PSAREV, V.I.

137-58-2-2809

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 2, p 87 (USSR)

AUTHORS: Kurilekh, D. G., Psarev, V. I.

TITLE: The Nature of the Drop in Yield Point in the Finishing of Sheet Steel (O prirode ponizheniya predela tekuchesti pri otdelke stal'nykh listov)

PERIODICAL: Nauchn. zap. Dnepropetr. un-ta, 1956, Vol 45, pp 69-71

ABSTRACT: A study was made of the mechanical properties of annealed and leveled sheet steel, and an attempt was made to determine the cause of the drop in the σ_s value after leveling. Used in the tests were sheets of steel 08KP, annealed at 680-710° for 8 hours. The sheets, 2000-2500 mm in length, were cut in half. From the one half samples were cut to be tensile-tested to destruction at angles to the direction of rolling of 0, 30, 45, 60, and 90°; the other half was sent on for leveling, then for mechanical testing. Reduction amounted to 0.85-1.0 percent. Tested were 6 sheets, 120 samples; the thickness of the samples was 0.82 mm. Chemical composition and test-result tables are included. The penetration depth of the leveling deformation was studied by X-ray. It was found that the solid

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The Nature of the Drop in Yield Point (cont.)

background of the line (110) receded from the surface to a depth of up to 0.05-0.07 mm in sheets reduced by 1.0 percent, and to a depth of up to 0.08-0.12 mm in sheets reduced by 1.8 percent. In the leveled sheets the σ_s value dropped from 24.05-26.7 kg/mm^2 to 19.35-2075 kg/mm^2, with a different value for each direction tested. Changes in σ_b and δ were insignificant. It is assumed that the increase in the surface area of a sheet resulting from a plastic flow of the ferrite grains in the surface layers of the sheet should lead to an elastic deformation of the individual grains not only on the surface but throughout the thickness of the sheet. The effect of leveling on the sheet steel was such that the elastic tensile deformation of the inner ferrite grains was balanced out by the elastic compression deformation of the surface layers. When the samples were tensile-tested, the preexisting elastic deformation of the grains was made evident by its absorption of some of the stress---which was apparent from the drop in the σ_s value.

D.M.

1. Sheets--Properties 2. Sheets--Steel--Analysis

Card 2/2

S/126/63/015/002/012/033
E111/E151

AUTHOR: Psarev, V.I.

TITLE: Coagulation of the carbide phase during tempering of a molybdenum steel

PERIODICAL: Fizika metallov i metallovedeniye, v.15, no.2, 1963, 234-238

TEXT: The coagulation of carbides has been studied in two molybdenum steels: 1) 0.04% C, 0.34 Mn, 0.17 Si, 1.39 Mo; and 2) 1.27% C, 0.46 Mn, 0.21 Si and 1.04 Mo. Specimens with a suitable carbide structure were selected from batches tempered at 600 °C. Coagulation was studied at 600, 650 and 700 °C by the microscopical examination of specimens after quenching and surface-stripping. Coagulation during continuous heating at 10, 50 and 100 °C/hour was also studied on steel (1). Crystal-structure changes were studied by X-ray diffraction on carbides isolated electrolytically, the structure obtained under the test conditions being that of cementite. Redistribution of molybdenum between the crystal lattices of alpha-iron and cementite leads to breaks on the curves correlating average carbide-particle radius and

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isothermal holding time at 600 and 650 °C; at 700 °C coagulation dies away, virtually ceasing after about 80 hours. The hardness changes correspond to the changes in the dispersion of the carbide phase and in the state of the alpha-solid solution. Comparison of these results and those with carbon steel indicate that molybdenum increases the dispersion of the carbide phase and at the same time greatly retards the coagulation. The results show that carbide coagulation is governed by diffusion of carbon, but also that the state of the matrix crystal lattice greatly affects both the dispersion of the carbide particles and their coagulation. The known fact that alloying steel with a very small amount of Mo does not lead to a large change in the carbon diffusion coefficient although the carbide phase is considerably more dispersed and the carbide coagulation parameters greatly changed, is explicable in terms of the equilibrium conditions in a simplified model. Similar results should be obtained with steels alloyed with other carbide-forming elements in quantities insufficient to form special carbides.
There are 4 figures and 1 table.

Coagulation of the carbide phase... S/126/63/015/002/012/033
E111/E151

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet
(Chernovitsy State University)

SUBMITTED: June 21, 1962

Card 3/3

PSAREV, V.I.; MAKOVIYCHUK, Yu.I.; STEFANOVSKAYA, N.B.

Coagulation of the carbide phase in molybdenum and vanadium steels at temperatures lower than the A_1 point. Izv. vys. ucheb. zav.; chern. met. 6 no.8:120-127 '63. (MIRA 16:11)

1. Chernovitskiy gosudarstvennyy universitet.

ACCESSION NR: AR4014151 S/0137/63/000/012/I034/I034

SOURCE: RZh. Metallurgiya, Abs. 12I211

AUTHOR: Psarev, V. I.; Galichuk, Ya. D.; Dobry*den', K. A.

TITLE: On the intergrowth of crystals of the compounds CdSb and Zn_3Sb_2 in alloys

CITED SOURCE: Nauchn. yezhegodnik za 1959 g. Chernovitsk. un-t. Fiz.-matem. fak. Chernovtsy*, 1960, 617-619

TOPIC TAGS: Cadmium antimonide crystal, Zinc antimonide crystal, crystal aggregation, crystal intergrowth, centrifugal crystallization

TRANSLATION: An investigation was made into the feasibility of consolidating crystals of CdSb and Zn_3Sb_2 in binary alloys of Cd with 25% Sb and Zn with 35% Sb by the mechanical effect of centrifugal forces on a crystallizing casting. The alloys were prepared from c.p. Zn, Sb of grade Su-0, and Cd of grade Kd-0, further purified by triple vacuum distillation. The crystallization was carried

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ACCESSION NR: AR4014151

out in evacuated pyrex ampoules, which were cooled together with the furnace after the metal had melted, at rest and with rotation. During the rotation, and in the course of the solidification, the CdSb and Zn_3Sb_2 crystals, which differ considerably in density from the adjoining liquid, grow together into large aggregates. This is illustrated by a comparison of the microstructures of the specimens cooled with and without rotation. V. Zolotorevskiy.

DATE ACQ: 09Jan64 SUB CODE: ML, PH, CH ENCL: 00

Card 2/2

KOSTUR, N.L.; PSAREV, V.I.

Methods of doping the crystals of CdSb compounds through alloys of the system Cd - Sb. Fiz. met. i metalloved. 16 no.1:71-79 Jl '63.
(MIRA 16:9)

1. Chernovitskiy gosudarstvennyy universitet.
(Metal crystals) (Cadmium-antimony alloys)

PSAREV, V.I.

Methodology involved in heating and cooling according to a previously given law. Inzh.-fiz.zhur. no.1:98-102 Ja '60. (MIRA 13:4)

1. Gosudarstvennyy universitet, g.Chernovtsy.
(Furnaces)

BLYUMENFEL'D, V.N.; LYUFUR, S.L.; LIVSHITS, B.S.; PARILOV, V.P.; PSAREV, S.A.; RODZYANKO, V.Ye.; GOLUBTSOV, I.Ye., otv. red.; KIRILLOV, L.M., red.; SLUTSKIN, A.A., tekhn. red.

[Methodology for designing the equipment of crossbar automatic telephone exchanges] Metodika rascheta oborudovaniia ATS koordinatnykh sistem; informatsionnyi sbornik. Moskva, Gos. izd-vo lit-ry po voprosam sviazi i radio, 1961. 130 p. (MIRA 15:4)
(Telephone, Automatic--Equipment and supplies)

AUTHOR: Psarev, V. I. SOV/78-3-9-36/38

TITLE: Computation of the Line of Cementite-Austenite Equilibrium in Fe-C Alloys (Raschet linii tsementitno-austenitnogo ravnovesiya Fe-C splavov)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol 3, Nr 9, pp 2217-2218 (USSR)

ABSTRACT: The paper under review is an attempt at computing the line of cementite-austenite equilibrium in Fe-C alloys with consideration to the mathematical dependence of the n-grain size of the Fe_3C particle on temperature and concentration. The dependence of the n-grain size of the Fe_3C particle on temperature and concentration is given in the equations 1 and 2:

$$r_2 = \frac{r_1}{1 - \frac{r_1}{a}\left[\ln \frac{c_o}{c_2}(T_2 - T_1) + T_1 \ln \frac{c_1}{c_2}\right]} \qquad (1)$$

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Computation of the Line of Cementite-Austenite Equilibrium in Fe-C Alloys

$$r = \frac{r_o}{1-\left(\frac{r_o}{a} \ln \frac{c_o}{c}\right)T} \qquad (2)$$

In these equations r_1 represents the n-grain size of the Fe_3C particle at the temperature T_1, r_2 the medium grain size of Fe_3C at T_2, and c_2 the respective concentrations at the limits of the particle with the radii r_1 and r_2.

The above formulae were tested in numerous experiments with highly disperse Fe-C alloys. The dependence obtained between the solubility of the compound Fe_3C at different temperatures is used for the computation of carbon concentrations in Fe-C systems. There are 2 tables and 3 references, 3 of which are Soviet.

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Chernovtsy State University)

AUTHOR: Psarev, V.I. SOV-21-58-4-7/29

TITLE: Computation of the Activation Energy of the Carbide Coagulation Process in Steel (Raschët energii aktivatsii protsessa koagulyatsii karbidov v stali)

PERIODICAL: Dopovidi Akademii nauk Ukrains'koi RSR, 1958, Nr 4, pp 386-389 (USSR)

ABSTRACT: The diffusion character of coagulation of various fine-dispersed carbide particles in steels makes it possible to calculate the activation energy of this process. The author derives a formula for this activation energy:

$$Q = \frac{R \ln \frac{v_1}{v_2}}{\frac{1}{T_1} - \frac{1}{T_2}}$$

where R is a universal gas constant; v_1 and v_2 are two values of the linear growth rate for temperatures T_1 and T_2 at the same size of the particles. The author carried out experimental investigations for a series of carbon steels, from 1.2 to 1.7% C, at a wide range of temperatures, from 750 to 950°C, and treated the results by the least-square method. The final result was Q = 32,000 cal/g-at, and the

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Computation of the Activation Energy of the Carbide Coagulation Process in Steel

activation energy (above the critical point A_1) closely agreed with that of carbon diffusion in austenite determined by M.Ye. Blanter [Ref. 2] and others. Similar computations were also performed by the author for various steel alloys. There is 1 graph and 5 references, 4 of which are Soviet and 1 American.

ASSOCIATION: Dnepropetrovskiy gosudarstvennyy universitet (Dnepropetrovsk State University)

PRESENTED: By Member of the AS UkrSSR, V.N. Svechnikov

SUBMITTED: July 5, 1957

NOTE: Russian title and Russian names of individuals and institutions appearing in this article have been used in the transliteration.

1. Carbides--Diffusion 2. Diffusion--Mathematical analysis
3. Steel

S/148/62/000/012/003/008
E071/E151

AUTHORS: Psarev, V.I., and Korobiy, O.I.

TITLE: Influence of the state of the solid solution on the kinetics of coagulation and dispersion of the carbide phase in steels

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya metallurgiya, no.12, 1962, 103-109

TEXT: The influence of the state of the matrix phase, the grain boundaries and of grain size on the coagulation of carbides was investigated for the steels ШХ15 (ShKh15) (1.13% C, 1.53% Cr, 0.44% Mn), У17 (U17) (1.67% C), and for a nickel steel (1.17% C, 1.5% Ni) made from Armco iron in a high frequency furnace in argon atmosphere. The specimens were water-quenched from 1100 °C, annealed at 620-630 °C and given isothermal treatments at various temperatures; in addition they were reheated and quenched from various temperatures between 950 and 1150 °C. From the number and mean radii of the carbide particles, calculations were made of the linear velocity of their growth and of the two parameters of the coagulation process: α - parameter characterising the slowing

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down of the coagulation in the later stages of the process; and β - parameter characterising the acceleration of the coagulation in the early stages. It was shown that the velocity of coagulation, the degree of dispersion of the carbide phase and the degree of slowing down of the process largely depend on the state of the α and γ solid solutions. The higher the hardening temperature, the larger will be the grain size of the solid solution, the more dispersed will be the carbide phase and the higher will be the hardness of the steel throughout the course of the coagulation process and vice versa. The values of parameter β are higher for specimens hardened from lower temperatures, and those of parameter α are higher for specimens hardened from higher temperatures. Conclusions: the process of coagulation of carbides along grain boundaries and other weak places is determined not only by the diffusion coefficient, but also by changes in the solid solution. It is necessary to consider the influence of an alloying element on the state of the matrix of the solid solution (bond forces, presence of defects, grain size, etc) as well as on changes of the latter (intensity of healing

of lattice defects, mobility of matrix grain boundaries, etc) during the process of heating.
There are 5 figures and 1 table.

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet
(Chernovitsy State University)

SUBMITTED: January 23, 1962

Card 3/3

PSAREV, V.I.; SALLI, I.V.

Coalescence of finely dispersed particles and determining surface tension on solid phase boundaries. Fiz. met. i metalloved 5 no.2: 268-278 '57. (MIRA 11:3)

1.Dnepropetrovskiy gosudarstvennyy universitet.
(Surface tension) (Alloys--Metallography)

Psarev, V. I.

AUTHORS: Psarev, V. I., and Salli, I. V. 126-2-12/35

TITLE: Coalescence of finely dispersed particles and determination of the surface tension at the boundary of solid phases. (Koalestsentsiya melkodispersnykh chastits i opredeleniye poverkhnostnogo natyazheniya na granitse tverdykh faz).

PERIODICAL: Fizika Metallov i Metallovedeniye, 1957, Vol. 5, No. 2, pp. 268-278 (USSR)

ABSTRACT: Coalescence is a process of coarsening of the particles (grains or crystals) of the disperse phase brought about by displacement of matter from the small particles to the larger ones. This process is of great importance during tempering of hardened steels, during heat treatment of etching alloys, etc. An attempt to describe quantitatively this process has been made in earlier work of the authors of this paper and also of other authors (Refs. 4-7,9). It is known from thermodynamics that, in the case of coalescence, the change in the free energy of the system ΔF is proportional to the change of the total surface of division between the phases and $\Delta F = \sigma \Delta s$, whereby the coefficient σ represents the specific free energy on the surface of division of two phases. The fundamental relations of the molecular-kinetic theory of phase

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Coalescence of finely dispersed particles and determination of the surface tension at the boundary of solid phases.

transformations include this important thermodynamic magnitude but so far no reliable data are available even on the order of magnitude of σ for solid phase boundaries. In this paper a calculation is presented with the aim of determining the order of magnitude of the surface tension at the boundary of the solid phases using experimental data on the kinetics of coalescence. During coalescence all the particles of the disperse phase can be sub-divided into the following two classes: large, growing particles, i.e., particles which continue to grow all the time until the process is stopped; dissolving particles, i.e., smaller particles, the smallest of which dissolve during the first stages of coalescence whilst the larger ones may even grow in the initial stage and still dissolve later. Bokshteyn, S. Z. (Ref.3) has found that during coalescence the average dimensions of the particles of both classes increase all the time. Konobeyevskiy, S. T. (Ref.1) proposed a formula for the growth of the average particle size of the disperse phase as a function of time during isothermal annealing in which the rate of growth is expressed by a linear relation; for

Coalescence of finely dispersed particles and determination of the surface tension at the boundary of solid phases.

a better agreement between this formula and the experimental results, the authors of this paper introduce a decelerating term of the rate of growth thus obtaining Eq.(1), p.269. The deviation of the coagulating system from the equilibrium position can be characterized by a linear speed of growth of the average dimension of coarsening particles at a given instant of time. However, with the progress of time the particles grow bigger and the speed of growth will decrease and tend to become zero. In earlier work of one of the authors (Ref.7), a formula was proposed for calculating the average dimension of the particles which contains a term with an exponential dependence on time. An equation is also derived for calculating the surface tension σ at the boundary of solid phases, Eq.(7), p.271. If experimental data are available enabling plotting the dependence of the average radius of the disperse phase particles on the duration of isothermal annealing (Fig.1, p.70), it is possible on the basis of the here derived relation to evaluate the surface tension at the boundary of solid phases. For verifying the proposed formula the authors

Coalescence of finely dispersed particles and determination of the surface tension at the boundary of solid phases.

used the experimental data of Bokshteyn , S.Z. (Ref.3), Schimura, S. et alii (Ref.8); the basic data extracted from the experimental results of these authors, which are necessary for calculating the surface tension, are entered in Table 1, p.272. In addition, the method of calculation is verified on extensive experimental data which permits determining the surface tension at the boundaries graphite-austenite, carbide-austenite and carbide-ferrite. The process of coalescence of graphite particles in iron was investigated on two groups of specimens, the first consisting of iron with a nearly eutectoidal content of admixtures, i.e., 1% Si, 0.3% Mn, 0.15% P and 0.1% S, the second was prepared from pure synthetic iron with the same C and Si contents as for the first group but having a minimum content of the other admixtures. The experimental technique was described in an earlier paper (Ref.6). Tables 2 and 3 give the data on the dependence of the numbers of grains per unit of volume on the time and temperature of annealing of various specimens of malleable iron. The

Card 4/7 results are entered into tables and they are discussed

Coalescence of finely dispersed particles and determination of the surface tension at the boundary of solid phases.

in some detail. The data contained in the paper justify the assumption that the presented method for determining the order of magnitude of surface tension at the boundary of the solid phases is fully satisfactory and this view is supported by a number of facts. The same value was obtained for the surface tension of cementite at the boundary with ferrite by determining it from three different sources. For the steel Y-8 at 650°C σ = 15 dyn/cm, for below-eutectoidal steel at 630°C Bokshteyn (Ref.3) obtained σ = 13.2 dyn/cm, whilst for steels with various carbon contents at 720°C Schimura et alii (Ref.8) quoted the value σ = 7.5 dyn/cm. If the temperature is taken into consideration these values can be considered as being fully in agreement. According to Schimura et alii (Ref.8) the surface tension of cementite at the boundary with ferrite remains constant when changing the carbon concentration. For all the investigated alloys the magnitude of the surface tension decreases with increasing temperature, whereby the decrease is almost inversely proportional with the solubility of the disperse phase in the mother phase (in the temperature

Card 5/7

Coalescence of finely dispersed particles and determination of the surface tension at the boundary of solid phases.

range where no phase transformations occur). The surface tension of cementite at the boundary with austenite is almost five times lower than the surface tension of graphite at the boundary with austenite. This fact is confirmed by phenomena which accompany solidification of iron. Investigation of alloy steels showed that for a relatively small content of the alloying element, of the order of 2%, the order of magnitude of the surface tension does not change. However, a definite tendency towards increasing can be observed in the surface tension of carbide bounding on ferrite on introducing carbide forming elements (Cr,Ti) and a tendency can be observed towards lowering of the surface tension on introducing non-carbide forming elements, cobalt for instance. The obtained values of surface tension appear reasonable also as regards the determined size of the critical germination nucleus during phase transformation, for instance for steel containing 1.2% C and super-cooled to 50°C below the A_1 point, the critical size of the cementite germ is about 10^{-7} cm, which is a fully realistic value for such undercooling.

Card 6/7

126-2-12/35

Coalescence of finely dispersed particles and determination of the surface tension at the boundary of solid phases.

There are 4 figures, 10 tables and 10 references, 8 of which are Slavic.

SUBMITTED: October 11, 1955 (Initially), April 10, 1957 (after revision.)

ASSOCIATION: Dnepropetrovsk State University. (Dnepropetrovskiy Gosudarstvennyy Universitet).

AVAILABLE: Library of Congress.

Card 7/7

PSAREV, V.I.

Strengthening of crystals of chemical compounds in alloys of the systems Zn - Sb, Cd - Sb, In - Sb. Kristallografiia 5 no.3: 479-481 My-Je '60. (MIRA 13:8)

1. Chernovitskiy gosudarstvennyy universitet.
(Zinc antimonide)
(Cadmium antimonide)
(Indium antimonide)

PSAREV, V. I.

"On Calculation of Kinetics Curves of Heating and Cooling.:

Report submitted for the Conference on Heat and Mass Transfer, Minsk, BSSR, June 1961.

PSAREV, V.I

S/070/60/005/03/008/008
E132/E360

AUTHOR: Psarev, V.I.

TITLE: On Increasing the Sizes of Crystals of the Chemical Compounds in the Alloy Systems Zn-Sb, Cd-Sb and In-Sb

PERIODICAL: Kristallografiya, 1960, Vol. 5, No. 3, 479-481

TEXT: Investigations have been made of the possibilities of increasing the sizes of the particles of Zn_3Sb_2, $CdSb_2$ and InSb occurring in alloys of the corresponding elements. This increase occurred in the process of coalescence under the action on the alloy of mechanical forces (centrifugal). Specimens were made from the elements by heating under vacuum in pyrex tubes, first at 40° above the liquidus temperature then at it for 6-7 hours. The other alloys were made similarly. The rate of enlargement of the particles was greater the higher the temperature. A graph is given of the rate of growth of Zn_3Sb_2 crystals from a melt of 93% Zn with 7% Sb at 440 °C. After some 60 hours the growth had almost finished. Where there is a difference in density between the solid and the liquid phases centrifugation may assist coalescence. This

Card 1/2

L 14614-66 EWT(m)/T/EWP(t)/EWP(b) IJP(c) JD
ACC NR: AT6002264 SOURCE CODE: UR/2564/65/006/000/0288/0295

AUTHOR: Kostur, N. L.; Psarev, V. I.

ORG: none

TITLE: Alloying crystals of some intermetallic compounds by means of alloys [Paper presented at the Third Conference on Crystal Growing held in Moscow from 18 to 25 November, 1963]

SOURCE: AN SSSR. Institut kristallografii. Rost kristallov, v. 6, 1965, 288-295

TOPIC TAGS: cadmium compound, antimonide, indium compound, electric conductivity, Hall constant, thermoelectromotive force

ABSTRACT: CdSb and InSb compounds were alloyed with alloys of the corresponding systems. The alloying elements chosen for CdSb were Ag, Au, Pb, and Bi, and for InSb, Bi and Hg. Crystals of the alloyed compounds were then used for growing large single crystals by zone recrystallization. The degree of alloying was determined in these crystals measuring the temperature dependence of the electrical conductivity σ, Hall constant R, and thermo-emf α. The results shows that the method of alloying intermetallic

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compounds with alloys of systems corresponding to them is very effective. It is particularly valuable because data on the solubility of elements, which are necessary in direct alloying and are lacking for intermetallic compounds, are not needed in this method. Orig. art. has: 5 figures.

SUB CODE: 20 / SUBM DATE: none / ORIG REF: 005

TS

PSAREV, V.I.

Mechanism of the coalescence of finely divided phases in metal alloys. Fiz. met. i metalloved. 18 no.3:471-473 S '64. (MIRA 17:11)

1. Chernovitskiy gosudarstvennyy universitet.

L 45222-65 EWT(m)/EWP(z)/EWA(c)/T/EWP(b)/EWA(d)/EWP(t) IJP(c) JD
ACCESSION NR: AP5010985 UR/0148/65/000/004/0142/0149

AUTHOR: Psarev, V. I.

TITLE: Coagulation of carbide particles in high-manganese steel

SOURCE: IVUZ. Chernaya metallurgiya, no. 4, 1965, 142-149

TOPIC TAGS: carbides, steel alloys, coagulation

ABSTRACT: Some results of the investigation of the kinetics of carbide coagulation in 12-13%-Mn steel are presented. Samples were taken from forged rods of two grades of steel (see table 1 of the Enclosure) and subjected to 20-25% precipitation hardening followed by tempering at 500°C for 10 hours. After isothermal treatment (750-850°C) and quenching in water, the number of carbide particle, radii of the dispersed particles and other coagulation parameters were measured in deformed and nondeformed samples. It is shown that carbon diffusion is the determining factor in the kinetics of carbide coagulation in high-manganese steel. The growth of carbide particles in coagulation is not accompanied by any considerable migration of manganese atoms the concentration of which remains high in the surrounding γ--iron solid solution. The characteristic result of alloying with manganese is the

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L 45222-65
ACCESSION NR: AP5010985

segregation and retention of a highly dispersed carbide phase during coagulation. The physical nature of this effect is attributed to the external carbide surface development and its change during the growth of the carbide particles while the reduction in dispersion and more rapid growth of the particles after deformation is attributed to a lower number of growth-active surface boundaries on the surface of deformed steels than on nondeformed steels. Orig. art. has: 2 figures, 1 table, 8 formulas.

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Chernovtsy State University)

SUBMITTED: 17Dec63 ENCL: 01 SUB CODE: MM

NO REF SOV: 017 OTHER: 001

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L 45222-65
ACCESSION NR: AP5010985

ENCLOSURE: 01

Table 1

Composition of types of steel investigated

	C	Si	Mn	P	S	Ti
1	1.30	0.69	12.62	0.090	0.01	0.045
2	1.34	0.67	11.93	0.098	0.01	0.061

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L 17083-63 EWP(q)/EWT(m)/BDS AFFTC JD

ACCESSION NR: AP3004594 S/0126/63/016/001/0071/0079

55

AUTHORS: Kostur, N. L.; Psarev, V. I. 54

TITLE: A procedure for growing CdSb crystals from alloys of Cd-Sb system 27 — 27

SOURCE: Fizika metallov i metallovedeniye, v. 16, no. 1, 1963, 71-79

TOPIC TAGS: CdSb, crystal growing, Cd-Sb alloy

ABSTRACT: A new method for growing large CdSb monocrystals is offered. The procedure consisted of three steps. 1) Binary alloys Cd-Ag (Ag to 2%) and Cd-Hg (Hg to 20 by weight) were prepared. They had a uniphasal structure of solid solution on the Cd base. 2) Various amounts of antimony (from 10 to 40% weight) were added to these binary solutions. The solutions were melted and held at 620C for 5 hours while being stirred to insure a good distribution of the alloy components. After that, the melt was cooled to 500C, aged at that temperature for 20 hours, and cooled again in the oven. The resultant ternary alloys Cd-Ag-Sb and Cd-Hg-Sb had a two-phase structure consisting of the CdSb crystals and a cadmium eutectic. 3) The CdSb crystals were separated centrifugally from the melt. They contained from 20 to 40% weight of Sb. These crystals were used

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L 17083-63

ACCESSION NR: AP3004594

as the initial material for the growing of large CdSb monocrystals by the method of zonal recrystallization. Orig. art. has: 2 tables and 5 figures.

ASSOCIATION: Chernovitskiy gosudarstvenny*y universitet (Chernovtsy State University)

SUBMITTED: 15Oct62 DATE ACQ: 27Aug63 ENCL: 00

SUB CODE: ML NO REF SOV: 007 OTHER: 000

Card 2/2

PSAREV, V.I.; Prinimali uchastiye: MAKOVIYCHUK, Yu.I., student; REVA, B.F., student

Coagulation of the carbide phase during the tempering of molybdenum steel. Fiz. met. i metalloved. 15 no.2:234-238 F '63. (MIRA 16:4)

1. Chernovitskiy gosudarstvennyy universitet.
(Molybdenum steel—Heat treatment)
(Phase rule and equilibrium)

PSAREV, V.I. [Psarev, V.I.]; KOSTUR, N.L. [Kostur, N.L.]; OBSTRA, A.V.

Phase separation in alloys of the systems Cd - Sb and In - Sb by centrifuging the melt. Ukr. fiz. zhur. 8 no.6:694-699 Je '63. (MIRA 16:7)

1. Chernovitskiy gosudarstvennyy universitet.
(Cadmium-indium-antimony alloys) (Crystals--Growth)

PSAREV, V. I.; KOROBIY, O. I.

Effect of the state of a solid solution on the kinetics of the coagulation process and dispersion of the carbide phase in steels. Izv. vys. ucheb. zav.; chern. met. 5 no.12:103-109 '62. (MIRA 16:1)

1. Chernovitskiy gosudarstvennyy universitet.

(Steel--Metallography)
(Phase rule and equilibrium)

PSAREV, V.I.; DOBRYDEN', K.A.; KAZYUK, F.I.

Investigating the coagulation process of finely divided phases in Zn-Sb alloys. Fiz. met. i metalloved. 14 no.1:130-133 Jl '62. (MIRA 15:7)

1. Chernovitskiy gosudarstvennyy universitet.
(Zinc-antimony alloys--Metallography)

Psarev, V. I.

/8266* Growth of the Carbide Phase During Heat Treatment of Steel. O koagulitsii karbidnoi fazy pri otpuske stali. (Russian.) V. I. Psarev. *Metallovedenie i Obrabotka Metallov*, 1956, no. 2, Feb. 1956, p. 2-8.

Relation between average radius or number of coarsening particles and the period of time of isothermal soaking. Linear character of rate of grain growth. Relation between surface energy at phase boundaries and the "coagulation" process. Effect of alloying elements and temperature. Tables, graph. 8 ref.

18(3)

AUTHOR: Psarev, V.I., Candidate of Technical Sciences

TITLE: On Regularities of the Coagulation Process of Carbide Particles in Steel Above the A1 Point (O zakonomernostyakh protsessa koagulyatsii karbidnykh chastits v stali vyshe tochki A1)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya metallurgiya, 1959, Nr 2, pp 93-99 (USSR)

ABSTRACT: An attempt is made to complete the existing data on coagulation processes in steel and to determine the interdependence between the coagulation parameters and the carbon content or the coagulation temperature. Information is given on general characteristics of coagulation kinetics of simple carbide systems in carbon and alloy steels. The correlation between the coagulation parameters and the equilibrium curve of iron carbon alloys is determined. The connection between the carbide-carbide phase dispersion and the shifting of the carbide-austenite equilibrium line due to the effect of an alloying

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On Regularities of the Coagulation Process of Carbide Particles in Steel Above the Al Point

element is established. It was stated that the linear coagulation rate in carbon steels depended on the time and temperature of isothermic heating. A higher carbon content in the steel or higher temperatures caused the reduced dispersion of the carbide phase. A formula is given to compute the dependence of the end radius of carbide particles on the coagulation temperature. In alloy steels an increased content of the alloy component created special carbide phases. Their coagulation depended on various factors, such as surface tension in the carbide-austenite border, diffusion of carbon and of alloying components etc. The experimental part of the work was carried out in cooperation with Ye. V. Akhtemiychuk and S. I. Ivanenko.
There are 2 tables, 1 graph, 3 sets of microphotos and 6 Soviet references.

SOV/148-59-2-11/24

On Regularities of the Coagulation Process of Carbide Particles in Steel Above the A_1 Point

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Chernovtsy State University)

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SOV/126-7-4-9/26

AUTHOR: Psarev, V.I.

TITLE: Investigation of the Process of Coalescence of Carbides in Carbon Steels

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 7, Nr 4, pp 551-558 (USSR)

ABSTRACT: Although the mechanical properties of steels depend to a large extent on the size of the carbide particles, little has been done in the way of establishing the laws governing the rate of coalescence and the final size attained by these particles during changes taking place in steels either in the course of thermal treatment, or in service at elevated temperatures. The problem of the formulation of general laws of this nature is the subject of the present paper. A two-phase system in which one of the phases is present in the form of small, dispersed particles will tend to attain the state of equilibrium by the process of growth and coalescence of the finely dispersed phase. In the previously published works (Ref 1 and 2), the author of the present paper derived an expression describing the relationship between the mean radius of the coalescing

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particles and the time of isothermal heating

$$r = r_o + \frac{v_o}{\alpha}\left[1 - \exp(-\alpha t)\right] \qquad (1)$$

where: r - mean particle size at time t;
r_o - initial mean particle size at t - 0;
v_o - initial rate of growth of the particles;
α - coalescence constant for isothermal heating.
It was shown experimentally (Ref 1) that this equation describes the relationship under consideration only starting from a certain time t^1, when the condition $\ln v_o/v = \alpha t$ (where α is the angle coefficient) is fulfilled (compare Fig 1). It was found also that for various steels tempered at 500 to 600°C, t^1 is equal 3 to 4 hours; at 700°C, t^1 is equal 2 to 1.5 hours and it approaches zero at temperatures above A_1.
A more accurate expression for the relationship described by Eq (1) can be obtained by solving this problem in the second approximation; if the function

Investigation of the Process of Coalescence of Carbides in Carbon Steels

of the variation of the rate of growth of the particle is expanded into series and if the second term of this series is taken into account, the following expression is obtained:

$$-\frac{dv}{dt} = \alpha v + \beta v^2 = f(v) \qquad (2)$$

The coefficients α and β in the expanded function $f(v)$ are constant at T = const but are affected by the variation of temperature and other factors; these coefficients are termed by the present author coalescence parameters. From Eq (2), and bearing in mind that $v = dr/dt$, an expression can be derived describing the relationship between the mean particle size (r) and the duration (t) of isothermal heating

$$r = r_o + \frac{1}{\beta} \ln \left\{ 1 + \frac{\beta v_o}{\alpha} \left[1 - \exp(-\alpha t) \right] \right\} \qquad (3)$$

Card 3/11 This equation satisfies the limiting conditions

Investigation of the Process of Coalescence of Carbides in Carbon Steels

$$t = \infty \quad r_m = r_o + \frac{1}{\beta} \ln \left(1 + \frac{\beta v_n}{\alpha}\right) \qquad (4)$$

where: r_m - the final particle size. From the latter expression the function $v = f(r)$ can be found in the form of

$$v = \frac{\alpha}{\beta} \left[\exp\beta(r_m - r) - 1\right] \qquad (5)$$

From the analysis of the possible values of the roots of Eq (5) it follows that it can describe the coalescence process when β has positive values; if β approaches zero, Eq (1) is obtained. Regardless of the order of magnitude of β, the second term in Eq (2) can be left out starting from time t^1 (see Fig 1), when the condition $\alpha v \gg \beta v^2$ is fulfilled. Starting from this moment, the time dependence of the particle size can be adequately described by Eq (1). The values of β for the process of growth of the carbide particles in steels was calculated for temperatures both above (Ref 1,3,4,5)

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and below (Ref 2,4,5,6,7) the critical point A_1; In the former case, the values of β are so small that the value of αv in Eq (2) is much larger (by one or two orders of magnitude) than that of βv^2 already in the initial stages of the process of coalescence; consequently, the time dependence of the carbide particle size at temperatures above A_1 is adequately described by Eq (1). For changes occurring at temperatures below A_1, when the values of β are relatively large, Eq (5) has to be used. Fig 2 shows the relationship d_{cp} (mean particle diameter, 10^5cm) versus v_{cp} (mean rate of growth, 10^5cm/h) for 0.4% C (curve 1) and 0.7% C (curve 2) steels heated isothermally at 630°C. Both curves were plotted from Eq (5), taking $\beta = 1.75 \times 10^5 cm^{-1}$ (curve 1) and $\beta = 2 \times 10^5 cm^{-1}$ (curve 2) and experimental values for other magnitudes appearing in this equation. Good agreement between the theoretical curves and experimental points (shown in Fig 2 by circles and crosses) indicates that by taking into account the second term of the expanded function f(v), it is possible to describe with sufficient accuracy the process of

Investigation of the Process of Coalescence of Carbides in Carbon Steels

coalescence of carbides in the early stages of their growth i.e. before time t_1. The problem of determination of the coalescence parameters is discussed in the second part of the present paper. It has been shown experimentally (Ref 1) that the final particle size of carbides in steels increases with the heat treatment temperature and that at the same temperatures, it can attain different values in different steels from which it was concluded that r_m depends on the concentration of the constituent atoms at the phase boundary. The relationship $r_m = f(c, T)$, where c - concentration; T - temperature, can be obtained from the known Thompson (Kelvin) formula by applying it to the limiting (initial and final) values of r_m, and then excluding the equilibrium concentration c_∞. The following expression is obtained:

$$c_{min} = c_o \exp\left[- \frac{a}{T} \left(\frac{r}{r_o'} - \frac{1}{r_m} \right) \right] \qquad (6)$$

Card 6/11 where $a = 2\sigma Mv/R$ (σ - specific surface energy at the

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phase boundary; M - molecular weight of the dispersed phase; R - gas constant). From Eq (6) the expression for the final particle size can be obtained

$$r_m = \frac{r'_o}{1-C'T} \qquad (7)$$

where $C' = r_o/a \ln c_o/c_{min}$. At present, it is not possible to determine C' which, however, obviously is a function of temperature. Fig 3 shows the temperature dependence of r_m plotted for cases when C' increases with the temperature (curve 1) when it remains constant (curve 2) and when its value decreases with rising temperature (curve 3). Calculations based on experimental data (Ref 1 to 4) show that for practical purposes C' changes very little with temperature and that the temperature at which $1/C' = T'$ corresponds almost exactly to the temperature of the phase transformation. (These calculations were based on experimental data on coalescence of carbides in carbon and alloy steels (Ref 1 to 3) and graphite particles in malleable cast iron (Ref 4).) The values of r_m calculated from the

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formula $r_m = r_o + v_o/\alpha$ (Ref 1) and values of the same magnitude calculated from Eq (7) are given in Table 1, for steel with 1.7% C, steel U12A and malleable cast iron. (The values of C' and r_o for each alloy are given at the bottom of the table). The temperature dependence of r_m in alloy steels is illustrated in Fig 4. (Curve 1 - chromium steel, $C' = 6.68 \times 10^{-4} °C^{-1}$, $r_o = 3.75 \times 10^{-5}$cm; Curve 2 - manganese steel, $C' = 7.5 \times 10^{-4} °C^{-1}$, $r_o = 5.1 \times 10^{-5}$cm). Taking into account the fact that with a sufficient degree of accuracy $C' = 1/T'$ (where T' is the temperature of the phase transformation in °K) the expression describing the temperature dependence of the coalescence parameter α can be derived. (It is pointed out at this stage that the above consideration applies to the case when, as a result of complete dissolution of the finely dispersed phase, a two-phase system is changed into a single phase system; consequently, it does not apply to coalescence of carbides in steels at temperatures below A_1). The relationship between α and r_m is given by $\alpha = -D/\rho \, de/dx$,

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where D - diffusion coefficient, ρ - density of the coalescing phase and dc/dx - concentration gradient. After substituting the values for r_m, v and D, the temperature dependence of α is obtained in the form of

$$\alpha = \frac{k}{r'_0} e^{-\frac{Q}{RT}\left(\frac{T'}{T} - 1\right)} \qquad (8)$$

where $k = -D_0/\rho \, dc/dx$; T' - the temperature at which carbides are completely dissolved. Analysis of this expression shows that α increases with rising temperature (see Fig 5), reaches a maximum at $T_1 = T'/(1 - RT'/Q)$, and then falls to zero at $T = T'$. The validity of Eq (8) can be checked with the aid of experimental data if the values of Q and k are known. The results of such calculations for a carbon steel, a chromium steel and a manganese steel are plotted in Fig 6, curves 1,2 and 3 respectively. (The values of Q cal/g-atom, k cm/sec and T' °K, are given in the caption.) Similar calculations were carried out for a wide range of carbon

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steels and in every case there was good agreement between the experimental and calculated values of α corresponding to the ascending portion of the $\alpha = f(T)$ curve; after passing the maximum, the calculated values of α are higher than those obtained experimentally. Table 2 gives experimental (column 2) and calculated (column 3) values of α at various temperatures. The problem of deriving an expression for the coalescence parameter β is more complex, since in this case it is necessary to know the form of the function $v = f(r)$. Then, by differentiating Eq (5) in respect to r, the following formula is obtained:

$$\beta = \frac{\ln\left(-\frac{1}{\alpha}\frac{dv}{dr}\right)}{r_m - r} \qquad (9)$$

The value of the magnitude dv/dr is best obtained graphically from the relationship between v and r; a curve of this type, plotted from experimental data is shown in Fig 2. Incidentally, it follows from that

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curve that at the point where $r = r_m$, parameter $\alpha = -(dv/dr)_{r = r_m}$. It is stated in the conclusion that although the analytically derived expressions describing the temperature dependence of the coalescence parameters are in fairly good agreement with the experimental data on the coalescence of the carbide particles in steels at temperatures above A_1, certain assumptions made in deriving these expressions should be verified by further experimental work. There are 6 figures, 2 tables and 8 references, 7 of which are Soviet and 1 German.

ASSOCIATION: Dnepropetrovskiy gosudarstvennyy universitet (Dnepropetrovsk State University)

SUBMITTED: April 14, 1958

PSAREV, V.I.

Solubility of carbon in ferrites. Fiz. met. i metalloved. 11 no. 6:944-945 Je '61. (MIRA 14:6)

1. Chernovitskiy gosudarstvennyy universitet.
(Iron—Metallography)

PSAREV, V.I.

137-58-3-5842

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 3, p 196(USSR)

AUTHORS: Psarev, V. I., Salli, I. V.

TITLE: Kinetics of Coalescence and the Determination of Surface Tensions on the Boundaries of Solid Phases (Kinetika koalestsentsii i opredeleniye poverkhnostnogo natyazheniya na granitse tverdykh faz)

PERIODICAL: Nauchn. zap. Dnepropetr. un-t, 1956, Vol 45, pp 61-67

ABSTRACT: The authors present data on the kinetics of coalescence of globular cementite over a wide range of temperatures and for various grades of pure and alloyed steels. Investigations are carried out to obtain experimental data permitting the calculation of the surface tension σ on the boundaries of solid phases according to the method proposed by Salli (see RzhMet, 1958, Nr 3, abstract 5841). Values of σ on the cementite-ferrite boundary, calculated from various sources (including allowances for the temperature t), are fairly close: steel U-8 at t=650°C, σ =15 dynes/cm; subeutectic steel at t=630°, σ =13.2 dynes/cm. The value of σ is not affected by the C content, but is decreased at higher temperatures. Although the order of magnitude of σ

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137-58-3-5842

Kinetics of Coalescence and the Determination of Surface Tensions (cont.)

is not affected by the introduction of alloying materials into the steel, a trend toward higher values of σ on the carbide-ferrite boundaries is observed when carbide-forming additives (Cr, Ti) are introduced. The introduction of additives which do not form carbides (Co) produces a reduction in the value of σ.

V. O.

Card 2/2

P.SAFEV, V.I.

Coagulation of the carbide phase during the tempering of steel. V. I. Psarev (State Univ., Dnepropetrovsk). *Metalloved. i Obrabotka Metal.* 1956, No. 2, 2–8.—A theoretical treatment of isothermal coagulation is made on the basis of the assumption that $dv = -\alpha dt$, where v is the velocity of growth of an av. particle, α is a const., and t is the time. The equations so obtained agree with the existing data for tempering below the A_1 temp. To test the equation for tempering above A_1, an exptl. study was made of coagulation in 3 types of steel: (1) 1.7% C, (2) 1.8 C and 2 Mn and (3) 1.8 C and 3.3 Cr. The specimens were heated for 10 min. at 1150° and quenched, and they were then heated for 3 hrs. at 6[illegible] to develop a uniform distribution of fine carbides. The change in this carbide distribution was observed during heating for periods up to 26 hrs. in a Pb bath at temps. from 730 to 950°. Some of the carbides dissolved in accordance with equil. relations, but others coagulated. The observed increases in carbide radius with increasing time agreed well with the predicted values. For time $\rightarrow \infty$ the limiting radius r_∞ was calcd. The values for the 3 steels at 800 and 900°, resp., were: (1) 38, 64; (2) 30, 44; (3) 13, 17 $\times 10^{-4}$ cm. The velocity of coagulation was detd. not only by diffusion but also by the concn. gradient and the specific surface energy.

A. G. Guy

PSAREV, V. I.

PSAREV, V. I. "The Kinetics of Coalescence of the Carbides of Iron-carbide Alloys." Acad Sci Ukrainian SSR. Inst of Ferrous Metallurgy. Dnepropetrovsk, 1956. (Dissertation for the Degree of Candidate in Technical Science)

So: Knizhnaya Letopis', No. 18, 1956,

PSAREV, V.I.; YURCHUK, I.A.

Coalescence of carbide particles in the process of continuous heating. Izv. vys. ucheb. zav.; chern. met. 4 no.10:82-87 '61. (MIRA 14:11)

1. Chernovitskiy gosudarstvennyy universitet.
(Steel--Heat treatment)

23620

S/148/60/000/012/009/020
A161/A133

18.7500 1454, 1555, 1418

AUTHOR: Psarev, V. I.

TITLE: On the coagulation of carbide particles in carbon steels below the A_1 point

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, no. 12, 1960, 91 - 96

TEXT: The purpose of the described experiments was to obtain more data on the coagulation of carbide particles below the critical A_1 point in carbon steel, for the data published hitherto vary and no systematical studies of the process had been undertaken. The test method had been described in two previous articles by the author (Ref. 6: V. I. Psarev, "Metallovedeniye i obrabotka metallov", 1956, no. 2; and Ref. 7: V. I. Psarev, "Fizika metallov i metallovedeniye", v. 7, no. 4, 1959). The investigated commercial steel grades У10 (U10), У12 (U12) and У17 (U17) were smelted from armco iron in an electric high-frequency furnace in an argon medium. Cylindrical specimens 12 - 15 mm in diameter and 15 - 20 mm in length were heated to 1,000°C ("U17" to 1,100°C), soaked in this heat for 5 - 8 min,

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quenched in water, and subsequently tempered at 620 - 630°C for 3 hrs, then additionally heated for 1 hr to different temperatures in which the coagulation had to be determined. The decarbonized layer was removed from the specimen after each isothermic heating (in a lead bath), the number of carbide particles was counted at x1440 magnification with the aid of a grid placed in a microscope ocular and the Brinell hardness was measured. The final radius of the particles was determined using the formula (from Ref. 6, 7)

$$r_m = r_0 + \frac{v_c}{\alpha} \qquad (1)$$

where r_0 is the initial particle radius; v_c - the initial linear particle growth rate; α - the coagulation factor characterizing the damping of the coagulation process and equal

$$\alpha = \frac{1}{t}\ln\frac{v_0}{v} . \qquad (2)$$

The mean radius r of the carbide particles was determined by the formula (also from Ref. 6, 7);

$$r_r = r\frac{v_0}{\alpha}\left[1-\exp(-\alpha t)\right] , \qquad (3)$$

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where t is the isothermic soaking time, and $v = \frac{dr}{dt}$ the experimentally determined rate of coagulation. The dependence of α on the tempering temperature below the A_1 point was similar to the dependence above A_1, and the mean radius of cementite particles increased with an increase in the carbon content in steel (Fig. 1). The quantity of cementite particles (during the same time of isothermic soaking) increased at the beginning and reached a certain maximum at a certain carbon content in steel, then decreased (Table 2). The growth rate of the constant particle size increased with the carbon content with linear regularity (Fig. 1). The final particle radius increased with the coagulation temperature. The relation curve is hyperbolic, but a quantitative regularity could only be stated for relatively pure binary steel (not for commercial steel). A linear relation between the steel hardness and the total carbide phase surface area was found in the interval 100 - 150 hrs of isothermic heating; during longer heating (150 - 250 hrs) it changed (Fig. 3). The results led to the conclusion that the coagulation of carbides must cease faster in high-carbon steel than in low-carbon, and same result can be attained by a higher coagulation temperature, but the linear coagulation rate grows rapidly with a rise in C-content and tempera-

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burn, and the result is a larger final size of particle. The growth of particles cannot be explained by easier coagulation at higher C-content, for the curve maximum shifted toward a low C-content after 1-hour isothermic heating. A further analysis is necessary. There is no linear relation between the steel hardness and the aggregate carbide phase surface, for the oversaturation of the alpha phase with carbon varies drastically with time. The relation may be approximately linear only in later coagulation stages. Long soaking (250 - 300 hrs), even in a protective medium, leads to partial decarbonization. The approximate relation between the steel hardness H and total carbide surface S may be expressed as

$$H = H_m + k(S - S_m)$$

where S_m is the minimum total carbide surface $S_m = 4\pi r_m^2 N_m$; N_m - the minimum number of carbide particles in a cm^3 after the end coagulation process; k - the proportionality factor depending on the variations of the alpha state, the rate of variation of the total carbide phase surface, C content in steel, and more factors. Ya. N. Balagutrak and M. D. Karliychuk participated in the work. There are 3 figures and 7 references: 6 Soviet-bloc and

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On the coagulation of carbide particles in...

1 non-Soviet-bloc.

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Chernovitsy State University)

SUBMITTED: April 4, 1960

Table 2.

Soaking time Время выдержки, часы hrs.	Carbon content, Содержание углерода, % in %				
	0.4 [1]	0.7 [1]	0.95	1.15	1.67
1	142.7	192.3	100.4	86.35	66.0
25	69.2	67.6	52.4	57.0	42.8

[Particles numbers in $(N \cdot 10)^{-10}$ cm^{-3}].

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PSAREV, V.I.

Coalescence of the carbide phase in steel tempering. Metalloved. i obr. met. no.2:2-8 F '56. (MLRA 9:7)

1. Dnepropetrovskiy gosudarstvennyy universitet.
(Steel--Metallography) (Tempering)

L 47341-66 EWT(l)/EWT(m)/T/EWP(t)/ETI IJP(c) GG/JG/JD/WW

ACC NR: AR6025 56 SOURCE CODE: UR/0058/66/000/004/A075/A075

54
B

AUTHOR: Kostur, N. L.; Psarev, V. I. 17 17

TITLE: Features of crystallization of the CdSb compound from melts 16

SOURCE: Ref. zh. Fizika, Abs. 4A628

REF SOURCE: Sb. Simpozium. Protsessy sinteza i rosta kristallov i plenok poluprovodnik. materialov, 1965. Tezisy dokl. Novosibirsk, 1965, 13-14

TOPIC TAGS: cadmium compound, antimonide, crystallization, phase composition, stoichiometry, single crystal growing, crystal impurity

ABSTRACT: An investigation was made of the influence of supercooling of a melt, which depends on the rate of its cooling, the degree of prior superheating, and the content of extraneous impurities, on the formation of stable and metastable phases during the solidification of melts corresponding to the composition of the compund CdSb. It is shown that CdSb compound ingots which solidify in the temperature interval 450 - 420C have a single-phase structure with minimum deviation from stoichiometry. The solution was superheated by 10 - 30°. On the basis of the obtained results, the most optimal regimes are proposed for growing CdSb single crystals of stoichiometric composition and of crystals doped with various impurities. [Translation of abstract]

SUB CODE: 20

Card 1/1 pb

L 04302-67 EWT(m)/T/EWP(t)/ETI IJP(c) JD

ACC NR: AP6029813 (A) SOURCE CODE: UR/0363/66/002/008/1383/1389

38
37
B

AUTHOR: Kostur, N. L.; Psarev, V. I.

ORG: Chernovtsy State University (Chernovitskiy gosudarstvennyy universitet)

TITLE: Conditions for crystallization of the intermediate phases in the Cd-Sb system

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 2, no. 8, 1966, 1383-1389

TOPIC TAGS: crystallization, phase diagram, solution property, phase composition, phase analysis, cadmium, antimony

ABSTRACT: The Cd-Sb system was studied in the 41.93-52.0 wt % Sb range by a combination of metallographic-, thermographic-, and x-ray techniques in order to define the conditions of crystallization of the stable and metastable phases of the system. Samples were prepared by fusing mixtures of pure components in sealed ampoules for 5 hr at 630-640°C and 10^{-3}-10^{-4} mm Hg. For a given rate of cooling (100-300 deg/hr) the formation of the intermediate phases was found to depend upon the maximum temperature of the melt. The variation in the formation of these phases depends apparently upon the presence of undissociated CdSb molecules which act as seeds during the crystallization process. A compound with a composition close to that of CdSb was found to crystallize out at 420-450°C. The CdSb, Cd_4Sb_3, and Cd_3Sb_2 crystallize only from melts heated up to 630°C. The metastable phases can be stabilized by means of rapid cool-

UDC: 546.48+546.86

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L 04302-67

ACC NR: AP6029813

ing. Formation of the intermediate metastable phases is characteristic for melts overheated to 50-150°C above their melting points. The following optimum conditions are recommended for selective crystallization of CdSb single crystals: temperature of the molten zone equal to 460-480°C and temperature in the crystallization zone equal to 420-440°C. Orig. art. has: 5 figures.

SUB CODE: 20 / SUBM DATE: 14Jul65/ ORIG REF: 005/ OTH REF: 004

Card 2/2

Country : USSR
CATEGORY : Farm Animals. General Problems. Q-1

ABS. JOUR. : RZBiol., No. 4, 1959, No. 16595

AUTHOR : Pshenichnyy, P. D.
INST. :
TITLE : Breeds and Productive Types of Farm Animals.

ORIG. PUB. : Zhivotnovodstvo, 1958, No 7, 55-56

ABSTRACT : No abstract.

CARD: 1/1

PSAREV, V.I.

Category : USSR/Solid State Physics - Phase Transformation in Solid Bodies E-5

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3855

Author : Psarev, V I
Inst : Dnepropetrovsk University, USSR
Title : Coagulation of Carbide Phase in the Tempering of Steel.

Orig Pub : Metallovedeniye i obrabotka metallov, 1956, No 2, 2-8

Abstract : Assuming that the quantity that characterizes the deviation of the system from the equilibrium state is the linear velocity of the growth of the thickening particles, a relationship was derived between the average radius of the particle and the time of the isothermal heating of the steel. Experimental data are given (over a wide temperature range) on the investigation of the coagulation of carbide particles above the critical point A_1 in three types of steel: carbon, manganese, and chrome. Analysis of the data made it possible to obtain the temperature dependence of the final dimension of the thickening carbide particles.

Card : 1/1

L 15946-66 EWT(m)/T/EWP(t)/EWP(b) IJP(c) JD

ACC NR: AT6002257 (N) SOURCE CODE UR/2564/65/006/000/0247/0254 33 32 B+1

AUTHOR: Psarev, V.I.; Dobryden', K.A.

ORG: none

TITLE: Principles of crystallization and stabilization of the structure of compounds CdSb and Cd_3Sb_2 in alloys of the Cd-Sb system. [Paper presented at the Third Conference on Crystal Growing held in Moscow from 18 to 25 November, 1963]

SOURCE: AN SSSR. Institut kristallografii. Rost kristallov, v. 6, 1965, 247-254

TOPIC TAGS: cadmium compound, antimony compound, cadmium alloy, antimony alloy, crystallization

ABSTRACT: The study was devoted to the determination of the conditions under which the compounds CdSb, Cd_3Sb_2, and Cd_4Sb_3 are formed during crystallization of Cd-Sb alloys. The structural state and composition of the samples was studied by thermographic, electrolytic, metallographic, and x-ray analyses. It was found that during crystallization of melts containing from 41.93 to 52.00%, CdSb crystals supersaturated with cadmium precipitate first, as a result of which the melt becomes rich in antimony, and suitable supercooling creates conditions for the nucleation of Cd_3Sb_2 crystals. When the melt is

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ACC NR: AT6002257

rapidly cooled, Cd_3Sb_2 crystals after nucleation have a higher growth rate than CdSb, and the structure of the solidified alloy consists primarily of particles of the metastable phase Cd_3Sb_2. The compound Cd_4Sb_3 is apparently a subtractive solid solution based on Cd_3Sb. Orig. art. has: 6 figures, 1 table, and 1 formula.

SUB CODE: 20 / SUBM DATE: none / ORIG REF: 008 / OTH REF: 001

FW

Card 2/2

PSAREVA, T.V.; RIKHTER, G.D.; CHIZHOV, C.P.

Second scientific conference of Kazakhstan geographers. Izv. AN SSSR. Ser. geog. no. 4:166-167 Jl-Ag '61. (MIRA 14:7)
(Kazakhstan--Geography--Congresses)

GROSVAL'D, M.G.; PSAREVA, T.V.; AVSYUK, G.A., otv. red.; OGANOVSKIY, P.N., red.

[Franz Josef Land]Zemlia Frantsa-Iosifa. Moskva. (Its Materialy gliatsiologicheskikh issledovanii). [Ice structure]Struktura l'da. 1962. 99 p. (MIRA 16:2)

1. Akademiya nauk SSSR. Institut geografii.
(Franz Josef Land--Ice)

KRENKE, A.N.; PSAREVA, T.V.; AVSYUK, G.A., otv.red.; OGANOVSKIY, P.N., red.

[Franz Josef Land; snow cover] Zemlia Frantsa-Iosifa; snezhnyi pokrov. Sost.A.N.Krenke i T.V.Psareva. Moskva, 1960. 151 p. (Materialy gliatsiologicheskikh issledovanii). (MIRA 14:3)

1. Akademiya nauk SSSR. Institut geografii.
(Franz Josef Land--Snow)

PSAREVA, Ye.N., kand.sel'skokhoz. nauk; MATVEYENKO, T.M.

Role of intravarietal selection in the resistance of tobacco to the cucumber mosaic virus CMV-1. Agrobiologiia no.3:413-418 My-Je '63. (MIRA 16:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut tabaka i makhorki, g. Krasnodar.
(Tobacco--Disease and pest resistance) (Cucumber mosaic virus)

PSAREVA, Ye.N., kand.sel'skokhozyaystvennykh nauk; MATVEYENKO, T.M.

Pathogenicity of the root rot of tobacco in various tobacco growing regions of the U.S.S.R. Agrobiologiia no.3:388-396 My-Je '62. (MIRA 15:10)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut tabaka i makhorki, Krasnodar.
(TOBACCO--ROOT ROT)

L 18257-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD

ACCESSION NR: AP3002125 S/0185/63/008/006/0694/0699

63
59

AUTHOR: Psar'ov V. I., Kostur M. L., Obstra A. V.

TITLE: On phase separation in alloys of Cd-Sb and In-Sb systems by centrifuging the melt.

SOURCE: Ukrains'kyy fizychnyy zhurnal, v. 8, no. 6, 1963, 694-699

TOPIC TAGS: phase separation, centrifuge separation, excess phase, liquid phase, alloy, melt, crystal growth, silver alloy, electrical conductivity, thermal electromotive force, thermal E.M.F., transport phenomena, mercury alloy, InSb, CdSb, centrifuge.

ABSTRACT: The authors suggested a method for separation of crystals of CdSb and InSb compounds from the liquid excess phase (Cd, In) by means of centrifuging the liquid melt. The composition of compounds and cooling conditions are given in a table. It was found that processes of crystal growth and separation of phases take place simultaneously as the melt is moving. The method was used for alloying CdSb crystals through alloys of Cd -- Sb and their subsequent separation from the excess component of the alloy, the alloyed Cd. The CdSb compound was alloyed with up to 1 to 1.5% of silver. This resulted in an increase in

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ACCESSION NR: AP3002125

electrical conductivity and decrease in thermal electromotive force. The CdSb compound was also alloyed with mercury, with no appreciable effect on either electrical conductivity or thermal electromotive force. The results are shown on Figs. 1 and 2 in enclosures 01 and 02, respectively. Orig. art. has: 4 figures and 1 table.

ASSOCIATION: Chernivets'ky*y Derzhuniversy*tet. (Chernivets State University)

SUBMITTED: 24 Nov 62 DATE ACQ: 12 Jul 63 ENCL: 02

SUB CODE: PH NO REF SOV: 005 OTHER: 001

Card 2/4

PSAR'OV, V.I.

Calculating the activation energy value of the carbide-coagulation process in steels [with summary in English]. Dop. AN URSR no. 4:386-389 '58. (MIRA 11:8)

1. Dnipropetrovs'kiy derzhavniy universitet. Predstaviv AN URSR V.M. Svechnikov [V.N.Svechnikov].
(Steel)
(Cementation(Metallurgy))

L 16370-65 EWT(m)/EWP(t)/EWP(b) IJP(c)/ESD(t)/AFWL/ASD(a)-5 JD
ACCESSION NR: AP4044172 S/0185/64/009/008/0900/0907

AUTHOR: Kostur, M. L. (Kostur, N. L.); Psarev, V. I. (Psarev, V. I.) B

TITLE: Solubility and effect on certain elements of the physical properties of InSb and CdSb

SOURCE: Ukrayins'ky*y fizy*chny*y zhurnal, v. 9, no. 8, 1964, 900-907

TOPIC TAGS: elements solubility, InSb alloy, CdSb alloy, semiconductor, emf lattice parameter

ABSTRACT: The solubilities of Ga, Hg, and Bi in InSb, and of Bi in CdSb have been investigated. The concentration of the admixture was determined by x-ray diffraction analysis from the changes of the lattice parameters. The solubilities of Ga up to 10.1 at.%, of Hg up to 6.2 at.%, and of Bi up to 0.26 at.% in the InSb crystals were found to depend on their dispersion. An expression was found for the change of the InSb lattice as a function of Ga content. Alloying of InSb with Ga and Hg produces a drop of thermal emf and an increase of the concentra-

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L 16370-65

ACCESSION NR: AP4044172

tion of holes which are the current carriers. Orig. art. has: 5 figures, 1 table

ASSOCIATION: Chernivets'ky*y derzhuniversy*tet(Chernovtsy State University)

SUBMITTED: 14Jun63 ENCL: 00

SUB CODE: MM, SS NO REF SOV: 003 OTHER: 003

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L 15750-65 EWI(m)/EWP(t)/EWP(b) IJP(c)/ESD(t)/ESD(gs)/AFWL/ASD(a)-5/ASD(f)-2/
ACCESSION NR: AP4042807 ASD(m)-3 JD S/0126/64/018/001/0047/0054

AUTHOR: Psarev, V. I.; Dobry*den', K. A.

TITLE: Phase transformations in Cd - Sb alloys

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 1, 1964, 47-54

TOPIC TAGS: phase transformations, Cd, Sb, crystallization, eutectic, stability, spheroidization, coalescence, equilibrium, metastability, isothermal holding, lattice distortion

ABSTRACT: Data available on the formation and transformation of metastable Cd_3Sb_2 compounds into the stable state are highly controversial. The authors investigated the conditions under which Cd-Sb alloys form, their structural state and the character of transformation. The formation of metastable phases is explained by the fact that insofar as supersaturation of CdSb crystals with Cd depends on their dispersity, the crystallization of the stable eutectic (CdSb plus Cd) or the dispersity of primary CdSb crystals under conditions of non-equilibrium leads to the dislocation of the composition towards a higher Sb contents. The Cd_3Sb_2 compound crystallizes from Cd - Sb melts in equilibrium. Specimens were

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L 15750-65
ACCESSION NR: AP4042807

submitted to metallographic examinations combined with thermographic and x-ray methods. The crystallographic structure of the particles was studied by electrolytic separation. After an 11-hour isothermal holding period at 290 C, the crystal lattice of impure CdSb was almost identical to that of the pure compound. In rapidly cooled specimens, the degree of lattice distortion was affected by the dispersity of particles. Subsequent heating led to the stabilization of the non-equilibrium lattice of CdSb particles. However, a complete restoration of the lattice equilibrium is achieved in the process of coalescence and spheroidization of the non-equilibrium particles. Rapid cooling from 400 to 410 C produces a three-phase structure, CdSb crystals having the highest microhardness followed by Cd_3Sb_2 crystals and the metastable eutectic. The result of tests designed to separate crystallization of the stable and the metastable eutectic confirm the assumption that the Cd_3Sb_2 phase forms in the melt of a compound that is changed and in a state of equilibrium. Orig. art. has: 6 figures.

ASSOCIATION: Chernovitskiy gosuniversitet (Chernovitsy State University)

SUBMITTED: 28Apr63 ENCL: 00

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L 15750-65
ACCESSION NR: AP4042807

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SUB CODE: MM NO REF SOV: 005 OTHER: 001

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USSR/Cultivated Plants - Commercial. Oil-Bearing. Sugar-Bearing. M

Abs Jour : Ref Zhur Biol., No 18, 1958, 82463

Author : Psareva, Ye.

Inst : All-Union Scientific Research Institute of Tobacco

Title : Differences in the Quality of Tobacco Seeds and Morphological Characteristics of the Plants.

Orig Pub : Byul. nauchno-tekhn. inform. Vses. n.-i. inst tabaka i makhorki, 1957, 3, 32-38

Abstract : In 1946-1948, heterogeneity of the biological properties of tobacco seeds was studied in relation to their position on the raceme. Tests were conducted under field conditions with the selected varieties Dynbek 44 and Tyk-Kulak 235. Results showed that the difference in the quality of the seeds explained by the position of the seed vessel on the raceme (in the center or on the

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periphery), shows itself both in the absolute weight of the seeds and in a number of variety characteristics: length of the vegetation period, yield and the form of the leaves. It does not depend on the difference in the period of blossoming and seed formation and is a biological characteristic of the tobacco. The farther the seed vessel is located from the center of the raceme, the stronger the deviation in the variety characteristics (in the undesirable direction) of the plants grown from them. In contrast to the principal phenotype, plants obtained from the periphery seeds are characterized by retarded maturing, lowered yield and a narrower and more elongated form of the leaves. These data confirm the need for using the "shaping" of the racemes, that is the removal of the side seed vessels. Leaving them on the plants lowers the uniformity of the variety plantings by creating forms deviating from the main mass of the plants

PSCHENICHKIN, P.A.

Paramag..otism of Mn-Cu alloys at temperatures higher than that of melting. Fiz. met. i metalloved. 14 no.3:378-382 S '62. (MIRA 15:9)

1. Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova.
(Manganese-copper alloys--Magnetic properties)
(Metals at high temperatures)

PSCHENICHNYY, I.P.; SHTEYGARDT, Yu.N.; MESHCHERYAKOV, A.V.; VASIL'YEV, V.N.; SOKOLOVA, E.F.; BROVKOVICH, E.D.; RUBANOVSKIY, B.R.; LUR'YE, R.G.; PARAKHONYUK, Z.M.; GOROKHOVSKIY, B.I.; ZHDANOV, V.S.; GORBUNOVA, Z.V. GLIKIN, M.I.; TAVAR'YAN, E.A.; SUKHODOLYA, Ye.I.

Abstracts. Kardiologiia 4 no.4:87-90 Jl-Ag '64. (MIRA 19:1)

Z/009/60/010/05/005/040
E112/E153

5.3600

AUTHORS: M. Repáš and J. Pschera

TITLE: Preparation of Anhydrous Ethylene Chlorhydrine

PERIODICAL: Chemický Průmysl, Vol 10, 1960, Nr 5, pp 238-240

ABSTRACT: The authors present a study of the laboratory preparation of anhydrous ethylene chlorhydrine from ethylene oxide and hydrochloric acid. They have adopted the preparation in the liquid phase and used ethylene chlorhydrine, the final reaction product as solvent, utilising the good solubility of HCl in that medium. They have studied the effect of temperature and concentration of reactants on the conversion of ethylene oxide and the formation of byproducts. For the study of temperature effects on yields, equimolar ratios of ethylene oxide and HCl were chosen. It was seen that a 92.5% conversion was obtained at 30 °C. At higher temperatures yields of ethylene chlorhydrine decreases rapidly while the formation of byproducts increases. Results of this series of experiments are summarized in graphs. Another series of experiments included the effect of varying proportions of reactants on yields. An excess of HCl suppresses the formation of byproducts, equilibrium being reached at

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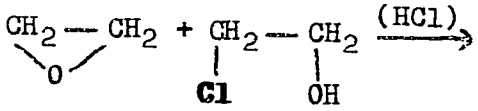
EC376

Z/009/60/010/05/005/040
E112/E153

Preparation of Anhydrous Ethylene Chlorhydrine

50% excess. An excess of ethylene oxide, on the other hand, enhances byproduct formation, according to equation



$$\longrightarrow \quad Cl - CH_2 - CH_2 - O - CH_2 - CH_2 - OH$$

The authors have also studied the effect of batch sizes on yields and the effect of refrigeration arrangements on the efficiency of conversion.

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There are 4 figures and 5 references, of which 2 are English, 1 French, 1 German and 1 Czech.

ASSOCIATION: Výzkumný ústav pre petrochémiu, Nováky
(Research Institute for Petrocarbon Chemistry, Nováky)

SUBMITTED: October 12, 1959

PSCHERA, Jiri

"Processes and equipment in the chemical industry" by Jaroslav Schneider and others. Reviewed by Jiri Pschera. Chem prum 13 no.9:487-488 S '63.

1. Vyzkumny ustav organickych syntez.

S/081/63/000/002/050/088
B171/B102

AUTHORS: Repás, Milan, Mistrík, Edmund Juraj, Pschera, Jiří

TITLE: Liquid- phase-method and plant for continuous preparation of ethylene chlorohydrin from ethylene oxide and hydrogen chloride

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 2, 1963, 401, abstract 2N23 (Czechosl. patent 100737, Aug. 15, 1961)

TEXT: A patent has been granted for the preparation of concentrated (95-100%) ethylene chlorohydrin (I). Ethylene oxide (II) and HCl are fed through perforated pipes or ceramic bubblers into a cylindrical reactor (RT), filled with a liquid which, although miscible with I and solvent of II and HCl, does not react with any of these substances. Raw materials are fed at the rate of 100-1000 l/hr per 1 l of RT capacity, at a temperature from -30 to 100°C (preferably ~70°C), using 1.005-1.01 mole of HCl to 1 mole of II. The incoming minute bubbles of II and HCl vigorously react to form I. The mixture, warmed by the heat of the reaction, is water-cooled in a thermo-siphon and returned into the RT. The

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Liquid- phase-method and plant ...

generated I is continuously discharged through a cooler at the rate of 175-1750 l/hr per liter of RT capacity, showing thus a yield of 90-100% with respect to II. For example, if 100 kg/hr of II and 51.2 m^3/hr of HCl are fed at 0-25°C into the lower part of the RT (having an inside diameter of 350 mm and a capacity of 100 l), 180 kg/hr of I are produced (yield of 99%). A flow sheet is given. [Abstracter's note: Complete translation.]

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PSCZOLOWSKI, T.

PSCZOLOWSKI, T. Radiophony in the Palace of Culture and Science.
p. 16, Vol. 6, no. 1, Jan. 1956
RADIOAMATOR. Warszawa, Poland

SOURCE: East European Accessions List (EEAL) Vol. 6 No. 4 April 1957

PSEHKOVA, V.M.; KHROMOV, S.I.; SHAKHPARONOV, M.I.

December Plenum of the Central Committee of the CPSU and the chemical science at Moscow university. Vest. Mosk. un. Ser. 2: Khim. 19 no.1:3-19 Ja-F '64. (MIRA 17:6)

ANASTASIU, St.; STOICA, Rodica; JELESCU, Eugenia; PSENESCHI, Valeria; BERCOVICI, Rodica

New aspects in the technology and control of alkyl phenol production. Rev chimie Min petr 15 no.2:71-75 F '64.