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Nykyforchy H. M., Student O. Z., and Markov A. D. Abnormal behaviour of high-temperature degradation of the weld metal of low-alloy steel welded joints

**SUMMARY.** Integral mechanical properties, such as hardness, impact toughness, tensile properties and local fracture mechanics parameters (static and cyclic crack growth resistance) are sensitive to in service degradation of a weld metal of 15H1М1Ф steel of power plant steam pipeline. Simultaneous decrease of such parameters as: resistance to brittle fracture, hardness and strength is a phenomenon of in service degradation of the weld metal. The specific correlation between ductility properties and other mechanical parameters was established. Particularly the increase of δ of exploited metal agree well with the decrease of its strength level, whereas decrease of ψ agrees with reduction of brittle fracture resistance. Strength and plasticity of exploited weld metal decrease much more to compare to virgin state. The absence of ferrite edging at the boundaries of primary austenitic grains causes the low resistance to brittle fracture, while changes in acicular ferrite – to deterioration of mechanical properties. Ductile fracture of non-exploited metal changes to intercrystalline fracture in the exploited metal.

Prytula A. O., Pohreliuk I. M., and Fedirko V. M. The influence of the degree of rarefaction of oxygen in the environment on interaction of boron carbide with titanium alloys

**SUMMARY.** The mechanism of processes at the interface metal-saturation medium under thermal diffusion saturation of titanium alloys in boron carbide at the temperatures below the point of titanium alloys phase transformation has been described. The influence of the partial pressure of oxygen over the boron carbide dust on the interaction of titanium and saturating medium has been established. The possibility to formation of steady borides coatings on the titanium matrix has been shown.

Humeniuk O. L., Syza O. I., and Krasovskyi O. M. Inhibitor protection of steels in acidic and neutral media by derivatives of 2-mercaptobenzoimidazole

**SUMMARY.** The anticorrosion properties of the new synthesised 2-mercaptobenzoimidazole derivatives and also the efficiency of their action in the compositions on the basis of the production wastes of ε-caprolaktam of Chernihiv plant “Khimvolokno” were studied. The conclusion about the possibility of use of the test compounds as inhibitors of 20 steel corrosion in acidic and neutral media was drawn. The efficiency of application of protective compositions based on the production wastes of ε-caprolaktam with 2-mercaptobenzoimidazole derivatives in the working media with pH 1…6.5 was shown.

Bulyk I. I., Trostianchyn A. M., and Markovych V. I. Phase transformations in the SmCo5-based alloy induced by hydrogen under pressure up to 650 kPa

**SUMMARY.** The interaction of the alloy based on SmCo5 compound with hydrogen was studied by means of the differential thermal analysis and X-ray phase analysis at the initial hydrogen pressures 200; 300; 400; 500; 650 kPa and temperature up to 1233 K. The alloys hydride is formed at a temperature of 343 K; hydrogen desorbs from the alloys hydride phases at 388…408 and 488…523 K; the alloy partially disproportionates into SmHx and Co at 828…863 K; SmHx is partially decomposed at 1008…1053 K, SmCo5 and Sm2Co17 phases were found; Co, SmCo5 and Sm2Co17 phases were observed above 1168…1188 K. The composition of phases depends on the time of the alloy interaction with hydrogen.

INVESTIGATION AND TEST METHODS

Sylovaniuk V. P., Marukha V. I., and Onyshchak N. V. Residual strength of cylindrical elements with cracks healed by injection technology

**SUMMARY.** The approximate analytic solution of the problem for a crack-like defect in an elastic cylinder is obtained. The level of strengthening of cylindrical element with a crack, when it is filled with injection material is determined. The parameters that define the effectiveness of the strengthening by injection are established. Experimental investigations that prove the theoretical predictions about strengthening of structural element by means of injection technologies are carried out.
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SUMMARY. Corrosion stability of substrates made of different metals and deposited nitride films has been investigated by a gravimetric method. Potentials and currents of corrosion have been determined. It has been established that nitride films obtained by different methods have a rather high stability in 10% H2SO4 solution at ambient temperature.

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