

## EXPERIMENTAL DETERMINATION OF TEMPERATURE FIELDS IN METAL-HYDRIDE SAMPLES AT ONE-SIDE HEATING

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The temperature fields in samples of investigated materials can give a huge information potential. These fields are a result (as a consequence) of energetic effect (boundary conditions - external reasons) on the material with the certain characteristics and parameters (internal reasons). If we have the mathematical model of heat transfer, the methods of solving of inverse problems of heat transfer and above all the experimental information about temperature fields in samples of tested materials, we can determine both boundary conditions and internal characteristics, parameters of these materials.

This work is devoted to the solution of the above mentioned problem - experimental determination of temperature fields in metal-hydride samples at one-side heating both in desorption and absorption processes of hydrogen.

The two designs of metal-hydride samples were developed both for compact and powder materials. At the first case the sample is the cylinder with 2 or 4 slots. These slots are made parallel to the cylinder butt-ends by the diamond disk (thickness is  $10^{-4}$  m). The W-Re thermocouples ( $10^{-4}$  m in diameter) are inserted in these slots. The thermocouples are covered by electroisolation material ( $Y_2O_3$ ). For powder hydride - powder is stacked to empty cylinder, which has a thin wall. The cylinder has slots for the thermocouples. These slots have been made in diameter plane. The end of heating cylinder is closed by the Ni-Cr alloy net. The samples of investigated materials are placed in the chamber, which allows to make the necessary vacuum and inleakage of inert gas or hydrogen.

The two methods of heat supply into butt-ends samples of investigated materials have been proposed both for powder and compact samples. First method is radiation heating (for example, concentrated solar energy). The next method is the electric heating, i.e. by the current passing through the Ni-Cr alloy net, which is in a contact with samples of investigated materials.

### References

1. Matysina ZA, Pogorelova OS, Zaginaichenko SYu, Schur DV, The surface energy of crystalline CuZn and FeAl alloys, Journal of Physics and Chemistry of Solids, 56, 1, 9-14, 1995, Elsevier
2. Isayev KB, Schur DV, Study of thermophysical properties of a metal-hydrogen system, International journal of hydrogen energy, 21, 11, 1129-1132, 1996, Pergamon
3. Schur DV, Lavrenko VA, Adejev VM, Kirjakova IE, Studies of the hydride formation mechanism in metals, International journal of hydrogen energy, 19, 3, 265-268, 1994, Elsevier
4. Matysina ZA, Zaginaichenko SYu, Schur DV, Hydrogen solubility in alloys under pressure, International journal of hydrogen energy, 21, 11, 1085-1089, 1996, Pergamon
5. Schur DV, Lyashenko AA, Adejev VM, Voitovich VB, Zaginaichenko S Yu, Niobium as a construction material for a hydrogen energy system, International journal of hydrogen energy, 20, 5, 405-407, 1995, Elsevier