

## Determination of the heat of formation of water

Article no: P3021501



### Principle

Standard molar enthalpies of formation  $\Delta_B H^\ominus$  are important compiled thermodynamics tabulation quantities for calculating standard enthalpies of reaction for any arbitrary reaction. They are defined as the heat of reaction occurring in the direct formation of one mole of the pertinent pure substance from the stable pure elements at constant pressure. For spontaneous and quantitative formation reactions, e.g. the conversion of hydrogen and oxygen to water, standard enthalpies of formation can be measured directly using calorimetry.

### Benefits

- Direct determination of standard enthalpy of formation
- Part of a system solution - glass jacket system easily expandable

### Tasks

Determine the enthalpy of formation of water by burning 100 ml  $H_2$  in a closed glass jacket calorimeter.

### Learning objectives

- First law of thermodynamics
- Thermochemistry
- Calorimetry
- Enthalpy of formation
- Enthalpy of reaction

### Necessary accessories

- Precision balance 620g/0.001g

## Scope of delivery

Support base DEMO	02007-55	1
Support rod, stainless steel, different lengths	02031-00	2
Support rod, stainless steel, different lengths	02032-00	1
Support rod, stainless steel, different lengths	02033-00	1
Right angle boss-head clamp	37697-00	10
Universal clamp	37715-01	3
Gas-syringe holder with stop	02058-00	3
Glass jacket	02615-00	1
Calorimeter insert for glass jacket	02615-01	1
Lid for calorimeter insert	02615-02	1
Gas syringe, 100 ml, with 3-way cock	02617-00	3
Thermometer -10...+50 °C	38034-00	2
Techn. magnifier, 10x, d:23mm	64598-00	1
Silicone tubing, inner diameter 3 mm	39296-00	1
Magnetic stirring bar 30 mm, cylindrical	46299-02	1
Magnet, d = 10 mm, l = 200 mm	06311-00	1
PHYWE High voltage power supply with digital display, 10 kV DC: 0... ± 10 kV, 2 mA	13673-93	1
Connecting cord, 30 kV, 1000 mm	07367-00	2
Funnel, glass, top dia. 50 mm	34457-00	1
Graduated beaker, 1000 ml, plastic (PP)	36640-00	1
Steel cylinder hydrogen, 2 l, full	41775-00	1
Steel cylinder oxygen, 2 l, filled	41778-00	1
Reducing valve for hydrogen	33484-00	1
Reducing valve f.oxygen	33482-00	1
Table stand for 2 l steel cylinders	41774-00	2
Wrench for steel cylinders	40322-00	1
Rubber hose	39282-00	3

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Weather monitor, 6 lines LCD	87997-10	1
Water, distilled 5 l	31246-81	1

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