

ROLE OF HYDROGEN AND CARBON AT DESTRUCTION OF WELDED JOINTS UNDER LOW CLIMATIC CONDITIONS OF THE NORTH

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Earlier by us for an explanation of a role of "the fish eyes" and flakes at destruction of welded joints, it has been shown [1], that on the basis of quantum-mechanical representations for diffusing hydrogen it is possible to accept orto-hydrogen (a molecule of hydrogen with odd total nuclear spin), and for para-hydrogen. (a molecule of hydrogen with even full nuclear spin). Thus diffusion of contribution of atomic hydrogen was considered by itself meant. However in the further according to laws of reaction of a molecule and atom us it is established, that presence of atomic hydrogen strongly accelerates transformation orto-para conversion of hydrogen with downturn of temperature. Therefore at hydrogen brittleness it is necessary to consider a mix of atom of hydrogen, orto-hydrogen and para-hydrogen. If in V.Pennic works, Van-Flek and A.Sherman under the quantum theory of valency the relative maintenance orto, para-hydrogen (3:1) depending on temperature was deduced from qualitative reasons in the present work such percentage is correctly calculated by means of laws of statistics of quantum processes, that once again proves correctness of a direction of the given research. For two updatings hydrogen quantum-mechanical distinct distinction in specific thermal capacities is revealed at low temperature qualitative methods. A parity by diffusing atomic and molecular hydrogen in view of orto-para conversion of hydrogen depending on temperature we plan to measure by a method of the chromatography, allowing to separate hydrogen from atmospheric gases on a molecular sieve or at the activated corner (Berchfield, Grinjak, Pohodnja I.K., etc.).

The role of presence and influence of carbon at hydrogen brittleness can be defined experimental-ly means of new generation (for example, devices of firm of special design bureau "Chromatec"). It is possible to use also a method of acoustic emission (the firm "Alcor", www.alcor.nnov.ru).

Acoustic emission (AE) are the ultrasonic fluctuations arising at occurrence and development of defects in controllable object under influence of loading. The method of the ae-control represents process of registration and the analysis of these

fluctuations. The ae-control allows to find out and define a site of defects of type of cracks, including microcracks, stratifications, corrosion, hydrogen brittleness, various defects of welded seams, outflow and etc.

It is known, that process of conversion of one form in another is difficult enough and, hence, when usual hydrogen is cooled up to low temperature the attitude orto-forms to para-to a condition keeps the value 3:1 though the mix and is not stable in thermodynamic sense. As has experimentally shown Cronig, in presence of coal as catalyst orto-hydrogen easily passes in para-the form. In case of hydrogen brittleness of welded seam catalysts can be carbon, nitrogen and et. than it is possible to explain this natural phenomenon.

By us it is revealed, that the known theory s-p does not satisfy L.Poling's hybridization to criterion of perfection of A.Ejnshtejna.

Also it is considered kinetic behaviour of hydrogen in times at an initial stage of cooling welding baths: 1) It is shown, that in alloys on the basis of iron at an initial stage of cooling welding baths there is a process of absorption of hydrogen of cavities in volume of metal, however after some decrease in temperature return process - transition of hydrogen from a time in volume of metal begins; 2) initial pressure of hydrogen from a time in volume of metal is estimated; 3) Changes of pressure of hydrogen in times are insignificant and not much more exceed 10^5 Pascal.

The literature

1. Sleptsov O.I., Semenov S.S., Sivtsev M.N., Sleptsov G.N. The basic principles of quantum-mechanical explanations of hydrogen brittleness Yakutsk: IPTPN SB RAS, 2004 – 300 p.