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CONTENTS

METALS SCIENCE. METALLURGY

<i>Saraphanov G. F., Perevezentsev V. N.</i> Modelling of processes of nucleation and formation of fragmentarried subborders	5
<i>Hlusova E. I., Golosienko S. A., Motovilina G. D., Pazilova U. A.</i> Influence of alloying on structure and properties of high-strength cold-resistant steel after heat and thermomechanical treatment	20
<i>Alekseeva T. N., Kruglov A. A., Orlov V. V., Khlusova E. I., Nemtinov A. A.</i> Research of features of formation of structure of high-strength low alloyed steels for pipes of large diameters at thermomechanical treatment	32
<i>Kudryavtseva I. V., Pavlov V. N.</i> Research of influence of heat treatment regimes on phase structure and mechanical properties of high-strength corrosion-resistant steels of martensite-austenite class of 07X15H4M2T grade	43

FUNCTIONAL MATERIALS

<i>Trykov J. P., Shmorgun V. G., Slautin O. V., Arisova V. N., Abramenko S. A.</i> Structure and mechanical properties of layered intermetalloid composites of systems Cu–Al and Ti–Fe	49
<i>Boiko V. F., Nikolenko S. V., Vlasova N. M., Dvornik M. I.</i> Semiempirical researches of process of crushing of powders from high-melting alloy BK8	57

WELDING. WELDING MATERIALS

<i>Kuznetsov S. V., Pas O. A., Tkach A. M., Hatuntsev A. N., Khudyakov S. V.</i> Development of electron-beam welding process of titanium with an additive in deep narrow gaps	63
<i>Fomin A. G., Levchenko A. M., Beljaev N. V., Sharapov M. G.</i> Research of features of structures and compositions of wear-proof coatings on basis of tungsten carbides claddied by powder wires with using of argon-arc and gas-flame methods	69

STRUCTURAL-WORKING STRENGTH AND SERVICEABILITY OF MATERIALS

<i>Kudryavtsev A. S., Kashtanov A. D., Markov V. G., Lavrukhin V. S.</i> Creep chromic martensite steel in heat-carrier on the basis of plumbeous	78
<i>Oryshchenko A. S., Popova I. P., Utkin J. A., Odintsov N. B.</i> Estimation of serviceability of pipes of reactionary coils for installation ЭП-300 made from new heat resistant alloy at stationary regime of loading	83

NEW ITEM

To 75 th anniversary of the Federal State Unitary Enterprise "All-Russian scientific-research institute of aircraft materials"	90
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Abstracts of published articles	95
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ABSTRACTS OF PUBLISHED ARTICLES

UDC 539.214:548.4

Modelling of processes of nucleation and formation of fragmentarried subborders. Saraphanov G. F., Perevezentsev V. N. – Problems of Materials Science, 2007, N 1 (49), pp. 5–19.

Legitimacies of nucleation and formation of fragmentarried subborders in elastic field of discleanation on border of a plastic zone in frame of computer modeling were examined. Formation of subborders for cases of accomodated plastic flow and plastic deformation caused by an external field were investigated.

Key words: fragmentarried dislocated subborders, formation of mesostructure, accomodated plastic flow, computer modelling.

UDC 669.14.018.41:621.785.796

Influence of alloying on structure and properties of high-strength cold-resistant steel after heat and thermomechanical treatment. Hlusova E. I., Golosienko S. A., Motovilina G. D., Pazilova U. A. – Problems of Materials Science, 2007, N 1 (49), pp. 20–32.

The influence of alloying level on structure and properties economic alloyed high-strength cold resistant F690W (09XH2MД) steel grade with a yield strength not less than 690 MPa after heat (hardening and tempering) and thermomechanical (hardening from rolling heating and tempering) treatment were examined. It was developed technological regimes of its production.

Key words: cold-resistant steel, heat and thermomechanical treatment, structure and properties, phase transformations, technological regimes.

UDC 669.15–194.2:621.785.796

Research of features of formation of structure of high-strength low alloyed steels for pipes of large diameters at thermomechanical treatment. Alekseeva T. N., Kruglov A. A., Orlov V. V., Khlusova E. I., Nemtinov A. A. – Problems of Materials Science, 2007, N 1 (49), pp. 32–43.

The features of formation of structure of high-strength low alloyed K60 steel categories, intended for manufacturing of large diameters pipes were examined. The features of phase and structural transformations, including after hot plastic deformation in γ -area with a various initial condition of austenite were examined. Received results were confirmed by manufacture of trial set of steel.

Key words: high-strength low alloyed steel, pipes of large diameters, phase and structural transformations, hot plastic deformation.

UDC 669.14.018.8:621.785

Research of influence of heat treatment regimes on phase structure and mechanical properties of high-strength corrosion-resistant steels of martensite-austenite class of 07X15H4M2T grade. Kudryavtseva I. V., Pavlov V. N. – Problems of Materials Science, 2007, N 1 (49), pp. 43–48.

The influence of heat treatment regimes on phase structure and mechanical properties of 07X15H4M2T steel grade was examined. The heat treatment regime of steel for the purpose of receiving of optimum structure and mechanical properties was developed. It is shown, that steel has high mechanical properties and high resistance against various kinds of corrosion.

Key words: high-strength corrosion-resistant steel, heat treatment, mechanical properties, corrosion resistance.

UDC 621.763–419

Structure and mechanical properties of layered intermetalloid composites of systems Cu–Al and Ti–Fe. Trykov J. P., Shmorgun V. G., Slautin O. V., Arisova V. N., Abramenko S. A. – Problems of Materials Science, 2007, N 1 (49), pp. 49–56.

Structures of diffusion layer on border of layers in composite materials of systems titan-iron and copper – aluminum were examined. Mechanical properties of 3-and 14-layers composites of titanium BT1-0 + steel 08кп structure in a range of working temperatures 20–900°C and 3-and 9-layers composites of copper M1 + aluminum АД1 structure at 20–500°C were determined.

Key words: layered intermetallic composite materials, diffusion layer, mechanical properties.

UDC 621.762:669.275

Semiempirical researches of process of crushing of powders from high-melting alloy BK8. Boiko V. F., Nikolenko S. V., Vlasova N. M., Dvornik M. I. – Problems of Materials Science, 2007, N 1 (49), pp. 57–62.

Semiempirical researches of powder crushing method of hard alloy on a carbide tungsten basis by means of mathematical statistics and colloidal chemistry were carried out. On laser diffraction microanalyzer of the particles sizes «Analysette 22» grading characteristics of initial and crushed hard BK8 alloy are investigated. Protocol data of the device are processed by an author's method and submitted by the formalized densities of distributions.

Key words: mathematical statistics, disperse particles, hard alloy, laser diffraction microanalyzer, grading characteristics, crushing process, density of distributions.

UDC 621.791.722:669.295

Development of electron-beam welding process of titanium with an additive in deep narrow gaps. Kuznetsov S. V., Pas O. A., Tkach A. M., Hatuntsev A. N., Khudyakov S. V. – Problems of Materials Science, 2007, N 1 (49), pp. 63–69.

The process and equipment for electron-beam welding (EBW) of titanium with an additive in deep narrow gaps were developed. At EBW with application of a wire in diameter of 3 mm productivity of cladding is twice higher than at manual argon-arc welding with additive wire in diameter of 6 mm at maintenance of quality of the welded connections corresponding to requirements of test rules. EBW with an additive is accepted for using in production. Ways of the further perfection of process are planned.

Key words: titanium, electron-beam narrow gap welding, cladding productivity, perfection of process.

UDC 621.791.92:621.791.042.3:669.275

Research of features of structures and compositions of wear-proof coatings on basis of tungsten carbides cladded by powder wires with using of argon-arc and gas-flame methods. Fomin A. G., Levchenko A. M., Beljaev N. V., Sharapov M. G. – Problems of Materials Science, 2007, N 1 (49), pp. 69–77.

Influence of grading structure of a powder wire from alloy BK6 on structure and composition of wear-proof coverings is investigated at argon-arc cladding and by gas-flame methods are examined. Adjusting powder wire with granularity up to 100; 200–315; 315–800 microns was used. At a gas-flame method of cladding thanks to smelting of a surface in deposits metal is provided more higher than at argon-arc method content of hard phase and more lower content of $\bar{\delta}$ -phase, the highest hardness of coating (59–60 HRC) is provided at cladding by wire with a powder granularity equal to 315–800 microns.

Key words: cladding, alloy BK6, a powder wire, grading structure, argon-arc method, a gas-flame method, structure, composition, hardness.

UDC 669.15–194.55:621.039.534.6:539.376

Creep chromic martensite steel in heat-carrier on the basis of plumbeous. Kudryavtsev A. S., Kashtanov A. D., Markov V. G., Lavrukhin V. S. – Problems of Materials Science, 2007, N 1 (49), pp. 78–82.

Influence of liquid-metallic plumbeous heat-carrier on creeping of chromic martensite 10X9HCMФБ steel grade was examined. As a result of carried out tests for long durability the increased speed of steel creeping in contact with liquid plumbeous was find out at 550°C in comparison with creeping speed on air. The reasons of the found out phenomenon which should be taken into account at designing of reactor installations with liquid-metallic plumbeous heat-carrier are investigated.

Key words: martensite steel, reactor installations, liquid-metallic heat-carrier on the basis of plumbeous, long durability, speed of creeping, quasilasticity.

UDC 669.14.018.44:539.376

Estimation of serviceability of pipes of reactionary coils for installation ЭП-300 made from new heat resistant alloys at stationary regime of loading. Oryshchenko A. S., Popova I. P., Utkin J. A., Odintsov N. B. – Problems of Materials Science, 2007, N 1 (49), pp. 83–89.

On the basis of experimental data referring to high-temperature creeping of a material for reactionary coils of installation for manufacturing of ethylene the pattern of distribution of stresses working on thickness of a pipe wall from a heat resistant alloy such as 45X25H35C2E is received, the estimation of serviceability of a pipe at stationary loadings is given.

Key words: high-strength corrosion resistant steel, heat treatment, mechanical properties, corrosion resistance.