KOGAN, L.G.

New method for the construction of the current lines and current pipes of a fluid in the electric modeling of oil field development processes. Nauch.-tekh.sbor.po dob. nefti. no.14: 64-69 '61. (MIRA 17:6)

KOGAN, L.G.

Determination of isobaric and flow line curvatures at the boundary line of two media based on electric modeling. Nauch.-tekh. sbor. po dob. nefti no.16:66-70 '62. (MIRA 15:9)

1. Vsesoyuznyy neftegazovyy nauchno-issledovatel'skiy institut.
(Oil reservoir engineering)

KOGAN, L.G.; MAKSIMOV, M.I.

Development of nonuniform-permeability fields with variation in reservoir structure. Nauch.-tekh. sbor. po dob. nefti no.17: 38-45 '62. (MIRA 17:8)

1. Vsesoyuznyy neftegazovyy nauchno-issledovatel'skiy institut.

KOGAN, L.G.

Determining the displacement time and forms of water-oil contact in the simultaneous operation of several straight-line wells. Trudy VNII no.37:52-69 '62. (MIRA 16:6)

(Oil field flooding)

KOGAN, L.G.

Time of water inrush to a straight-line of wells. Nauch.-tekh. sbor. po dob. nefti no.19:20-25 '63. (MIRA 17:8)

1. Vsesoyuznyy neftegazovyy nauchno-issledovatel'skiy institut.

KOGAN, L.G.

Construoting on the basis of electric-model data the current lines and current pipes in a reservoir consisting of several uniform sections possessing various parameters. Nauch.-tekh. sbor. po dob. nefti. no.20:36-41 '63. (MIRA 17:6)

KOGAN, L.G.; KARPOV, V.P.

Effect of the relationship between the viscosities of the displaced and displacing fluids on the conformance factor in a pattern system of oil-field development. Nauch.-tekh. sbor. po dob. nefti no.21:48-50 '63.

(MIRA 17:5)

1. Vsesoyuznyy neftegazovyy nauchno-issledovatel'skiy institut.

KOGAN, L.G.; KARPOV, V.P.

Electric modeling of propane drive with subsequent injection of dry gas for a nine-point system of well spacing. Trudy VNII no.40:167-181 '63 (MIRA 17:7)

Effect of the nonuniformity of reservoir structure with respect to permeability on the conformance factor and other parameters of development. Ibid.:182-191

KOGAN, L.G.; BAISHEV, B.T.; VOLODINA, V.I.

Effect of the position of nonpermeable reservoir boundaries on indices of the reservoir development. Trudy VNII no.40:257-270 '63. (MIRA 17:7)

KOGAN, L.G.

Calculating the resistances of electric models of nonuniform media. Nauch.-tekh. sbor. po dob. nefti no.22:36-40 '64. (MIRA 17:9)

1. Vsesoyuznyy neftogazovyy nauchno-issledovatel'skiy institut.

KOGAN, L.G., ANDREYEVA, A.P.

Electric modeling of the development of a bed consisting of bands of varying permeability. Nauch.-tekh. sbor. po dob. nefti no.24: 95-105 '64. (MIRA 17:10)

1. Vsesoyuznyy neftegazovyy nauchno-issledovatel'skiy institut.

ANDREYEVA, A.P.; KOGAN, L.G.; KARPOV, V.P.

Determining on electric models the effect of the withdrawal of oil through observation wells with the injection of liquefied gases. Nauch.-tekh. sbor. po dob. nefti no.25:93-96 '64.

(MIRA 17:12)

1. Vsesoyuznyy neftegazovyy nauchno-issledovatel'skiy institut.

KOGAN, L.G.

Modeling some problems of the pattern flooding of fluids with gases on ohmic-resistance networks. Trudy VNII no.42:181-197 '65. (MIRA 18:5)

DIKIS, M.Ya., kandidat tekhnicheskikh nauk, dotsent; KOGAN, L.I., inzhener, redaktor; LEUTA, V.I., inzhener, redaktor; RUDENSKIY, Ya.V., tekhnicheskiy redaktor

[Automatic machines for hermetically sealing canned goods] Mashiny-avtomaty dlia germetizatsii konservnoi tary. Kiev, Gos.nauchno-tekhn.izd-vo mashinostroit. lit-ry, 1955 205 p. (MIRA 9:2)
(Canning and preserving--Apparatus and supplies)

ACCESSION NR: AT4041656 S/2604/64/000/051/0043/0048

AUTHOR: Kogan, L. I.

TITLE: Method and apparatus for recording refracted waves during the continuous movement of a seismic exploration vessel

SOURCE: Moscow. Vsesoyuzny*y nauchno-issledovatel'skiy institut geofizicheskikh metodov razvedki. Razvedochnaya i promy*slovaya geofizika, no. 51, 1964, 43-48

TOPIC TAGS: seismic wave, seismic exploration, seismic refracted wave, seismic filtering, seismograph, marine seismography, piezoelectric detector

ABSTRACT: Methods and apparatus are already available for recording reflected seismic waves during the continuous movement of a seismic exploration vessel. Since 1958, the NIMGE VNIIgeofiziki has been seeking a method of using the refracted waves under similar conditions. This article describes the method and apparatus now developed for this purpose. Emphasis is on a description of the string of piezoelectric detectors towed behind the vessel (shown in Fig. 1 of the Enclosure). It was necessary to attain a high absolute sensitivity of the piezoelectric channel; this was accomplished by using 20 titanium-barium pressure detectors having an absolute sensitivity of 3.8-4.0 μ v/bar. This made a high sensitivity increase possible and made it possible to match the piezoelectric channel with the input of

Card 1/4

ACCESSION NR: AT4041656

the seismic station amplifier; this is very important when recording low-frequency refracted waves. The changes in specifications for the filters of the SS-26-51-D seismic station are described in detail; the maxima of the frequency characteristics of the amplifier filters were shifted into the region of low frequencies. Various components of the modified seismic station are described, and the method for shooting profiles at sea by the refracted waves method is discussed. When the rate of movement of the seismic exploration vessel is 4-5 km/hour the explosions are set off at a rate of 6 or 7 an hour. When recording is done at short distances the charges used weigh up to 50 kg and the explosions are set off at the rate of 10-12 an hour. Ways in which the productivity of such exploration work at sea can be increased are suggested. "The following persons participated in the development and adoption of the new method for recording refracted waves during the movement of a seismic exploration vessel: A. A. Gagel'gants, S. P. Vartanov, V. Z. Zonov, B. A. Bondarenko, V. V. Bokun, P. M. Zakharov and G. S. Zolotarev". Orig. art. has: 2 formulas, 4 figures and 1 table.

ASSOCIATION: (All-Union Scientific Research Institute of Geophysical Methods of Exploration) Vsesoyuznyky nauchno-issledovatel'skiy institut geofizicheskikh metodov razvedki, Moscow

Card 2/4

...tance from the... ...converted ...

KOGAN, L.I.; NEYMARK, V.Ye., kand.fiz.-mat.nauk; PILETSKAYA, I.B.; ENTIN, R.I., kand.tekhn.nauk

Effect of certain small addition elements on steel crystallization and recrystallization processes. Probl.metalloved.i fiz. met. no.[1]:225-274 '49. (MIRA 11:4)

1.Laboratoriya fazovykh prevrashcheniy i Laboratoriya kristallizatsii TSentral'nogo nauchno-issledovatel'skogo instituta chernoy metallurgii.
(Steel alloys--Metallography)
(Solidification)

CA

2

Kinetics of recrystallization of alloyed iron. L. I. Kogan and R. I. Entin. *Zhur. Tekh. Fiz.* 20, 620-32 (1950).—By x-ray patterns, the temp. of beginning recrystn. of Armco iron cold-rolled by 60-65%, and annealed for 10-20 min., is 580°. Under the same conditions, the same iron with 2% Ni has a recrystn. temp. of 510°, with 0.1% C or 2% Si or 1% Mn, 560°, with 2% Co 575°, with 2% Cr 600°, with 1.5% W 655°, and with 2% Mo 650°. On annealing at 570-5°, Armco iron, unalloyed or alloyed with Ni, Mn, or Si, begins to recrystallize after 1-3 min., with 2% Co after 8-10 min., and with 2% Cr after 2-3 hrs.; with 1.5% W or 2% Mo, recrystn., even at 600-10°, begins only after 3-4 hrs. If the log of the length of time elapsing until the beginning of the recrystn. is plotted against $1/T$, the plot is a straight line in all cases, and permits calcn. of an activation energy E for the rate of recrystn.; for unalloyed Armco iron, E = 46-56, with 2% Ni 50-70, with 0.1% C 75-85, with 1% Mn 80-90, with 1.5% W 85-95, with 2% Mo, Cr, or Co, 100-105, with 2% Si 110-120 kcal./g. atom. The value of E for iron is fairly close to the activation energy of self-diffusion. The activation energies for recrystn. of Cu and for its self-diffusion, calcd. from literature data, are equally very close. If the amts. of the alloying elements added to iron are expressed in at. %, their effects on the rate of recrystn. are found to increase in the order Cr, Co, Mo, W. N. Thon

CA

Effect of alloying elements on the kinetics of the γ-α
transition in iron. L. I. Kagan and P. I. Katin. Zhur.
Tekh. Fiz. 30, 663-69(1960); cf. C.A. 44, 8751h.—The
rates of the isothermal γ → α transition, at temps. below
the A_m temp., were detd. below the Curie point of α (768°).
by the angle of rotation of cylindrical 3.5 × 30 mm. samples
in a magnetic field; this method permitted detection of as
little as 0.5% of α-phase. Above 768°, the amt. of α formed
could, in some cases, be estd. from micrographs of quenched
samples, by the amt. of the acicular martensitic structure.
With tech. iron (C 0.04, Mn 0.25, Ni traces, A_m = 910°),
the rate of conversion increases with falling temp. At 720°,
conversion begins only after 8-9, and the half-conversion

time τ_{50} = 14 sec.), the conversion is not yet completed in
30 sec. At 680-70°, the time necessary for the conversion
to begin is comparable with the time necessary for the
sample to acquire the temp. of the bath, i.e. the conversion
is no more strictly isothermal. Plots of the time τ necessary
to attain a stated degree of conversion (5, 25, 50% of α-
phase) as a function of the temp., for an alloy Fe + 5%
Cr (A_m = 880°), show a max. of the rate of conversion at
720°. At 780°, conversion begins after 1 min., and is not
completed before 1 hr.; at 800°, completion is not yet at-
tained in 4 hrs. The conversion isotherms at 300 and 400°
are martensitic in character, i.e. involve no incubation
period, and the conversion is completed rapidly. At 500
and 600°, conversion is rapid up to about 50%, then it is

slowed down. Fe + 7% Cr (A_m = [illegible]°) shows max. rate of
conversion at 730-40°; at 620, 600, and 500°, conversion
is rapid only up to a point (e.g., 40-45% at 600°), then be-
comes very slow; at 300 and 400°, the kinetic curves are
martensite-like. Fe + 8.5% Cr (A_m = 808°) shows max.
rate of conversion at 670-700°. Kinetic curves in the range
700-620° are normal. At 600 and 500°, the conversion is
very slow; at 600°, it begins only after 3 min., and 25%
conversion takes 40 min.; at 535°, conversion begins after
3 hrs. The kinetic curves at 375, 400, and 415°, are mar-
tensite-like; the degrees of conversion attained at 415,
400, 375, and 300°, are, resp., 9, 30, 48, and 100%. The
velocity of the γ → α conversion in Fe + 2.2% Ni (A_m =
770°) at 600° and above is considerably lower than in Fe,
and about the same as in Fe in the range 600-500°; at
680°, in 30 sec., the conversion in the alloy is 28%, as
against 97% in Fe. In Fe + 1.4% W, in the range 715-
480°, the conversion is slower than in Fe, despite the higher
A_m = 955°; at 480-500°, only 80% are converted in 11 sec.;
the incubation periods at 670 and 715° are, resp., 15 and 30
sec., as against 5 and 10 sec., resp., in Fe. In Fe + Cu,
2, 5, and 50% (A_m = 895, 885, and 970°, resp.) the rate of
conversion is increased as compared with Fe; at 730°, in
5 sec., the conversion attains 27, 87, and ~87%, whereas
no conversion is noticeable as yet in Fe. In Fe + 0.9% Mo,
the rate of conversion is about the same as in Fe. Fe + 1%
Cr + 3.3% Ni shows max. rate at about 650°; the curves
at 300 and 400° are martensite-like. Whereas addn. of Ni
alone lowers the rate of conversion considerably at 680° but
hardly at all at 620°, simultaneous presence of Ni and Cr
results in low rate both at 680 and at 620°. Fe + 1.2% Cr

over

CA

/

Kinetics of the polymorphic transformation in alloyed No. 6
iron. L. I. Kogan and R. I. Entin. *Doklady Akad.*
Nauk S.S.S.R. 73, 1173-6(1950); cf. *C.A.* 44, 8751h.—An
exptl. study was made of the subcrit. gamma to alpha trans-
formation of Fe alloys contg. about 0.04% C and more
than 5% total alloying elements. The alloys contained
Cr; Cr and Ni; Cr, Ni, and Mo; and Cr and Co. In Fe-
Cr-Ni alloys the temp. dependence of the transformation is
controlled by the work of nucleus formation, which is in
creased by Ni, and by the activation energy of the trans
formation process, which is increased by Cr. Data were ob-
tained by photographically recording magnetometer read-
ings. The addn. of 2.5% Ni to an 8.5% Cr alloy increased
the time for 5% isothermal transformation at the knee from
1 to 20 min. The time for half reaction at 600° is 7-10 sec.
in Fe; in a 2.5 Ni alloy, 14-15 sec.; in a 7 Cr alloy, 35-40
sec.; in a 7 Cr, 2 Ni alloy, 10 min. Effects of alloys are not
additive. The temp. of the crit. point does not greatly af-
fect the transformation rate. The addn. of 5% Co to the
8% Cr alloy also increases the time for 5% transformation at
the knee. Addns. to Fe of Cr, Cr-Mo, and Cr-Co increase
the stability of the gamma phase at temps. below the knee,
and hence increase the activation energy of transformation.
Addns. to Fe of Cr-Ni increase both the activation energy
and the work of nucleus formation. A. G. Guy

1957

KOGAN, L.I.; ENTIN, R.I., kand. tekhn. nauk.

Kinetics of polymorphous transformations of alloyed iron. Probl. metalloved. i fiz. met. no.2:204-215 '51. (MIRA 11:4)
(Iron alloys--Metallography) (Polymorphism)

KOGAN, L.I.; ENTIN, R.I., kand. tekhn. nauk.

Kinetics of the recrystallization of alloyed iron. Probl. metalloved. i fiz. met. no.2:216-221 '51. (MIRA 11:4)
(Iron alloys--Metallography) (Solidification)

3

Effect [illegible]

[illegible] of ammonia [illegible]

the induction period for the decom[illegible]

KOGAN, L. I.

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

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6618

Author : Kogan, L.I., Entin, P.I.

Title : Effect of Elements that Form Difficulty-Soluble Carbides on the Decomposition of Austenite.

Orig Pub : Probl. metalloved. i fiz. metallov. sb. 4, 1955, 251-286

Abstract : When hardening from ordinary heat treating temperatures (900 -- 1000°), the presence of such strongly-carbide-forming elements as Ti, V, Zr, Nb, and Ta reduces the hardenability of the carbon steel, owing to the formation of quite stable carbides by these elements. A partial transformation of these carbides into austenite when heating to 900 -- 1000° can be accomplished by alloying the steel with manganese (1.5 -- 2.5%). In this case, addition of titanium to manganese steel increases considerably the stability of the austenite in the pearlite and intermediate regions. Alloying with titanium also leads to a sharp isolation of the pearlite and middle

Card : 1/2

KOGAN, L. I.

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

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6617

Author : Tsivinskiy, S.V.; Kogan, L.I.; Entin, R.I.

Title : Radioactive Tracer Investigation of the Distribution of Chromium and Tungsten During the Process of Austenite Decay

Orig Pub : Probl. metalloved. i fiz. metallov, sb. 4, 1955, 277-295

Abstract : The method of radioactive isotopes was used to determine the contents of Cr and W in the carbide phase in steels with 1.18% C and 2.42% Cr and with 1.02% C and 0.78% W respectively in the process of transformation of austenite at the temperatures of the pearlite and intermediate regions. In the Process of decomposition in the pearlite region, the contents of the alloying elements in the carbides exceed their contents in steel by a factor of 3 -- 5 times. The results obtained prove that the decomposition of the austenite in the pearlite region is connected with the need for diffusion redistribution of the tungsten. It is shown that rate of secondary diffusion

Card : 1/2

81510

18.7500

SOV/137-59-5-10755

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 5, p 184 (USSR)

AUTHORS: Kogan, L.I., Entin, R.I.

TITLE: On the Theory of Intermediate Austenite Transformation 18

PERIODICAL: V sb.: Materialy Nauchno-tekhn. konferentsii po probl. zakalki v goryachikh sredakh i promezhutochn. prevrashcheniyu austenita, Nr 1, Yaroslavl', 1957, pp 3 - 28

ABSTRACT: Information is given on results of investigations into peculiarities of intermediate transformation of austenite and on the nature of phase formation. It is noted that intermediate transformation is connected with a redistribution of C and $\gamma \rightarrow \alpha$ martensite transformation. Redistribution of C in the austenite precedes the $\gamma \rightarrow \alpha$ transformation. The higher the temperature of intermediate transformation, the sharper are the changes in the period of the residual austenite lattice, i.e., the higher is the degree of diffusion redistribution of C in the austenite. Relief formation is a characteristic feature of intermediate transformation. The maximum temperature of the intermediate transformation in the given

Card 1/2

AUTHORS: Kogan, L.I. and Entin, R.I. 126-2-24/30

TITLE: Redistribution of carbon during transformation of austenite in the medium range. (Pereraspredeleniye ugleroda pri prevrashchenii austenita v sredney oblasti).

PERIODICAL: "Fizika Metallov i Metallovedeniye" (Physics of Metals and Metallurgy), Vol.IV, No.2, 1957, pp.360-368 (USSR).

ABSTRACT: Recent experimental data enable to characterise as follows individual elementary processes which bring about austenite transformation in the medium range of temperatures: the austenite transformation takes place without any appreciable redistribution of the alloying elements; this follows from numerous results of analysis of the structure and composition of the carbide phase which indicate that, apart from the dependence on the structure of the equilibrium carbide phase, cementite forms in the medium temperature range, the content in alloying elements of which corresponds approximately to their average content in the steel (6 to 8). Measurement of the period of the crystal lattice of the austenite indicates that transformation in the medium temperature range is linked with redistribution of the carbon (9 to 11); intermediate transformation can be linked with enrichment as well as with impoverishment in carbon of the residual austenite. Austenite transformation in the medium temperature

Card 1/7

Redistribution of carbon during transformation of austenite in the medium range. (Cont.) 126-2-24/30

range is accompanied by the formation of a characteristic relief on the polished surface of the cut and this indicates a regular character of the displacements of the atoms at the phase boundary and a coherence of the phases (11-13). Formation of a relief during the transformation is characteristic both for alloy and for carbon steels (11). It was also shown by Kogan(16) that even in practically carbon free iron alloys alloyed with various elements, the γ to α transformation at temperatures below 500 - 400 C can take place only as martensitic transformations. All these data indicate that austenite transformation in the medium temperature range represents a martensite mechanism of γ to α transformation and therefore austenite transformation in the medium temperature range has to be interpreted as a combination of the processes of diffusion redistribution of carbon in the austenite and of a martensitic γ to α transformation in sections of the austenite with reduced carbon concentrations. In this paper experimental results are given on the character of the process of carbon redistribution as a function of the steel composition (content of C and of alloying elements) and also the results obtained

Card 2/7

Redistribution of carbon during transformation of austenite in the medium range. (Cont.) 126-2-24/30

[illegible] of the changes in the carbon concentration in the austenite as a function of the temperature and duration of transformation of the austenite in the medium temperature range. The lattice period of the austenite after its partial transformation in the medium temperature range was measured for a number of steels, the chemical compositions of which (for 12 steels) are entered in Table 1, p.361. In para.1 the change of the average period of the austenite lattice as a function of transformations in the medium temperature range is studied on steel specimens with an approximately equal chromium content (3.45, 3.15 and 3.54%) but differing carbon contents (1.44, 0.98 and 0.54%). In para.2 the same relations are studied for the steels 118Г3 (1.18% C, 3.58% Mn) and 48Г4 (0.48% C, 4.33% Mn). In para.3 the same relation was studied on the steels 30Ю2 (0.3% C and 2.9% Al) and 79Ю2 (0.79% C and 2.86% Al). In para.4 the changes in the lattice period of the residual austenite are compared for partial transformations in the medium temperature range for steels with approximately equal carbon contents. The authors arrive at the following conclusions: in the case of alloying with Cr, Mn and Ni the

Card 3/7

Redistribution of carbon during transformation of austenite in the medium range. (Cont.) 126-2-24/30

degree of carbon enrichment of the residual austenite as a result of the austenite transformation in the medium temperature range depends fundamentally on the carbon content of the steel. The degree of change of the concentration of carbon in the austenite (for increasing as well as decreasing C contents) will be the higher, the higher the transformation temperature in the medium range. For steels for which carbon enrichment of the residual austenite is a characteristic feature, the curves of the changes of the lattice period of the residual austenite as a function of the transformation time in the medium temperature range and the curves representing the kinetics of transformation are similar. For steels for which a decrease in the carbon content of the austenite is characteristic,the sharpest change (decrease) of the lattice period is observed before the α phase begins to separate out, i.e., in the initial stages of transformation. This is obvious from the X-ray exposures taken directly at the transformation temperatures.

Card 4/7 The austenite transformation in the medium temperature range is characterised by a redistribution of the carbon in the austenite and subsequent martensitic transformation in these

Redistribution of carbon during transformation of austenite in the medium range. (Cont.) 126-2-24/30

austenite sections which have a reduced carbon concentration. For temperatures corresponding to the medium temperature range the formation of nonuniformities as regards the carbon concentration in the austenite is advantageous from the thermodynamic point of view since it brings about a reduction of the free energy of the system. The direction of the process of redistribution of carbon in the austenite at temperatures of the medium temperature range is determined by kinetic factors. In steels containing 0.3 to 0.6% C, movement of the carbon into the remaining part of the austenite may prove kinetically more advantageous than the formation of cementite, which requires a carbon concentration increase to 6.7% and, consequently, it requires diffusion from distant spots. In steels containing 0.7 to 1% C, in which no changes of the average lattice period of the residual austenite are observed during transformation in the medium temperature range, removal of carbon from the sections with reduced concentration into the remaining part of the austenite and separation of cementite is equally likely. Interaction between the atoms of Fe, C and of the alloying elements can change appreciably the

Card 5/7

Redistribution of carbon during transformation of austenite in the medium range. (Cont.) 126-2-24/30

degree of the redistribution of C in the austenite; for instance, alloying with Si leads to a very considerable carbon enrichment of the residual austenite. Even in high carbon steel which is alloyed with Si, transformation of the austenite in the medium temperature range involves an increase in the carbon content in the residual austenite by 0.5 to 0.6%. Thereby, the specific influence of Si is explained by the inhibition of the processes of carbide formation. The higher the transformation temperature in the medium temperature range, the more will the carbon content be lowered in those austenite sections which are subsequently subjected to martensitic transformation. This conclusion is confirmed by the dependence of the degree of the change of the carbon concentration in the austenite on the transformation temperature (for an equal degree of transformation). Self braking of the reaction in the medium range is not linked with a redistribution of the carbon and is obviously the result of the martensitic mechanism of γ to α transformations. The influence of alloying elements on the kinetics of transformation of the austenite in the medium

Card 6/7

Kogan, L.I.

AUTHORS: Kogan, L. I., and Entin, R. I. 126-2-20/35

TITLE: On secondary hardening of structural steels. (O vtorichnoy zakalke konstruktsionnykh staley).

PERIODICAL: Fizika Metallov i Metallovedeniye, 1957, Vol.5, No.2, pp. 349-354 (USSR)

ABSTRACT: The causes are investigated of secondary hardening of structural steels in conjunction with experimental investigation of the changes of the crystal lattice period of residual austenite. In some structural and tool steels tempering at 500 to 600°C brings about a secondary hardening, i.e., transformation of residual austenite into martensite during subsequent cooling. Secondary hardening in structural steels was observed during tempering only if the hardening was effected under conditions ensuring partial transformation of austenite in the medium temperature range. Investigation of the secondary hardening was effected on the two steels 34XГC2 and 73XH3, the compositions of which are as follows: 0.34% C, 2.5% Si, 1.08% Mn, 1.89% Cr and 0.73% C, 0.3% Si, 0.78% Mn, 0.7% Cr, 3.48% Ni respectively. The heat treatment of chromated specimens of 3 x 5 x 25 mm was effected in an "anizometer"; the

Card 1/4

On secondary hardening of structural steels. 126-2-20/35

specimens were heated in the furnace to 1000 and 900°C respectively for six minutes and then transferred into a tin bath which was heated to 300-400°C and finally quenched in oil. Following that, one of two specimens was heated in the oil bath of the anisometer to 500-550°C and then cooled to 280°C inside the bath with the heater switched off and finally transferred to an oil bath of the same temperature in which it was cooled to room temperature. Due to such slow cooling below the martensitic point, a maximum quantity of residual austenite remained in the specimen which facilitated measuring the period of the crystal lattice. During the process of cooling, the deflection of the light beam of the anisometer was recorded and from the obtained data the cooling curves were plotted which were compared with the cooling curves obtained for a specimen of the same steel containing 100% of the magnetic phase. A bend in the cooling curve was taken as an indication of the existence of a secondary hardening. After the heat treatment the specimens were etched and investigated by means of the X-ray ionization instrument УРС-50-И at room temperature. The period of the austenite lattice

Card 2/4

was measured before and after tempering on the line (200); the absolute error amounted to 0.0026 kX. The experimental results are entered in tables and graphs. It was found that secondary hardening is linked with a reduction of the carbon content and possibly also of alloying elements in the residual austenite during tempering at 500 to 550°C. A qualitative correspondence was observed between the degree of drop of the carbon concentration in the residual austenite and the intensity of secondary hardening. In structural steels a preliminary condition of secondary hardening during tempering is the occurrence of partial transformation of austenite in the intermediate range during hardening. Such hardening leads to a considerable increase in the carbon concentration of the residual austenite and, therefore, during subsequent tempering at 500 to 550°C a carbide phase may separate out from the residual austenite which will result in a reduction of the lattice period of the residual austenite. In the case of steels with a higher carbon content intermediate transformation during hardening is not a necessary condition for the separation of a carbide phase during tempering at 500 to 550°C. It is possible that relaxation processes taking place during tempering play

On secondary hardening of structural steels. 126-2-20/35

an important role in secondary hardening.
There are 5 figures, 3 tables and 2 Slavic references.

SUBMITTED: July 24, 1956.

ASSOCIATION: Institute of Metal Technology and Metal Physics TsNIIChM.
(Institut Metallovedeniya i Fiziki Metallov TsNIIChM).

AVAILABLE: Library of Congress.

Card 4/4

KOGAN, L.I., Cand Tech Sci--(diss) "On the intermediate transformation of austenite." Mos, 1958. 16 pp (Min of Higher Education USSR. Mos Order of Labor Red Banner Inst of Steel im I.V. Stalin), 120 copies (KL,22-58,108)

-88-

KOGAN, L.I.

129-58-5-16/17

Scientific-Technical Conference on Hardening in Hot Media and Intermediate Transformation of Austenite (Yaroslavl') - 1958

by high temperature tempering;
13) A full and even a partial decomposition of the austenite in the upper region of the intermediate range causes appearance of a particular variant of irreversible temper brittleness which is characterised by a trans-crystalline fracture.

Doctor of Technical Sciences R. I. Entin and L. I. Kogan in their paper "On the Theory of Intermediate Transformation of Austenite" communicated experimental data on the elementary reactions, structure and composition of transformation products of austenite in the medium range. They pointed out that transformation in this range is not due to redistribution of the alloying elements in the austenite but to diffusional redistribution of carbon in the austenite. Depending on the composition of the steel and the transformation temperature, an increase or a decrease of the carbon concentration in the residual austenite may take place, which is due to separating out of carbides. In some cases (for instance in nickel steels) the process of carbon enrichment of the residual austenite at a later stage of the transformation is followed by a

Card 4/29

SOV/137-58-8-17683

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 8, p 212 (USSR)

AUTHORS: Kogan, L. I., Entin, R. I.

TITLE: Transformation of Austenite in the Central Region (Prevrashcheniye austenita v sredney oblasti)

PERIODICAL: Sb. tr. In-t metalloved. i fiz. metallov Tsentr. n. i. in-ta chernoy metallurgii, 1958, Vol 5, pp 161-209

ABSTRACT: A survey of works dealing with the process of austenite (A) transformation in the intermediate region. The authors present the results of experimental investigations of processes of redistribution of C, the effect of partial intermediate transformation of A (ITA) on the kinetics of transformation during subsequent cooling, as well as the results of investigations dealing with changes in C concentration in the α phase during ITA. The investigations were performed on experimental smeltings of Mn, Cr, Si, Ni, V, Cr-Ni, Cr-Si-Mn, and carbon steels, as well as on steels alloyed with Al. It is shown that ITA is connected with a redistribution of C and with the martensite $\gamma \rightarrow \alpha$ transformation. By means of direct measurements of the period of the crystal lattice of the austenite A

Card 1/3

Results of investigations conducted at Inst. of Physical Metallurgy, Cent. Sci Res Inst of Ferrous Metallurgy

SOV/137-58-8-17683

Transformation of Austenite in the Central Region

during the process of transformation, it was established that the redistribution of C in A precedes the process of the $\gamma \to \alpha$ transformation. The appearance of A zones with decreased C concentration makes it possible for martensite transformation process to occur at temperatures $>M_n$; A zones with increased C concentrations may precipitate cementite. Alloying of steel with Si significantly increases the C content in residual A. The formation of a relief in the course of ITA is an indication of martensitic character of the $\gamma \to \alpha$ transformation. The fact that certain steels exhibit a protracted incubation period and the possibility of suppressing the process of ITA during rapid cooling indicate that both these factors are connected with processes of diffusional preparation and redistribution of C in A. The effect of alloying elements on the kinetics of the ITA is determined by the manner in which they affect the diffusion rate and the diffusion length of C. The isolation of the intermediate region on the diagram of A transformation is determined by a delay in the processes of formation of carbides and polymorphous $\gamma \to \alpha$ transformation in the pearlite region, whenever steel is alloyed with such elements as Cr, Cr and Ni, Mo, W, etc. As the temperature is reduced, the rates of diffusion of the alloying elements and of selfdiffusion of Fe in the A become very small and, under these conditions, the process of transformation consists in diffusional

Card 2/3

SOV/137-58-8-17683

Transformation of Austenite in the Central Region

redistribution of C only in conjunction with martensite $\gamma \rightarrow \alpha$ transformation in regions of A with reduced C concentration. The formation of relief and a change in the period of the lattice of the retained A, at the temperatures of upper and lower regions of the ITA, justify the assumption that the mechanism of transformation in the various regions is, basically, identical.

M. Sh.

1. Austenite--Transformations 2. Carbon--Diffusion 3. Austenite--Structural analysis

Card 3/3

AUTHORS: L.I. Kogan and R.I. Entin SOV/24-58-6-3/35

TITLE: On the Mechanism of the Isothermal Transformation of Austenite in the Intermediate Temperature Range (O mekhanizme promezhutochnogo prevrashcheniya austenita)

PERIODICAL: Izvestiya akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, 1958, Nr 6, pp 12-18 (USSR)

ABSTRACT: The authors review the results of recent investigations into those transformations of austenite which result in the formation of bainite. They reject Cottrel's findings (Ref 6) that martensite is not formed during these reactions, and conclude that the bainite transformation proceeds in two stages; diffusion and redistribution of the carbon content occur during the first stage, followed by a martensitic $\gamma - \alpha$ transformation. This hypothesis had been advanced by the authors in an earlier paper (Ref 3) describing the results of an investigation of the isothermal transformation in steels whose composition and code numbers are given in Table 1. Some results of that research are reproduced in Figs 1 to 4, in the form of graphs showing the kinetics of the transformation (the time

Card 1/7

On the Mechanism of the Isothermal Transformation of Austenite in the Intermediate Temperature Range SOV/24-58-6-3/35

dependence of the proportion of decomposed austenite) and the corresponding variation of the lattice parameter. However, no general laws could be formulated on the basis of the previously obtained data, and the present work was intended to verify the hypothesis that carbon redistribution did in fact precede martensitic transformation. This confirmation was to be achieved by measurement of the carbon content of the resultant α or ferrite phase, which should, in accordance with the theory, have a carbon content lower than the average of the investigated steel. In order to avoid confusion due to the possible decomposition of the α phase during the isothermal transformation, it was necessary to select steels in which complete transformation occurred in the intermediate temperature range, and in which martensite did not decompose below 400-450°C. Consequently, steels 2[illegible]82G3N2F and 2382G3Kh2N2F composition which were thought to possess these characteristics were used in the present investigation. The compositions of these steels were respectively:

Card 2/7

SOV/24-58-6-3/35

On the Mechanism of the Isothermal Transformation of Austenite in the Intermediate Temperature Range

0.24% C, 2.10% Si, 2.94% Mn, 1.85% Ni, 1.64% V; 0.23% C, 2.07% Si, 2.96% Mn, 1.83% Cr, 1.85% Ni, 1.54% V. The experimental specimens were investigated by hardness measurements, and by magnetometric and X-ray diffraction techniques. Samples of forged material were chromium plated after vacuum homogenisation. They were then heated in argon to 1150°C, held at this temperature for 4 to 6 minutes and then transferred to the isothermal transformation bath which was maintained at temperatures ranging from 150 to 350 C for a period long enough to ensure the maximum possible transformation at the given temperature. The specimens were then quenched to room temperature in a 10% solution of caustic soda. The magnetometric measurements showed that the austenite did not transform isothermally at temperatures higher than 400°C. The T.T.T. curves for the two investigated steels are shown on Figs 5a and 6a. As can be seen from the graphs reproduced on Figs 5b and 6b, the proportion of the decomposed austenite at 350, 300 and 250°C was 5, 70 and 80%

Card 3/7

On the Mechanism of the Isothermal Transformation of Austenite in the Intermediate Temperature Range

respectively. The carbon content of the α phase was determined by an X-ray method developed by G.V. Kurdyumov et alii, E.Z. Kaminskiy and T.I. Stelletskaya (Refs 8, 12,13), which involved measurement of the width of the line diffracted from the 211 planes. The variation of the width ω (in 10^{-3} radians) and of Rockwell hardness number (R_c) of the studied steels, quenched and tempered for 1 hr at 200 to 650°C, is entered in Table 2. The proportion of the transformed austenite (%), hardness (R_c), the width of the (211) lines, and the estimated carbon content of the α phase of steel specimens tempered for 30 minutes at various temperatures are given in Table 3. The data reproduced in Table 2 indicated that decomposition of the martensite did not occur when the quenched specimens were tempered for one hour at temperatures up to 500°C. Above this temperature a decrease of hardness accompanied a decrease in width of the (211) diffraction lines of the α phase. These findings confirmed the suitability of the selected steels for the purposes of the present investigation, because they showed that no decomposition of the

SOV/24-58-6-3/35

On the Mechanism of the Isothermal Transformation of Austenite in the Intermediate Temperature Range

α phase would occur during isothermal transformation experiments all of which were carried at temperatures below 350°C (Table 3). A direct determination of the carbon content of the α phase in the course of the transformation thus became possible. The mean width of the (211) diffraction line, determined planimetrically, was found to decrease from 35.10^{-3} radians in the quenched specimens to 27.10^{-3} radians after isothermal transformation. These widths were related to the carbon content by a series of corresponding line-width determinations made on the martensite of steels containing the same proportions of the alloying elements as the investigated steels, and having carbon contents ranging from 0.05 to 0.20% (Fig 7). It was found that the carbon content of the α phase formed during isothermal transformation varied between 0.15 and 0.16%. The average carbon content of the studied steels was 0.23 to 0.24%. This decrease of 30% in the carbon content was considered to be highly significant in view of a maximum possible experimental error of only 4%. These findings were accepted as confirmation of

Card 5/7

SOV/24-58-6-3/35

On the Mechanism of the Isothermal Transformation of Austenite in the Intermediate Temperature Range

the hypothesis that at the instant of its formation during the intermediate temperature transformation the carbon content of the α phase was already lower than the average carbon content of the steel. Consequently, isothermal transformation of austenite must be preceded by carbon redistribution, which leads to the formation of domains of high and low carbon concentration; the domains of lowest carbon content are least stable, and transform into martensite. The stability of the other domains will vary with the carbon content, and any tendency to reject cementite at various rates will depend upon the temperature and the content of the alloying elements.

Card 6/7

There are 6 graphs, 3 tables, and 13 references of which 11 are Soviet, 1 English and 1 German.

SOV/24-58-6-3/35

On the Mechanism of the Isothermal Transformation of Austenite in the Intermediate Temperature Range

ASSOCIATION: Institut Metallovedeniya i fiziki metallov (Institute of Metals Technology and Metal Physics)

SUBMITTED: September 10, 1957

Card 7/7

AUTHORS: Kogan, L.I., (Cand.Tech.Sci.), and Entin, R.I. (Dr. Tech. Sci., Professor) SOV/129-59-6-2/15

TITLE: Certain Laws Governing the Transformation of Residual Austenite (Nekotoryye zakonomernosti prevrashcheniy ostatochnogo austenita)

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1959, Nr 6, pp 7-13 (USSR)

ABSTRACT: The authors investigated in detail the influence of partial intermediate transformation of austenite on the subsequent transformation at lower temperatures for the steels 53KhN3 (0.53% C; 1.1% Cr and 3.4% Ni), 60S2 (0.6% C and 2.3% Si), and 129G2 (1.29% C and 2.7% Mn). For each of these, two temperatures (T_1) of preliminary transformation were selected and two temperatures of subsequent transformation (T_2) in the minimum range. These temperatures were as follows: T_1 = 405 and 365 °C, T_2 = 300 and 260 °C for the steel 53KhN3; T_1 = 400 and 350 °C, T_2 = 350 and 300 °C for the steel 60S2. After preliminary transformation at the temperature T_1 the subsequent transformation at T_2 began after a certain incubation period. In Figs 1-3 the influence is

Card1/4

SOV/129-59-6-2/15

Certain Laws Governing the Transformation of Residual Austenite

graphed of the partial transformation of the austenite on the kinetics of subsequent transformation for the three tested steels. A drop in the degree of transformation at the temperature T_2 after partial transformation at the temperature T_1 was observed for all the investigated steels, irrespective of the sense of the concentration changes occurring in the austenite. This drop is particularly large if the transformation at the temperature T_1 proceeds until damping occurs. It can be assumed that this effect, as well as self-braking of the intermediate transformation at a constant temperature is related to the martensite mechanism of gamma-alpha transformation in the intermediate range. The kinetics of transformation of the residual austenite during tempering of hardened steel comply basically with the same relations which were established for isothermal austenite transformation by Cohen (Ref 11) and by the authors of this paper (Ref 12). This assumption is confirmed by the transformation diagrams of the primary and residual austenite of the steel 73KhN3 containing 0.73% C, 0.8% Cr, 3.5% Ni (Fig 4). The influence of

Card2/4

partial intermediate transformation of austenite on subsequent transformation at lower temperatures is one of the basic causes of the difference in the kinetics of transformation of austenite under isothermal conditions, which also applies to continuous cooling. Behaviour of the residual austenite during tempering depends to a considerable extent on the conditions of hardening of the steel and on the chemical composition. For evolving rational heat treatment regimes it is also necessary to take into consideration the features of the kinetics of transformation of residual austenite during tempering. Preliminary experiments have shown that if steel which contains a considerable quantity of residual austenite is subjected to heat treatment, the impact strength can be considerably improved by double tempering. For this purpose it is advisable to first temper the steel at temperatures corresponding to the lower part of the intermediate range and then to increase the tempering temperature to 600 - 650 °C. In the case of direct

SOV/129-59-6-2/15

Certain Laws Governing the Transformation of Residual Austenite

tempering at 600 - 650 °C, the impact strength will be lower. I.V. Geyzer and L.I. Volosevich participated in the experiments.

There are 8 figures, 1 table and 12 references, 7 of which are Soviet, 4 English and 1 German.

ASSOCIATION: TsNIIChM

Card 4/4

18.1500

24188
S/129/61/000/007/002/016
E073/E535

AUTHORS: Entin, R. I., Doctor of Technical Sciences, Professor and Kogan, L. I., Candidate of Technical Sciences

TITLE: Redistribution of Carbon During Intermediate Austenite Transformation

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1961, No.7, pp.7-11

TEXT: According to earlier investigations of the authors, the nature of the changes in the carbon concentration in residual austenite depends on the chemical composition of the steel. During transient transformation the carbon concentration in the residual austenite becomes highly non-uniform. This follows from metallographic investigations and from the results of measurements of the lattice parameter of the residual austenite in the case of step cooling to temperatures lower than room temperature. Measured parameters of electrolytically isolated austenite also indicate that after partial intermediate transformation the austenite will become non-uniform. Some features of the redistribution of carbon in the austenite may escape notice, since

Card 1/6

24188

sections of residual austenite with the lowest carbon concentration, which do not become transformed into the α-phase at the isotherm temperatures, may become transformed during the cooling process. Furthermore, the lattice parameter of the residual austenite can change, depending on the fraction of martensite in the structure. Therefore, the authors considered it advisable to determine the lattice parameters of austenite directly at the intermediate transformation temperature. In earlier work such measurements were made on steels which, after quenching, had an austenitic structure and for which the intermediate transformation occurred on heating to 300-400°C. It was found that the lattice parameter of the austenite decreases during the process of transformation. Comparison of the data of high temperature X-ray exposures with results measured after cooling the specimens to room temperature have confirmed earlier established relations and also the considerable nonuniformity of the carbon distribution in untransformed austenite. The authors used a special chamber for high temperature X-ray exposures, developed by E. Z. Kaminskiy and L. I. Kogan (one of the authors), for direct study of the austenite of various steels during intermediate transformation.

24188

Redistribution of Carbon ... S/129/61/000/007/002/016
E073/E535

The compositions of these steels are given herewith (in %)

Steel	C	Si	Mn	Cr	Ni	Mo
53ХН3С (53KhN3S)	0.53	1.22	0.32	1.42	2.35	-
52Х3С2ГМ (52Kh3S2GM)	0.52	2.18	1.8	2.97	-	0.38
80Х4 (80Kh4)	0.81	0.16	0.28	3.86	-	-

The selection of the steel compositions were based on the cooling conditions in the chamber and on the conditions of making the X-ray exposures. It was necessary to ensure a high stability of the austenite in the pearlitic range so as to prevent pearlitic transformation during cooling and also a high stability in the intermediate range so as to permit taking numerous X-ray exposures during the process of transformation. Specimens 0.8 x 10 x 100 mm were vacuum annealed for 10 hours at 1150°C and then they were etched so as to remove the decarburised layer. Following that, the specimens were heated by passage of an electric current to

Card 3/6

24158

Redistribution of Carbon ... S/129/61/000/007/002/016
E073/E535

930-950°C in a helium atmosphere for a period of 5 min and then cooled to the isothermal holding temperature. The temperature was measured with an accuracy of ± 5°C by means of a welded-on platinum-platinum thermocouple. The exposures were made with the K_α radiation of manganese and an exposure time of 20 min focusing onto the (311) line of the austenite. It was found that this interference line became strongly blurred after the beginning of the intermediate transformation (Table 2). Since type I distortions were virtually absent from the 0.8 mm thick specimens, which were cooled at a moderate speed, a change in the position of the centre of the line during the process of transformation must be associated with a change of the average concentration of the carbon in the austenite. In the steel 53ХН3 (53KhN3) the average austenite parameter increased 14-fold in the steel 52Kh3S2GM 11-fold corresponding to increases in the average carbon concentration by 0.3 and 0.25%, respectively. Another series of experiments have shown that the width of the austenite line during intermediate transformation is determined to a considerable extent by the distribution of the carbon in the

Card 4/6

24100

austenite and not by type II distortions or by refining of the blocks. Investigation of the steel 80Kh4 in the medium temperature range has shown that the lattice parameter of the austenite does not change during intermediate transformation. The following conclusions were arrived at:

1. It was experimentally confirmed that a pre-requisite of $\gamma \rightarrow \alpha$ transformation in the intermediate range is the redistribution of carbon in the austenite.
2. Redistribution of carbon leads to the formation of areas with differing carbon concentrations. Areas with the lowest carbon concentration ensure the possibility of martensitic transformation at intermediate range temperatures. The peculiarities of redistribution of carbon in the austenite depend on the initial carbon content in the steel and the nature of the alloying.
3. Redistribution of carbon and presence of areas with changed lattice parameters of the austenite can be observed only if these are relatively stable and the formation of carbides is stopped. Apparently, in alloyed as well as in carbon steels containing 0.8 to 1% C, the carbides form sufficiently rapidly so that the lattice period of untransformed austenite does not change.

Redistribution of Carbon ...

S/129/61/000/007/002/016
E073/E535

There are 2 figures, 2 tables and 7 references: all Soviet.

ASSOCIATION: TsNIIChM

Table 2.

1. Frame No.
2. Time from the beginning of the transformation, min
3. Quantity of transformed austenite, %
4. Width of the (311) line, mm
5. Distance between the lines, mm
6. Bragg angle, ϑ
7. Parameter at 300°C, a, kX
8. Change in the carbon content, %
9. Steel 53KhN3S, isothermal 300°C
10. Steel 52Kh3S2GM, isothermal 310°C

(1) № кадра	(2) Время от начала превращения в мин.	(3) Количество превращенного аустенита в %	(4) Ширина линии (311) в мм	(5) Расстояние между линиями в мм	(6) Угол Брегга θ	(7) Параметр при 300° a в кХ	(8) Изменение содержания углерода в %
Сталь 53ХН3С, изотерма 300°. (9)							
1	0—20	0—10	1,4	26,3	74°46'	3,604	—
2	20—40	10—55	3,9	27,37	[illegible]4°15'	3,613	0,20
3	40—60	55—78	4,0	27,75	74°05'	3,616	0,27
4	60—80	78—84	3,9	28,0	73°58'	3,618	0,31
Сталь 52Х3С2ГМ, изотерма 310° (10)							
1	0—20	0—7	1,5	25,5	75°0'	3,598	—
2	20—40	7—24	3,5	26,0	74°55'	3,602	0,09
3	40—60	24—38	4,0	26,5	74°40'	3,606	0,19
4	60—80	38—49	3,8	26,5	74°40'	3,608	0,19
5	180—200	71—74	3,5	26,6	74°37'	3,607	0,21
6	300—320	80	3,8	26,9	74°29'	3,609	0,24

Card 6/6

18.7500 1555 26556 S/126/61/012/002/005/019
E073/E335

AUTHORS: Kogan, L.I. and Entin, R.I.

TITLE: Intermediate Transformation of Austenite in Carbon Steel

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol. 12, No. 2, pp. 204 - 207

TEXT: So far, no definite data are available on the upper temperature of the range of intermediate transformation in carbon steels. The causes that determine the features of intermediate transformation in carbon steels have also not been clarified. The authors investigated the formation of the surface relief in carbon steel containing 0.9% C by direct microscopic investigation of a polished section of the specimen in high-temperature vacuum equipment. It was assumed that high-temperature heating and the use of thin (1 mm) specimens would make possible undercooling the austenite down to temperatures of the medium range and observation of the process of formation of the surface relief. The specimens were heated for 15 min

Card 1/5

at 1 150 °C and during this process the austenite grain grew to large dimensions (0.5 - 0.6 mm in diameter). The specimen was cooled to 540 °C, at which temperature it was held for 5 min (until transformation was completed); subsequent cooling to room temperature did not lead to formation of a relief. The test results indicate that this temperature is in the range of pearlitic transformation. Cooling from 1 150 to 530 °C led to the growth of only a very small number of crystals (a few crystals in each grain) during the first 3 seconds after the specimen reached this temperature. Further soaking at this temperature for 5 min and cooling to room temperature did not result in any additional relief formation. This indicates that partial intermediate transformation is followed directly by pearlitic transformation. If cooling proceeded after holding the specimen at 530 °C for 3 seconds an additional relief formed at the surface at lower temperatures of the intermediate range and below the martensitic point (230 °C). The data obtained make possible the plotting of an isothermal diagram of the

26956

Intermediate Transformation S/126/61/012/002/005/019
E073/E335

intermediate transformation of the austenite in carbon (0.9%) steel. Fig. 5 shows the diagram of the isothermal transformation (°C, versus time in secs and min). The curves of the beginning and end of the austenite transformation were determined magnetometrically; the hatched (intermediate transformation) area was determined on the basis of observation of the relief formation. High-temperature metallographic investigation of the surface relief enabled establishing the range of intermediate transformation in steel containing 0.9% carbon. The upper temperature of this range is 530 - 540 °C; in the temperature range 530 - 470 °C intermediate transformation develops only to a certain extent and pearlitic transformation will occur after this. The degree of intermediate transformation increases with decreasing temperature. Thus, it is shown that characteristic features of intermediate transformation exist in carbon steel, namely - self-braking at a constant temperature and temperature-dependence of the limit of transformation. The medium range of transformation could

Card 3/5

X

26556

Intermediate Transformation S/126/61/012/002/005/019
E073/E335

not be detected in numerous earlier investigations due to the high speed of the process of pearlitic transformation which follows intermediate transformation.
There are 5 figures and 10 references: 8 Soviet and 2 non-Soviet. The 2 English-language references quoted are: Ref. 6 - Ko, T. and Cottrell, S.A. - J. Iron and Steel Inst., 1952, 172, p. 3; Ref. 8 - Kazou Tsuya a T(?)tsutaro Mitsuttashi J. Mechanical Laboratory of Japan, 1955, Vol. 1, No. 2.

ASSOCIATION: Institut metallofiziki TsNIIChM (Institute of Physics of Metals, TsNIIChM)

SUBMITTED: December 10, 1960 (initially)
January 17, 1961 (after revision)

Card 4/5

S/032/61/027/006/015/018
B124/B203

AUTHORS: Kaminskiy, E. Z., and Kogan, L. I.

TITLE: Exchange of experience

PERIODICAL: Zavodskaya laboratoriya, v. 27, no. 6, 1961, 761

TEXT: For studying the intermediate stages in conversions, the authors improved a high-temperature chamber which had been described earlier (Ref. 1: E. Z. Kaminskiy and T. I. Stelletskaya. Problemy metallovedeniya i fiziki metallov, 2, 240 (1951)). The specimen, 1·10·100 mm, was placed in the interspace between the water-cooled copper electrodes, and electrically heated. A transparent foil of перфоль ПК-4 (Perfol' PK-4) caprone, 50μ thick, is stretched over the chamber window, the distance between specimen and film being 45 mm. Exposure time is 20 min. Before operation, the chamber is evacuated and then filled with helium. To prevent bending of the specimen during heating to high temperatures (above 900°C), a 5μ thick nickel foil is welded to the specimen. The X-ray patterns showed the nickel bands besides those of the steel investigated. By measuring the distance of the nickel bands at a certain temperature, it was also possible to calculate the

Card 1/2

Exchange of experience

S/032/61/027/006/015/018
B124/B203

distance between specimen and film. When heating the specimens to 900°C and cooling to 300 - 275°C, no iron diffuses into the nickel foil. There is 1 Soviet-bloc reference.

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii im. I. P. Bardina (Central Scientific Research Institute of Ferrous Metallurgy imeni I. P. Bardin)

Card 2/2

KAMINSKIY, E.Z.; KOGAN, L.I.; NECHVOLODOV, V.V.; LEVIT, A.M.

Exchange of experience. Zav.lab. 27 no.6:769 '61. (MIRA 14:6)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii imeni I.P. Bardina (for Kaminsky, Kogan).
2. Vsesoyuznyy nauchno-issledovatel'skiy institut geofizicheskikh metodov razvedki (for Levit).

(Scientific apparatus and instruments)

24050

S/020/61/138/004/010/023
B104/B203

18.7500

AUTHOR: Kogan, L. I and Entin, R. I.

TITLE: Studies of carbon concentration in the alpha phase in intermediate transformation of austenite

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 138, no. 4, 1961 826 - 827

TEXT: In the introduction, the authors discuss recent studies stating that the austenite transformation in the medium temperature range consists of a diffusion redistribution of carbon in austenite and a martensite transformation γ-α. The formation of part of the austenite with higher carbon content permits the martensite transformation γ-α at medium temperatures above the M_H point [Abstracter's note: M_H point not defined.] It was shown that the redistribution of carbon is a necessary condition for the formation and growth of α crystals. Further, the authors had shown in a previous paper that the carbon concentration in the α-phase at the instant of transformation is lower than the mean carbon concentration in steel (Izv. AN SSSR, OTN, no. 6 (1958)). The method used for

Card 1/4

these studies did, however, not allow a determination of the carbon concentration in the α-phase on the transformation temperature in the medium range. For this reason, the authors made X-ray studies of the α-phase directly at the transformation temperature. They studied a low-alloy carbon steel of the composition 0.23 % C, 2.1 % Si, 3 % Mn, 1.8 % Ni, 1.8 % Cr. and 1.5 % V. The concentration of the α-phase was determined from the width of the (211) interference line. The specimens were heated in a chamber directly with electric current to 1150°C, held at this temperature for 5 min, and subsequently cooled down to the temperature of the isothermal. After the end of the austenite transformation determined by magnetometric measurements, the specimens were heated to 300°C; then, the X-ray pictures were taken. At this temperature, carbon is not released from the α-phase, and there is no new austenite transformation; this permitted a comparison of the line widths of the α-phase. For determining the carbon concentration in the α-phase from the width of the interference lines, the authors used a calibration curve plotted with the aid of studies of hardened steel with carbon contents of 0.05 - 0.25 %. Results are given in Table 1. As can be seen, the α-phase formed in an intermediate transformation contains less carbon than corresponds to the mean carbon content in steel. The carbon concentration in the α-phase is the lower, the higher the transformation temperature. There are 1 table und 5 Soviet-bloc references.

ASSOCIATION: Institut metallovedeniva i fiziki metallov Tsentral'nogo nauchno-issledovatel'skogo instituta metallurgii im. I. P. Bardina (Institute of Metallography and Physics of Metals of the Central Scientific Research Institute of Metallurgy imeni I. P. Bardin)

PRESENTED: November 30, 1960, by G. V. Kurdyumov, Academician

SUBMITTED: November 29, 1960

33459

1.1700 1454 1045

S/129/62/000/001/001/011
E193/E383

AUTHORS: Kogan, L.I., Candidate of Technical Sciences and
Entin, R.I., Doctor of Technical Sciences, Professor

TITLE: The effect of deformation of supercooled austenite on properties of hardened steels

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, no. 1, 1962, 3 - 9

TEXT: A new method of improving the mechanical properties of steel has been developed in recent years (L.V. Smirnov, Ye.N. Sokolov and V.D. Sadovskiy - Trudy instituta fiziki metallov, no. 18, 1956.. Ref. 3; E.M. Lips, H.V. Zuilen - "Metall Progress", v.66, no. 2, 1954 .. Ref. 4), which consists of plastic deformation of supercooled austenite followed by conventional hardening and tempering treatment, and to which the term "TMO" (abbreviation of "termomekhanicheskaya obrabotka") has been ascribed in the Soviet Union. The main object of the present investigation was to study the effect of this treatment on the mechanical properties of steel 40ХН5С (40KhN5S) which was chosen for this purpose because its austenite remained stable

Card 1/~~11~~ 6

33459

The effect of deformation S/129/62/000/001/001/011
E193/E383

at relatively low temperatures (570 - 500 °C). The composition of this and other steels used by the present authors is given in Table 1, as follows:

Melt No.	Type of steel	Composition, %				
		C	Si	Mn	Cr	Ni
1*	40XH5C (40KhN5S)	0.41	1.39	0.08	1.65	4.54
2	40KhN5S	0.40	1.4	0.07	1.65	4.55
3**	42XH5CMФ (42KhN5SMF)	0.42	1.85	0.25	1.86	4.15
4*	31XH5C (31KhN5S)	0.31	1.45	0.07	1.45	4.45
5*	33XH5C (33KhN5S)	0.33	1.35	0.04	1.60	4.25

* denotes vacuum-melting
** means that the melt contained 0.48% Mo and 0.25% V.

Card 2/6

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000723610013-8"

33459

The effect of deformation S/129/62/000/001/001/011
E193/E383

In the first series of experiments the effect of both conventional treatment and TMO on vacuum-melted steel 40KhN5S (Melt 1) was studied. The conventional treatment consisted of oil-quenching the steel from 850 °C and tempering it for one hour at various temperatures. TMO was carried out in the following manner: the test piece was heated in a furnace or in a salt bath to 850 °C, after which it was transferred to a molten tin bath maintained at 525 °C. After it had cooled to 525 °C the test piece was deformed to 70% reduction with one or two strokes of a drop hammer; it was then immediately oil- or water-quenched, after which it was tempered for one hour at various temperatures between 200 and 650 °C (in some cases, rolling instead of forging was used to deform the austenite). The results of these tests (carried out on test pieces 1 mm in diameter) are reproduced in Fig. 2, where the yield strength (σ_s, kg/mm^2, graph a) and UTS (σ_b, kg/mm^2, graph б) of steel 40KhN5S are plotted against the tempering temperature (°C), the circles (1) and dots (2) relating to specimens treated by the conventional and TMO methods, respectively. It will be seen
Card 3/6

33459

that a maximum increase in yield strength and UTS of steel subjected to TMO was attained in specimens tempered at 220 °C. Under these conditions, σ_s = 260 kg/mm^2 and σ_b = 330 kg/mm^2 were occasionally attained; in these cases, elongation and reduction of area were, respectively, 5 - 6 and 30 - 35%. The hardness of steel 40KhN5S, after TMO but before tempering, was HRC 59, i.e. 3 units higher than that of the same steel hardened by the conventional method. The improvement brought about by TMO, when applied to steel 40KhN5S, melted in air, was less pronounced; this is shown by data reproduced in Table 2. To check the effect of size of the test piece on the results of the process studied, tensile specimens, 3 mm in diameter, were used in the next series of experiments. The results are given in Table 3. The effects of other variants of TMO on the properties of steel 40KhN5S (melt 1) are shown in Table 4. Some significant results were obtained when TMO was applied to steel 42KhN5SMF (melt 3), in which secondary hardness is developed during tempering at 450 - 525 °C. It was found that high mechanical

33459

The effect of deformation S/129/62/000/001/001/011
E193/E383

properties (σ_b = 200 - 210 kg/mm^2, σ_s = 190 kg/mm^2) imparted to this steel by TMO were retained after tempering at temperatures as high as 500 °C. The results of the next series of experiments confirmed that TMO brought about a decrease in the size of the martensite grains. It was also established that this effect played an insignificant part in the increase in strength brought by TMO and that there was practically no difference between the block dimensions and the magnitude of stresses of the second type in specimens subjected to the conventional and TMO treatments. In the next series of experiments, carried out on steels 31KhN5S and 33KhN5S, it was established that the beneficial effect of TMO increased with increasing degree of plastic deformation and that deformation at 525 °C brought about an increase in strength of the austenite. The effect of the carbon content in this steel on the effectiveness of TMO was also studied. It was found that whereas the increase in strength brought about by the application of TMO to an 0.05% C steel amounted to 10%, the corresponding figures for the 0.14 and 0.24% C steels were 19 and 21%, respectively. It was established also that with increasing

Card 5/11

C content of the austenite, its rate of work-hardening increased. This effect is illustrated in Fig. 4, showing stress (σ, kg/mm^2) versus strain (ε, %) diagrams for austenite in steels containing 0.05, 0.14 and 0.24% C (Curves 1-3, respectively) tested at 525 °C. It is stated in the concluding remarks that the relatively greater improvement in the mechanical properties of vacuum-melted steels subjected to TMO is associated with their high purity and the resultant high plasticity of both austenitic and martensitic structures in which, therefore, local stress concentrations leading to the formation of microcracks are less likely to arise. There are 4 figures, 8 tables and 8 references: 6 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: TsNIIChM

KOGAN, L.I., kand.tekhn.nauk; ENTIN, R.I., doktor tekhn.nauk, prof.

Investigation of austenite transformations in the medium region directly at transformation temperatures. Probl.metalloved.i fiz. met. no.7:231-245 '62. (MIRA 15:5)
(Steel--Metallography) (Phase rule and equilibrium)

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000723610013-8"

S/126/62/013/005/025/031
E111/E435

AUTHORS: Drozdov, B.Ya., Kogan, L.I., Entin, R.I.

TITLE: Influence of stress and deformation on the kinetics of the intermediate transformation of austenite

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.5, 1962, 776-779

TEXT: Information on the effect of deformation of metastable austenite followed by quenching on the austenite transformation is incomplete. The authors have studied the kinetics of the transformation under applied-load conditions on type 40XH5C (40KhN5S) and 80X4 (80Kh4) steels. For the first, loading was carried out at 0.6 mm/min to the required stress which was then kept constant within ± 1 kg/mm^2. The kinetics were studied at 300 and 350°C. Acceleration occurred at all the temperatures, being especially marked at temperatures of the lower part of the intermediate region. The influence of rate of deformation was studied at 300, 400 and 525°C. This and other work shows that when conditions for thermomechanical treatment of steels are

Card 1/2

KOGAN, L. I.

Multiple reflections in a water layer and their effect on the validity of the interpretation of the data of offshore seismic prospecting. Razved. geofiz no.2:16-35 '64. (MIRA 18:5)

KOGAN, L.I.

Recording refracted waves during the continuous motion of a seismic prospecting ship. Razved. i prom. geofiz. no.51:43-48 '64. (MIRA 17:11)

...cal treatment conditions. The influence of stress and deformation on

KOGAN, L.I.; ENTIN, R.I.

Austenite transformation in the intermediate region. Probl. metalloved. i fiz. met. no.8:222-226 '64. (MIRA 18:7)

KOGAN, L.I.

Separation of multiple reflections by the elongated hodographs of reflected waves in the shallow-water zone of the southeastern part of the Caspian Sea region. Razved. geofiz. no.4:37-51 '65. (MIRA 18:9)

KOGAN, L.I.; DANTSIG, I.I.

Abstracts. Sov. med. 28 no.9:144 S '65. (MIRA 18:9)

1. Leningradskiy nauchno-issledovatel'skiy institut tuberkuleza.

L 31139-66 EWT(m)/EWP(w)/EWA(d)/T/EWP(t) IJP(c) JD
ACC NR: AP6012234 SOURCE CODE: UR/0129/66/000/004/0019/0021

AUTHOR: Bashchenko, A. P.; Gurevich, Ya. B.; Kogan, L. I.; Teymer, D. A.; Entin, R. I.

ORG: TsNIIChERMET

TITLE: Investigation of steels susceptible to secondary hardening and strengthened by thermomechanical treatment

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 4, 1966, 19-21

TOPIC TAGS: steel treatment, thermomechanical treatment, low temperature treatment, high temperature treatment /45Kh5M3F, 42Kh2N2VFS, 44Kh5MVFS, 60Kh5MVFS

ABSTRACT: The effect of thermomechanical treatment on the properties of 45Kh5M3F, 42Kh2N2VFS, 44Kh5MVFS, and 60Kh5MVFS structural steels susceptible to secondary hardening has been investigated. Low temperature thermomechanical treatment (austenitizing at 1050—1100C for 15—20 min, cooling to 550C, plastic deformation with 75% reduction, water quenching followed by refrigeration in liquid nitrogen and tempering) improved the strength of all steels tested. For instance, at 330C the tensile strength was 230—266 kg/mm^2, the yield strength 233—260 kg/mm^2, the elongation 3%, and the reduction of area 15—30%. Corresponding figures for 480C were 204—246 kg/mm^2, 194—236 kg/mm^2, 3—4%, and 18—38%. However, 42Kh2N2VFS and 60Kh5MVFS steels in the as-hardened or low-tempered condition were brittle at room temperature. The yield strength can be increased to about 200 kg/mm^2 at 500C and about 250 kg/mm^2

Card 1/2 UDC: 539.374:621.785

ACC NR: AR6013665 SOURCE CODE: UR/0058/65/000/010/E028/E028

AUTHOR: Kogan, L. I.; Entin, R. I.

TITLE: The transformation of austenite in the intermediate region

SOURCE: Ref. zh. Fizika, Abs. 10E219

REF SOURCE: Sb. tr. In-t metalloved. i fiz. metallov Tsentr. n.-i. in-ta chernoy metallurgii, vyp. 36, 1964, 222-226

TOPIC TAGS: phase transition, crystal growth, austenite transformation, austenite steel / U9 steel, 100 M steel, 90S2 steel, 70N3 steel

TRANSLATION: The growth rate of α-phase crystals during intermediate transformations (at 250, 300 and 350°C) was measured in U9, 100 M, 90S2 and 70N3 steels on the Lozinskiy apparatus. It is hypothesized that the growth of α-phase crystals is limited by the rate at which C is removed from the edge of the growing crystal. The small activation energy of and intermediate transformation (12,000-14,500 cal/gram-atom) as compared to the activation energy for C diffusion in austenite (32,000 cal/gram-atom) is related to the high stress that occur in austenite during a transformation and only slightly relax at intermediate temperatures. The effect of alloy elements on the growth rate of α-phase crystals is discussed. 9 references. I. Tulupova.

SUB CODE: 11,20

Card 1/1

KOGAN, L.M.; IGNATOVA, N.F.

Effect of air and moisture on the chlorination of butane.
Zhur. org. khim. 1 no.4:683-685 Ap '65. (MIRA 18:11)

1. Vsesoyusnyy nauchno-issledovatel'skiy institut khimicheskikh sredstv sashchity rasteniy, Moskva.

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000723610013-8"

RABOVSKAYA, N.S.; KOGAN, L.M.; NIKOLAYEVA, A.A.

Radiolysis of some unsaturated carbon chlorides. Vest. Mosk. un. Ser. 2:Khim. 20 no.4:42-43 Jl-Ag '65. (MIRA 18:10)

1. Kafedra khimicheskoy tekhnologii Moskovskogo gosudarstvennogo universiteta.

RABOVSKAYA, M.S.; KOGAN, L.M.

Radiolysis of hexachlorocyclopentadiene. Dokl. AN SSSR 165 no.2:337-340 N '65. (MIRA 18:11)

1. Moskovskiy gosudarstvennyy universitet i Vsesoyuznyy nauchno-issledovatel'skiy institut khimicheskikh sredstv zashchity rasteniy. Submitted April 6, 1965.

KOGAN, L.M.

Counting small parts in the manufacture of instruments.
Priborostroenie no.7:21-22 Jl '60. (MIRA 13:7)
(Instrument manufacture)

KOGAN, L.M.; ORANSKAYA, M.S.; SUVOROV, N.N.; SKRYABIN, G.K.; TORGOV, I.V.

Microbiological transformations of steroids. Report No.1: Preparation of Δ^4-pregnene-17α, 20β,21-troil-3-one by means of actinomycetes. Izv. AN SSSR Otd.khim.nauk no.2:302-303 F '62. (MIRA 15:2)

1. Institut khimii prirodnykh soyedineniy AN SSSR i Institut mikrobiologii AN SSSR.

(Pregnene)
(Actinomycetes)

KOGAN, L.M.

Microbiological transformations of steroids. Usp.khim. 31 no.5:581-608 My '62. (MIRA 15:5)

1. Institut khimii prirodnykh soyediminiy AN SSSR.
(Steroids--Microbiology)

KOGAN, Leonid M.; ULEZLO, I.V.; SKRYABIN, G.K.; SUVOROV, N.N.; TORGOV, I.V.

Microbiological transformations of steroids. Report No.2: Reduction of 17 , 21-dihydroxy-20-keto steroids by means of Actonomyces albus 3006. Isv.AN SSSR.Otd.khim.nauk no.2:328-332 F '63. (MIRA 16:4)

1. Institut khimii prirodnykh soyedineniy AN SSSR i Institut mikrobiologii AN SSSR.

(Steroids—Microbiology)

S/119/62/000/012/001/009
D201/D308

AUTHOR: Kogan, L.M.

TITLE: Design of ferromagnetic probes

PERIODICAL: Priborostroyeniye, no. 12, 1962, 6-8

TEXT: The author considers the problems met in designing axial excitation ferromagnetic probes. The following conclusions may be made from the analysis of the induced emf spectrum: 1) the amplitude of the excitation field, which results in the maximum amplitude of a given harmonic, increases with the order of this harmonic; 2) the excitation field amplitudes, corresponding to the maximum amplitudes of odd harmonics, are simple ratios to those of even harmonics; 3) the ratio of even harmonics amplitudes is directly proportional to the amplitude of the excitation field. After selecting the core material it is necessary to find the incremental permeability of the core shape. A formula for the probe sensitivity G is given. Several probes, designed according to the above principles, have their parameters differing on the average by 1 to 6% from theoretical values. There are 8 figures.

Card 1/1

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000723610013-8"

...m-dioxide...

...-ly*rochny*ye perekhody* v...

DATE ACQ: 15May63

construction, physical phenomena, and ...

ACCESSION NR: AT3003009