Study of the Thermal Decomposition of Lead Selenate and Lead Selenite

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B017/B067

corresponds to the monotropic, polymorphous transformation of lead selenate. The endothermic effect at 715°C indicates the melting point of lead selenate. Lead selenate melts under decomposition. Table 4 shows the phase composition of the products which formed on thermal decomposition. The decomposition products of lead selenate and lead selenite contain two phases which were studied by X-ray photographic methods. The lattice of the first phase A is tetragonally body-centered with the following parameters: a = 3.92 ± 0.01 A, c = 5.37 ± 0.01 A; the lattice of phase B is rhombically body-centered and has the following parameters: a = 3.92 ± 0.01 A, b = 3.73 ± 0.01 A, and c = 5.72 ± 0.01 A. There are 3 figures, 4 tables, and 9 references: 4 Soviet, 1 US, 3 French, and 1 German.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 9, 1959

S/078/60/005/010/009/021
B004/B067

AUTHORS: Korneyeva, I. V., Novoselova, A. V.

TITLE: Investigation of the Oxidation Process of the Selenides of Zinc and Cadmium by Means of Oxygen

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 10, pp. 2265-2268

TEXT: The authors produced CdSe by fusing the components at a stoichiometric ratio in evacuated and sealed ampoules at 1300°C. ZnSe was produced by heating the components in argon atmosphere and by subsequent heating in vacuum to 450°C. The analytical data of the two compounds are tabulated. Oxidation took place in an apparatus similar to that described in Ref. 4. The heating current was stabilized with an ЭПА-58 (EPA-58) ferro-resonance stabilizer; temperature was measured with a thermocouple and a ППТВ -1 (PPTV-1) potentiometer. The reaction vessel was evacuated, filled with oxygen up to a pressure of 300 - 310 torr, and the oxidation was determined from the pressure drop. The polythermal oxidation was

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Investigation of the Oxidation Process of the Selenides of Zinc and Cadmium by Means of Oxygen

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studied between 20° and 900°C. The increase in pressure due to thermal expansion of oxygen was taken into account. In the isothermal oxidation the vessel was evacuated, filled with argon (600 torr), heated to the experimental temperature, and argon was then replaced by oxygen. Fig. 1 shows the course of the polythermal oxidation of CdSe. It begins at 580 - 600°C, and shows a maximum at 720°C. Fig. 2 shows the isothermal oxidation of CdSe at 650°, 700°, 750°, and 800°C. At 650°C, the reaction was incomplete. CdSe, CdO, and $CdSeO_3$ were detected by X-ray photography (Fig. 3). The reaction proceeds in two stages according to the equations $CdSe + 1.5O_2 = CdSeO_3$; $CdSeO_3 \longrightarrow CdO + SeO_2$. At 750 - 800°C only CdO is contained in the final product. In the case of ZnSe, polythermal oxidation sets in at 400 - 450°C (Fig. 1), and attains a maximum at 600°C. The isothermal line of the oxidation of ZnSe was drawn for 520°, 570°, 600°, 640°, 680°, and 710°C (Fig. 4). The oxidation of ZnSe leads directly to ZnO without formation of intermediate products. There are 4 figures, 1 table, and 7 references: 5 Soviet, 1 British, and 1 German.

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Investigation of the Oxidation Process of the Selenides of Zinc and Cadmium by Means of Oxygen

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B004/B067

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova, Khimicheskiy fakul'tet (Moscow State University imeni M. V. Lomonosov, Department of Chemistry)

SUBMITTED: July 9, 1959

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S/078/60/005/010/028/030/XX
B017/B067

AUTHORS: Grigor'yev, A. I. and Novoselova, A. V.

TITLE: Complex Compounds of Beryllium Oxyacetate with Ammonia and Aliphatic Amines

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 10, pp. 2280-2283

TEXT: The authors studied the dissociation of the compounds forming in the system $Be_4O(CH_3COO)_6$ - NH_3 by measuring the vapor pressure at -33, +25, and +50°C; the isotherms of vapor pressure at the above temperatures are reproduced in Figs. 1 and 2. It was found that a compound with the composition $Be_4O(CH_3COO)_6 \cdot 12NH_3$ is formed on the dissolution of beryllium oxyacetate in ammonia at -33°C. Vapor pressure measurements at 25 and 50°C showed that this compound decomposes under formation of phases of different compositions. The compounds with the composition $Be_4O(CH_3COO)_6 \cdot 3R\text{-}NH_2$ (R = CH_3, C_2H_5, C_4H_9) are unstable, and decompose on

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heating to 100°C. For determining the structure of complex compounds of beryllium oxyacetate with ammonia, the infrared absorption spectra were taken by means of an UKS-11 (IKS-11) spectrograph with KBr, NaCl, and LiF prisms. The formation of complex compounds of beryllium oxyacetate with ammonia and with amines is caused by a regrouping of the inner addenda of the complex $Be_4O(CH_3COO)_6$. Part of the acetate groups of the inner sphere of the complex are displaced by ammonia and amine, and the acetate groups ionized in this connection cause the electrical conductivity of the solutions of complex compounds of beryllium oxyacetate with ammonia and with amines. Beryllium oxyacetate itself is a non-electrolyte. The molar electrical conductivity of solutions of beryllium oxyacetate in liquid ammonia was measured at +10 and -33°C. The temperature dependence of the electrical conductivity of 0.15 molar solutions of beryllium oxyacetate in liquid ammonia showed that the electrical conductivity increases with decreasing temperature, and attains a maximum at -30°C; at lower temperatures, it decreases again. Further studies are necessary to determine the structure of complex compounds of beryllium oxyacetate with ammonia and amines. There are 5 figures, 1 table, and

Complex Compounds of Beryllium Oxyacetate With Ammonia and Aliphatic Amines

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13 references: 7 Soviet, 4 US, 1 British, and 1 German.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 9, 1959

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RESHETNIKOVA, L.P., NOVOSELOVA, A.V., KIRKINA, D.F., NOSOVA, N.M.

Effect of ethanol on the joint solubility of beryllium and calcium sulfates. Vest. Mosk. un. Ser. 2: khim. 15 no.2:50-52 Mr-Ap '60. (MIRA 13:6)

1. Kafedra neorganicheskoy khimii Moskovskogo universiteta.
(Ethyl alcohol) (Beryllium sulfate) (Calcium sulphate)

5.2100

688 50

AUTHORS: Kuvyrkin, O. N., Breysov, O. N., Novoselova, A. V., Semenenko, K. N.

S/076/60/034/02/012/044
B010/B015

TITLE: On the Polymorphism of Beryllium Chloride

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol 34, Nr 2, pp 343-348 (USSR)

ABSTRACT: Beryllium chloride forms several polymorphous modifications. Since hitherto only the crystal structure of fibrous modifications has been investigated, the present study deals with the thermal and X-ray phase analysis of the polymorphism of beryllium chloride. The composition of the preparation applied is given (Table 1). Thermal structure analysis of this preparation was carried out with a PK-52 Kurnakov pyrometer and Pt/PtRh thermocouples. The Cu radiation of a BSV tube was used for the X-ray analyses, and the photographs were taken by RKD or RKU-86 cameras, and Unicam cameras at high temperatures, respectively. The results of the X-ray phase analyses are given (Tables 2-4). A rapid cooling-down of the beryllium chloride melt, or a crystallisation from the gas phase, leads to a formation of the metastable α'-modification which is similar to silicon sulfide with respect to its structure. On heating the α'-modification is transformed at 250° into the cubic β'-modification which in turn is transformed into the stable

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On the Polymorphism of Beryllium Chloride

β-modification at 340°. A slow cooling-down leads to the transformation melt $\xrightleftharpoons{425^\circ}$ $\alpha(BeCl_2)$ $\xrightleftharpoons{405^\circ}$ $\beta BeCl_2$. It is possible that the α-modification, the structure of which could not be identified, is the same as the α'-modification. The diagram obtained does, however, not comprise all polymorphous transformations of beryllium chloride, since N. V. Bychkov, e.g., (Ref 12) on crystallization of beryllium chloride in quartz vessels discovered a modification differing from the afore-mentioned modifications. There are 2 figures, 4 tables, and 12 references, 5 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: April 24, 1958

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S/020/60/135/004/025/037
B016/B066

AUTHORS: Novoselova, A. V., Corresponding Member AS USSR, Grigoryan, L. A., and Simanov, Yu. P.

TITLE: Investigation of the System Niobium - Tellurium

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 4, pp. 864-867

TEXT: The paper deals with the investigation of the system niobium - tellurium. The authors pulverized these elements (99.8 % pure Nb, 99.99 % pure Te), mixed them in different quantitative ratios and sintered them for 700 h in evacuated, sealed quartz ampules at 900°C. A line spectrogram of this system was recorded by means of a РКД (RKD) X-ray camera in the nauchnoissledovatel'skiy institut fiziki MGU (Scientific Research Institute of Physics of the Moscow State University imeni M. V. Lomonosov). The intensity of the diffraction lines of the powder patterns was estimated visually by means of a ten-part division. The least intense lines (degree 1 - 2) were left out of consideration. On the basis of these data the authors found in the Nb-Te system 3 phases of variable composition with wide areas of homogeneity: α, β and γ phase. The specimen with 66.67 atom%

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Investigation of the System Niobium - Tellurium

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B016/B066

tellurium contains in addition to black powder needlelike crystals, which were identified in separate and pulverized condition as the γ-phase. Hence this preparation is diphase ($\beta+\gamma$). The lines of the β-phase disappear on further addition of tellurium. The authors further determined the electrical conductivity and thermo-emf on pressed specimens which were first pulverized and then pressed under 13 000 kg/cm^2. They applied for this purpose a device of A. E. Middleton and W. W. Scanlon (Ref. 6) with the ППТВ-1(PPTV-1), ППТН-1(PPTN-1) and ПП (PP) potentiometers, which had been mounted according to a somewhat modified scheme. The two characteristics were measured by probing. Iris diaphragms of tantalum were used as probes. Fig. 2 shows the electrical conductivity as a function of the composition. The atom% of tellurium are plotted on the abscissa, log of the specific electrical conductivity on the ordinate axis. Fig. 3 illustrates the dependence of the thermo-emf of the pressed specimens on the composition. The thermo-emf values in μV/degree are plotted on the ordinate axis. The vertical dashed lines in Figs. 2 and 3 show the phase boundaries as determined in the X-ray diffraction pattern. The authors point out that the two characteristics (Figs. 2 and 3) are not specific for niobium tellurides, as they are dependent both on impurities and on the methods of preparation of the

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specimens. The numerical values of the electric properties indicate the semimetallic character of the chemical bond in the niobium tellurides. There are 4 figures and 7 references: 1 Soviet, 1 US, 2 Swedish, and 3 German.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 14, 1960

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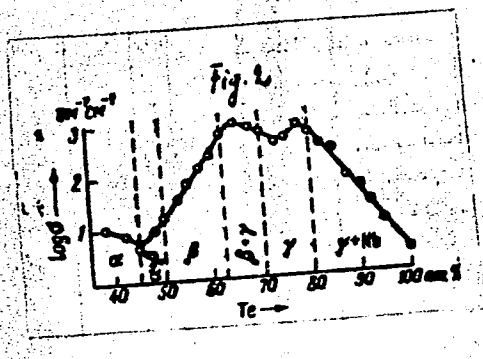
Fig. 2



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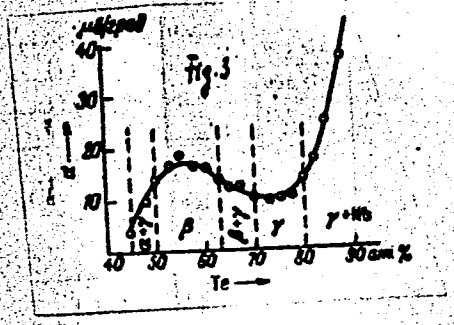

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S/020/60/135/005/026/043
B016/B052

AUTHORS: Grigoryan, L. A., Simanov, Yu. P., and Novoselova, A. V., Corresponding Member, AS USSR

TITLE: Analysis of α-, β-, and γ-Phases in the System Niobium - Tellurium

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 5, pp. 1133-1134

TEXT: The authors report on a comprehensive X-ray analysis of the following phases in the system niobium - tellurium: α-phase (homogeneous region from $NbTe_{0.18}$ - $NbTe_{0.82}$), β-phase ($NbTe_{1.00}$ - $NbTe_{1.70}$), and γ-phase ($NbTe_{2.33}$ - $NbTe_{4.00}$). The existence of these phases has been stated by the authors in Ref. 4. They used cameras of the types РКД(RKD), РКУ(RKU), and РКОП(RKOP). The latter was used for studying single crystals. All these cameras were built by the Nauchno-issledovatel'skiy institut fiziki MGU (Scientific Research Institute of Physics of Moscow State University imeni M. V. Lomonosov). From their results the authors concluded that: the α-phase crystallizes in a simple cubic lattice with a parameter of

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Analysis of α-, β-, and γ-Phases in the System Niobium - Tellurium

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$NbTe_{0.82}$ was 8.419 ± 0.001 A. This value remains unchanged within the a = 8.418 ± 0.005 A. The exact value obtained from powder patterns of whole region of homogeneity (within the limits of the measuring error). X-ray pictures of the α-phase preparation exhibit clearly resolved doublets of CuK_{α_1} and CuK_{α_2} (from ϑ = 53° on) and distinct lines at small and large angles (up to 80°). The pycnometric density of $NbTe_{0.82}$ (t = 20°C) was in good agreement with the calculated radiographic density (6.036). The X-ray pictures of the β-phase of $NbTe_{1.00}$ in a hexagonal lattice can be indicated by the following parameters: a = 5.16 ± 0.01 A; c = 7.62 ± 0.05 A; c/a = 1.477. This preparation (50 atom% of tellurium) was studied in powder form in a sealed up quartz capillary with the high-temperature X-ray camera "Unicam" (Ref. 5) at 700°, and after cooling at 20°C. Visually, no polymorphous changes could be found. Exact measurements were impossible due to a strong background and indistinct lines. Single crystals of the γ-phase of $NbTe_3$ were studied by the swinging method. The authors thus proved that the γ-phase to crystallize in a tetragonal body-centered lattice. The parameters of the axis are: a = 9.10 ± 0.05 A; c = 21.35±0.05 A;

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Analysis of α-, β-, and γ-Phases in the System Niobium - Tellurium

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c/a = 2.346. The powder patterns of the γ-phase preparations can be easily indicated by this lattice. There are 5 references: 1 Soviet, 1 Swedish, and 1 German.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 14, 1960

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YAKUTOVICH, M. V.; MEYERSON, G. A.; IGNATYEV, B. G.; KURBATOV, G. P.; et al

"Uranium Prepared by Powder Metallurgy Techniques."

report submitted for 2nd Intl Conf, Peaceful Uses of Atomic Energy, Geneva, 31 Aug-9 Sep 64.

S/078/61/006/001/014/019
B017/B054

AUTHORS: Novoselova, A. V., Babin, V. N., Sobolev, B. P.

TITLE: Synthesis of Monocrystal Luminophores Zn_2SiO_4/Mn and $(Zn, Be)_2SiO_4/Mn$

PERIODICAL: Zhurnal neorganicheskoy khimii, 1961, Vol. 6, No. 1, pp. 227 - 228

TEXT: The authors developed a new method of synthesizing monocrystals of the luminophores $(Zn,Be)_2SiO_4/Mn$ and Zn_2SiO_4/Mn. Silicon, beryllium, and zinc oxides were used as initial materials, and lithium zinc fluoride as mineralizer. Manganese in the form of MnF_2 was added as activating component. The component ratio of ZnO : BeO : SiO_2 was 3 : 1 : 2. The mineralizer $LiZnF_3$ was added in an amount of 5%, and the activator MnF_2 in an amount of 1% (% by weight of the oxide mixture). The monocrystals were investigated by their luminescence and by X-ray analyses. Fig.1 shows the luminescence spectra taken with the УФС-2 (UFS-2) ultraviolet filter of

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5 2400

AUTHORS: Zlomanov, V. P., Muratova, G. V., and Novoselova, A. V.

TITLE: The production of lead selenide

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 6, no. 7, 1961, 1730 - 1731

TEXT: The production of lead selenide by reducing lead selenite with hydrogen and reacting PbO with Se and Pb with SeO_2 was studied. The lead selenite used was prepared by mixing equivalent amounts of hot selenous acid solution and lead nitrate. Lead selenite is noticeably reduced with hydrogen at 300 - 350°C, at 420°C $PbSeO_3$ exists besides PbSe, at a temperature of 500 - 600°C, the reaction product consists entirely of PbSe. At a reduction above 600°C, the reaction products decompose under the formation of selenium and metallic lead. The method suggested allows the production of PbSe without application of the toxic hydrogen selenide, using high-purity initial materials. The optimum reduction temperature for lead

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AUTHORS: Korneyeva, I. V., Novoselova, A. V.

TITLE: Reduction of zinc selenite by hydrogen

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 6, no. 8, 1961, 1965-1966

TEXT: Recently, the production of highly pure zinc selenide for use in luminophores has become ever more important. Because of unpleasant attendant phenomena and impurity of the end product, the usual methods of producing zinc selenide are uninteresting. Therefore, much attention is being paid to the reduction of zinc selenite, and, in the present paper to reduction by hydrogen. This subject has been mentioned in publications only by L. Ya. Markovskiy and Yu. P. Sapozhnikov (Sb. rabot. gos. in-ta prikl. khimii, 43, 123 (1960)) who stated that an end product free from zinc oxide cannot be obtained by reduction at 300 - 400°C. The authors of the present paper carried out the reduction in the temperature range of 400 - 700°C, the velocity of flow of hydrogen being 10 - 15 cm^3/min. The products obtained from 5 g of $ZnSeO_3$ were subjected to chemical and X-ray analyses, the results of which are given in a table. The Debye-Scherrer

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B127/B226

AUTHORS: Muratov, F. Sh., Novoselova, A. V.

TITLE: Determination of the solubility of beryllium carbide in a liquid copper-beryllium melt

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 6, no. 8, 1961, 1974-1976

TEXT: For their studies, the authors mixed a powder of copper, beryllium, and carbide which had the following composition: copper and beryllium 2% of the alloy referred to beryllium, and carbide 8 - 12% by weight of alloy. The copper was chemically pure; purity of beryllium: 99.8%. The beryllium carbide was synthesized from the elements. This powder mixture was melted with ash-free charcoal in a graphite vacuum furnace at 1400 - 1500°C for 2 hr. The carbide forming large, porous lumps was yellow to orange, and hat the following composition: Be_2C - 95.21%; C_{free} - 4.56%. This mixture was pressed to briquettes under a pressure of 300 kg/cm^2, and kept in vacuo at 800°C for 8 - 10 hr. Solubility was studied in a special device at 1287 - 1709°C. The temperature above 1600°C was measured by an Mo - Mo-Al thermocouple. The carbide content in the copper-beryllium

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