

Heat capacity of gases with Cobra3 3.2.02-11



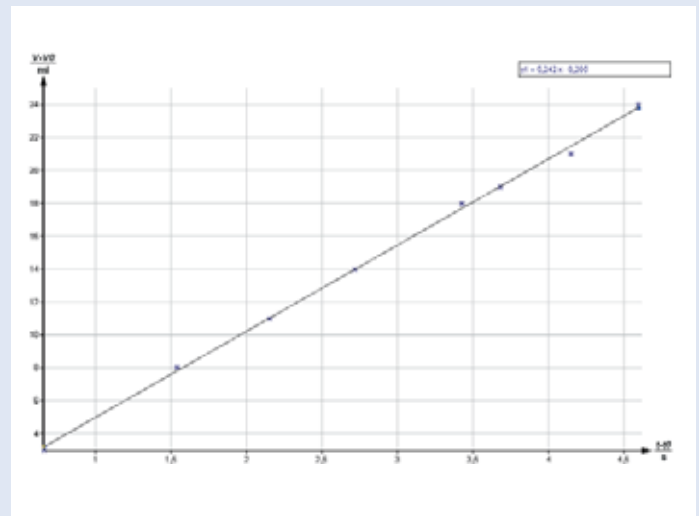
- What you can learn about ...
- Equation of state for ideal gases
 - 1st law of thermodynamics
 - Universal gas constant Degree of freedom
 - Mole volumes
 - Isobars
 - Isotherms
 - Isochors and adiabatic changes of state

Principle:

Heat is added to a gas in a glass vessel by an electric heater which is switched on briefly. The temperature increase results in a pressure increase, which is measured with a manometer. Under isobaric conditions a temperature increase results in a volume dilatation, which can be read from a gas syringe. The molar heat capacities C_V and C_p are calculated from the pressure or volume change.

What you need:

Cobra3 BASIC-UNIT	12150.00	1
Power supply 12V/2A	12151.99	1
Software Cobra3 Universal recorder	14504.61	1
Precision manometer	03091.00	1
Hand held measuring instrument Pressure, RS 232	07136.00	1
Data cable 2 x SUB-D, plug/socket, 9 pole	14602.00	1
Cobra3 current probe 6 A	12126.00	1
Mariotte flask, 10 l	02629.00	1
Gas syringes, without cock, 100 ml	02614.00	2
Glass stopcocks, 1 way, straight	36705.00	1
Three-way cock	36732.00	1
Rubber stopper, $d = 32/26$ mm, 3 holes	39258.14	1
Rubber stopper, $d = 59.5/50.5$ mm, 1 hole	39268.01	1
Rubber tubing, $d_i = 6$ mm, $l = 1$ m	39282.00	2
Nickel electrode with socket, $d = 3$	45231.00	2
Nickel electrode	45218.00	1
Chrome-nickel wire, $d = 0.1$ mm, $l = 100$ m	06109.00	1
Scissors, stainless, $l = 140$ mm, round	64625.00	1
Push button switch, circuit closing	06039.00	1
Connecting cable, 4 mm plug, 32 A, red, $l = 50$ cm	07361.01	1
Connecting cable, 4 mm plug, 32 A, red, $l = 75$ cm	07362.01	1
Connecting cable, 4 mm plug, 32 A, blue, $l = 50$ cm	07361.04	4
Tripod base -PASS-	02002.55	1
Retort stand, $h = 750$ mm	37694.00	2
Universal clamp	37718.00	2
Right angle clamp	37697.00	2



Volume change ΔV as a function of the heat-up time Δt . $U = 4.59$ V, $I = 0.43$ A.

Tasks:

Determine the molar heat capacities of air at constant volume C_V and at constant pressure C_p .

Complete Equipment Set, Manual on CD-ROM included
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