Characteristic and efficiency of PEM fuel cell and PEM electrolyser 4.1.11-00

What you can learn about ...

- ➔ Electrolysis
- ➔ Electrode polarisation
- ➔ Decomposition voltage
- ➔ Galvanic elements
- ➔ Faraday's law

Principle:

In a PEM electrolyser, the electrolyte consists of a proton-conducting membrane and water (PEM = Proton-Exchange-Membrane). When an electric voltage is applied, hydrogen and oxygen are formed. The PEM fuel cell generates electrical energy from hydrogen and oxygen.

The electrical properties of the electrolyser and the fuel cell are investigated by recording a current-voltage characteristic line. To determine the efficiency, the gases are stored in small gasometers in order to be able to measure the quantities of the gases generated or consumed.

What you need:

PEM fuel cell	06747.00	1
PEM electrolyser	06748.00	1
Connection box	06030.23	1
Resistor 10 Ω 2%, 2W, G1	06056.10	2
Resistor 5 Ω 2%, 2W, G1	06055.50	1
Resistor 2 Ω 2%, 2W, G1	06055.20	1
Resistor 1 Ω 2%, 2W, G1	06055.10	2
Short-circuit plug, black	06027.05	2
Gas bar	40466.00	1
Graduated cylinder, 100 ml, plastic	36629.01	1
Rubber tubing, d = 4 mm	39280.00	1
Rubber tubing, d_i = 6 mm, l = 1 m	39282.00	1
Pinchcock, width 10 mm	43631.10	4
Hose connector, reducing, d = 3-5/6-10 mm	47517.01	2
Wash bottle, plastic, 500 ml	33931.00	1
Beaker, 250 ml, low form, plastic	36013.01	1
Stopwatch, digital, 1/100 s	03071.01	1
Hand held measuring instrument Pressure, RS 232	07136.00	1
Laboratory thermometers, -10...+100°C	38056.00	1
Digital multimeter 2010	07128.00	2
Power supply, universal	13500.93	1
Connecting cable, 4 mm plug, 32 A, red, l = 50 cm	07361.01	3
Connecting cable, 4 mm plug, 32 A, blue, l = 50 cm	07361.04	2
Connecting cable, 4 mm plug, 32 A, red, l = 75 cm	07362.01	1
Connecting cable, 4 mm plug, 32 A, blue, l = 75 cm	07362.04	1
Water, distilled 5 l	31246.81	1

Complete Equipment Set, Manual on CD-ROM included

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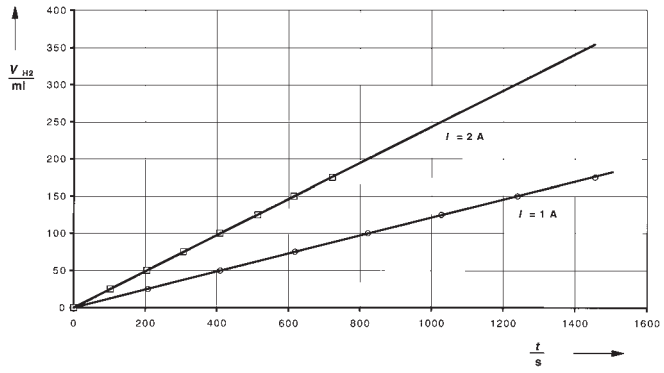

Volume of the hydrogen generated by the PEM electrolyser as a function of time at different current I.

Tasks:

1. Recording the characteristic line of the PEM electrolyser.
2. Recording the characteristic line of the PEM fuel cell.
3. Determination of the efficiency of the PEM electrolysis unit.
4. Determination of the efficiency of the PEM fuel cell.