

**CALORIMETRIC STUDY OF HYDROGEN REACTION
WITH LAVES PHASE C14**

Anikina E.Yu.

Lomonosov Moscow State University
119991, Moscow, Leninskie Gory, 1

The initial compounds $ZrMn_2$, $ZrMn_{2.7}$, $Ti_{0.9}Zr_{0.1}Mn_{1.4}V_{0.7}$ and $Ti_{0.9}Zr_{0.1}Mn_{1.5}V_{0.8}$ were synthesized as described in [1]. Thermodynamic studies of the IMC-hydrogen systems were carried out on a DAK-12 calorimeter of the Tianca-Calve type in the temperature range 333 – 518 K and hydrogen pressure up to 5 MPa (see Table).

Temperature dependence of reaction enthalpy for the AB_2-H_2 system

Compounds	T, K	Range H/IMC (desorption)	$\Delta H_{des.}$, kJ/molH ₂
$ZrMn_2$	373	0.1 – 1.9	40.16±1.02
	518	0.4 – 1.6	36.97±0.63
$ZrMn_{2.7}$	353	0.1 – 1.1	35.43±0.42
		1.1 – 1.9	32.15±0.65
$Ti_{0.9}Zr_{0.1}Mn_{1.4}V_{0.7}$	333	0.9 – 1.5	28.40±0.40
		1.5 – 2.1	30.13±0.30
	373	0.3 – 0.9	24.70±0.36
		1.0 – 2.0	30.22±0.43
$Ti_{0.9}Zr_{0.1}Mn_{1.5}V_{0.8}$	373	0.1 – 0.85	30.05±0.45
		1.1 – 1.8	36.77±0.91
	418	0.1 – 0.6	28.86±1.41
		0.6 – 1.6	36.30±1.30

Enthalpy values of the hydrogen reaction with the IMC change with the temperature of the process under the study and the concentration of hydrogen in the IMC. For $ZrMn_2-H_2$ the enthalpy values change only reaction temperature, but it does not depend on the hydrogen content in the IMC. In $ZrMn_{2.7}-H_2$ there are two sections where the enthalpy values are constant. For $Ti_{0.9}Zr_{0.1}Mn_{1.4}V_{0.7}-H_2$ and $Ti_{0.9}Zr_{0.1}Mn_{1.5}V_{0.8}-H_2$ systems the enthalpy values change with reaction temperature and hydrogen concentration moreover an increase in hydrogen concentration is accompanied by an increase in the reaction enthalpy.

1. Anikina E.Yu., Verbetsky V.N. //J. Alloys Compd. 2002. V. 330-332. P. 45.
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