

JIS

JAPANESE INDUSTRIAL STANDARD

Method for measuring the heat of hydriding reaction of hydrogen absorbing alloys

JIS H 7204—1995

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Method for measuring the heat of hydriding
reaction of hydrogen absorbing alloys

H 7204-1995

1. Scope This Japanese Industrial Standard specifies the method for measuring the heat of hydriding reaction of hydrogen absorbing alloys with a calorimeter.

Remarks 1. This method may be applied to the measurement of the heat of dehydrogenation.

2. For measuring the heat of hydriding, there is a method which utilizes van't Hoff's formula, other than the method using a calorimeter.

3. Heat of reaction per unit hydrogen content can be measured with a calorimeter.

4. The following standards are cited in this Standard.

JIS H 7003 Glossary of terms used in hydrogen absorbing alloys

JIS H 7201 Method of determining the PCT relations of hydrogen-absorbing alloys

JIS K 0512 Hydrogen

JIS Z 8801 Test sieves

2. Definitions For the main terms used in this Standard, the definitions in JIS H 7003 apply, and the rest of the terms are as follows:

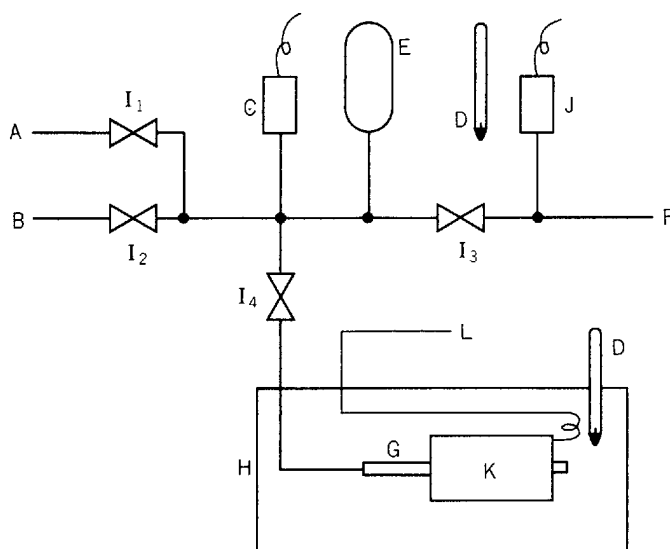
- (1) van't Hoff's formula Such a formula that the heat of hydriding is calculated from variation in temperature of hydrogen absorption equilibrium pressure in the reaction between a gaseous phase and a solid phase.
- (2) DTA curve The curve obtained by such a method that the sample and a reference material are placed under the same thermal conditions, and the temperature difference between the above two is measured as a function of temperature while both temperatures are being varied at an adjusted rate. The curve in a thermocouple electromotive force vs. time diagram is used herein.
- (3) isothermal base line The DTA curve obtained after steady state is achieved by setting the temperature of a twin type calorimeter constant.
- (4) DTA area The area surrounded by the isothermal base line and the DTA curve in the diagram of the measured DTA curve (V·s).

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(5) thermal equivalent The proportional constant which holds between the Joule's heat and the DTA area in the calibration experiment of a twin type calorimeter (J/V·s).

3. Measuring instrument The measuring instrument shall be composed of the components stated below in addition to compliance with 4. of JIS H 7201. The basic configuration of the measuring instrument is given in Fig. 1.

Fig. 1. Basic configuration of measuring instrument



A: helium gas supply system

B: hydrogen gas supply system

C: pressure gauge

D: thermometer

E: pressure accumulator

F: evacuation system

G: sample pipe

H: thermostatic chamber

I₁ to I₄: valves

J: vacuum gauge

K: twin type calorimeter

L: recorder

(1) Twin type calorimeter The twin type calorimeter shall be composed of a sample pipe, a temperature sensing plate, a heat sink, a thermocouple, and a microheater, and so structured as to be capable of measuring the thermal equivalent.

The conceptual drawing of the twin type calorimeter is given in Fig. 2.