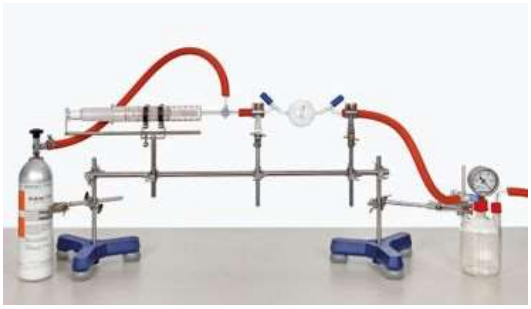
TECHNICAL DATA

Determination of molar mass using the ideal gas law

Article no: P3010401



Principle

All gases may be considered, to a first approximation, to obey the ideal gas equation which relates the pressure p, volume V, temperature T and amount of substance n of a gas. The amount of gas n is expressed as the number of moles and is equal to m / M where m is the mass of gas present and M is the mass of one mole of the gas. The volume occupied by a known mass of gas is to be measured at a given temperature and pressure, so that the ideal gas equation can be used to estimate the molar mass of the gas.

Benefits

- Examination of many different gases possible
- Illustrative experimental setup

Tasks

Determine the molar masses of the gases helium, nitrogen, carbon dioxide and methane.

Learning objectives

- Molar mass and relative molar mass
- Properties of gases
- Ideal and ordinary gases
- Equations of state

Necessary accessories

- Precision balance 620g/0.001g

Scope of delivery

Tripod base PHYWE	02002-55	2
Support rod, stainless steel, different lenghts	02031-00	2
Support rod, stainless steel, different lenghts	02033-00	1
Universal clamp	37715-01	4
Right angle boss-head clamp	37697-00	7

Gas-syringe holder with stop	02058-00	1
Gas syringe, 100 ml, with 3-way cock	02617-00	1
Glass sphere, 2 stopcocks, 100 ml	36810-00	1
Secure bottle, 500 ml, 2 x Gl 18/8, 1 x 25/12	34170-01	1
Spring manometer, 0...-1000 mbar	34170-02	1
Glass tubes, right-angled, 150 x 80 mm	MAU-10022500	1
Stopcock,3-way,t-shaped, glass	36731-00	1
Rotary valve vacuum pump, two stages, 115 V / 230 V	02741-95	1
Adapter for vacuum pump	02657-00	1
Rubber hose for vacuum	39286-00	3
Rubber hose for vacuum	39288-00	1
Hose clip, diam. 8-16 mm, 1 pc.	40996-02	4
Hose clip f.12-20 diameter tube	40995-00	2
Weather monitor, 6 lines LCD	87997-10	1
Silicon grease Molykote, 50 g	31863-05	1
Fine control valve	33499-00	1
Compressed gas, nitrogen, 12 l	41772-04	1
Compressed gas, CO2, 22 g	41772-06	1
Compressed gas, methane, 12 l	41772-08	1
Compressed gas, helium, 12 l	41772-03	1