Leseprobe

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Contents and Layout of the Case

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2. Knob to fasten elastic cord (manual fixing)
3. Instructions
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5. Suspension for the baseplate

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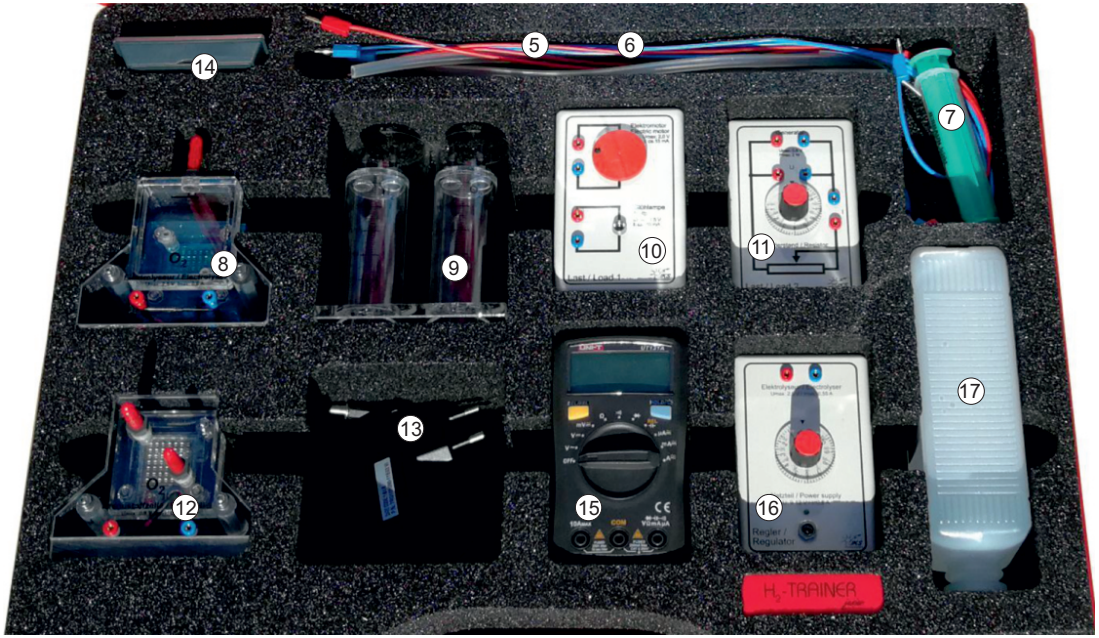

5 8 Measuring cables, 4x red, 4x blue
6 4 Silicon tubes
7 Syringe with sprout
8 Electrolyser
9 Gas storage
10 Load 1
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12 Fuel cell
13 Power supply unit
14 Timer
15 2 Multimeters (stacked)
16 Regulator
17 Bottle with distilled water

Contents and Layout of the Case

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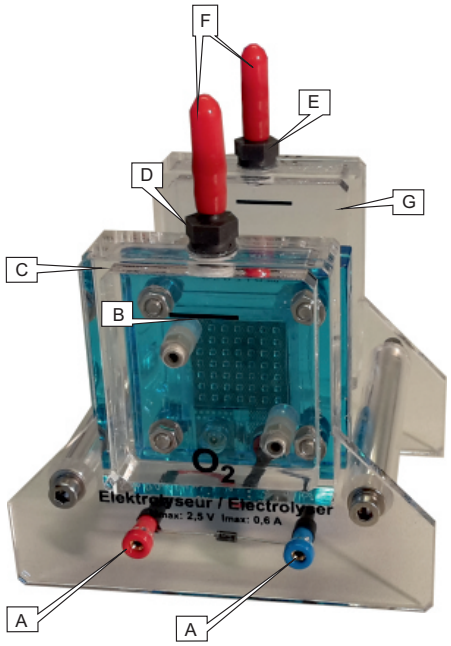
Commissioning - Preparing the individual Devices for the Experiments

Electrolyser



1. Take off the fitting caps **F** from the connecting sleeves **D** and **E** and put them in the corresponding space **E** of the baseplate (1) .

2. Check the water level on the oxygen and hydrogen side (**C** and **G**).
   The water level must be at the level marks B . If this is not the case, put the sprout on the attached syringe (7) and insert it into the connecting sleeve **D** / **E** . Siphon off water or fill in new water from the bottle (17) .

⚠ **Use o n l y distilled water for operation!**

Make sure that the connections A have the correct polarity.
The electrolyser may not be operated with inverted polarity.

While storage, using and transport protect against frost!
Gas production with put on caps is forbidden. Danger of overpressure and jump off of the caps. (Injury danger)
Housing sensitive to impact stress.

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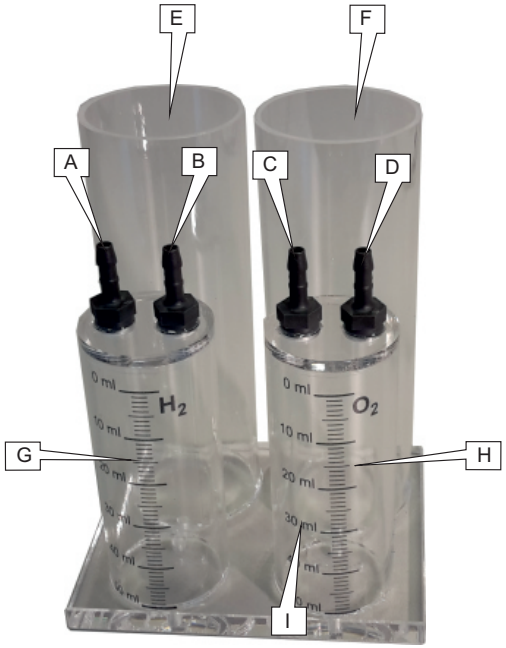
Electrolyser



Fill distilled water into the orifices **E** and **F** of the gas storage (9) until the water level in the gas collecting chamber **G** and **H** reaches exactly the **0 ml** mark on the scale **I** .
If the mark is exceeded, take away the exhaust water using the attached syringe (7) .

⚠ **Use o n l y distilled water for refilling!**

Housing sensitive to impact stress.

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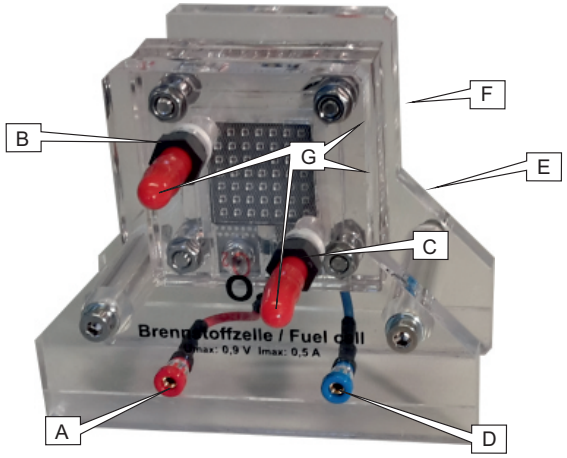
Commissioning - Preparing the individual Devices for the Experiments

Fuel cell



Remove the upper fitting caps **G** from the connecting sleeves **C** and **E** and put them in the corresponding space **E** of the baseplate (1).

⚠ **While storage, using and transport protect against frost!**
Housing sensitive to impact stress.

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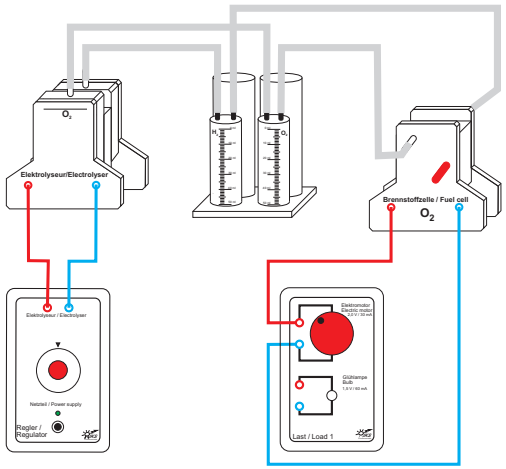
Venting the System as Preparation for the Experiments 5 and 6



Attention:
If experiments are carried out with the fuel cell, it is extremely important to remove the atmospheric air from the experimental setup beforehand. Otherwise it would accumulate in front of the membrane of the fuel cell and the fuel cell would have little or no power. With these venting instructions you ensure that only hydrogen or oxygen is in front of the membrane.

Assemble the components as shown above. The sealing caps are attached to the lower connection pieces **C** and **E**.
Note the polarity on the electrolyser!
After assembly, the electrolyser, the gas holder, the fuel cell and the hoses are filled with air. To vent the apparatus, you must proceed as follows:

Fill the openings **E** and **F** of the gas holder with distilled water until the water level in the gas collection chambers **G** and **H** exactly reaches the **0** ml mark on the scale **I**.
If the mark is exceeded, remove the excess water with the enclosed syringe.

Set the slider to maximum. Wait until the reservoir contains **50ml** H2 / **25ml** O2.

Then remove the sealing caps **G** from the **lower** connection piece **C** of the fuel cell and let the oxygen flow out almost completely until just before the filling mark: **0** ml. Please repeat this with the connecting piece **E** and the hydrogen. Then put the caps back on immediately. The electric motor of the **load 1** rotates as evidence of the energy conversion.
Remove the measurement cables to **load 1**.
Now fill up the gas reservoir again up to **50** ml H2 / **25** ml O2.
Set the slider to 0.
The setup is now prepared for the experiments with the fuel cell.

Just before you start the experiment, please allow approx. **10-15 ml** H2 and O2 to flow out again at the top stopper of the fuel cell!

If the fuel cell does not perform well in the further experiments, repeat the venting instructions.

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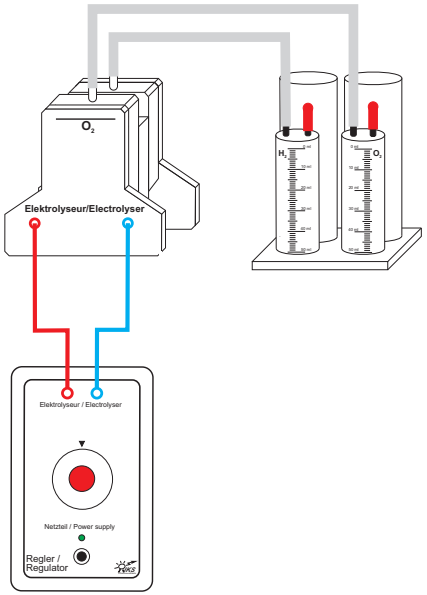
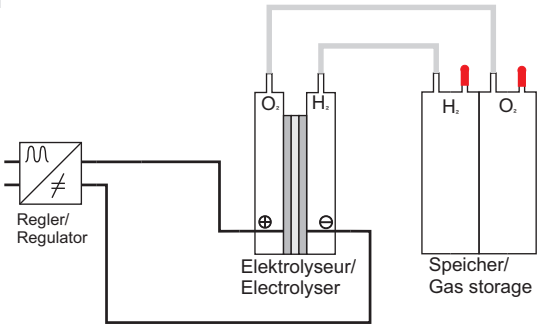
Measuring the Volume Ratio of the Gases Produced — Experiment 1

Set-up



Wiring diagram



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Information

During an electrolysis, the gases oxygen and hydrogen are produced from liquid water.
In this experiment, the ratio between the produced gas volumes shall be examined.

Task

Set up the experiment according to the figure above.

Observe the polarity at the electrolyser!

The gas storage should be filled with distilled water to the **0** ml mark.

Close the right connecting sleeves of the gas storage with the fitting caps to prevent gas from streaming out.

Set the regulator to maximum. Wait until approx. **20** ml of hydrogen have been produced and read the produced gas volumes for hydrogen and oxygen.

	Gas volumes produced V in ml
Hydrogen	
Oxygen	

1. What is the ratio between the gas volumes produced?

$$\frac{V(H_2)}{V(O_2)} = \quad =$$

2. How can this ratio be explained?

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3. State the reactions taking place at the anode and the cathode and write down the overall reaction equation.

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