

The solar cell as a diode

Task and equipment

Information for teachers

Additional Information

The pupils should become familiar with the behavior of a solar cell which is not being illuminated. In doing this, a DC voltage is applied to the the cell and it is ascertained whether a current is flowing, with the aid of a light bulb. Then the polarity of the voltage is reversed.

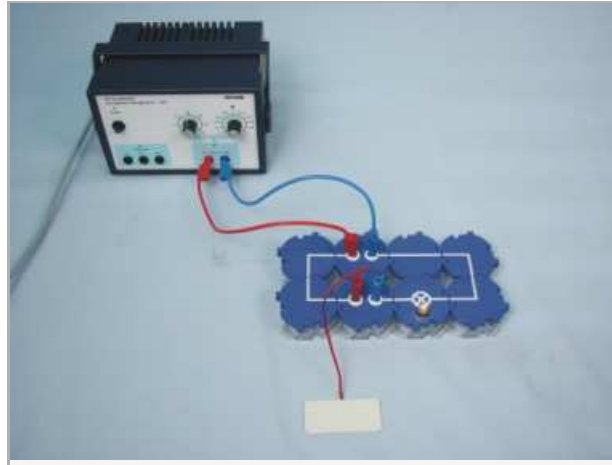
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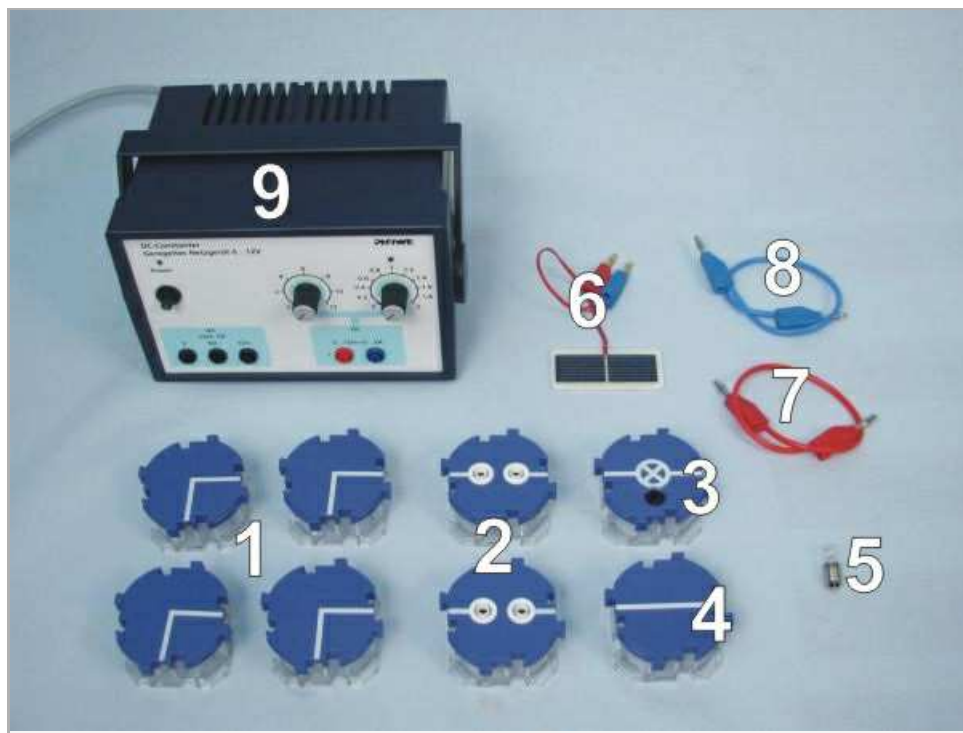
Task

How does a cell which is not illuminated behave within a DC circuit?

Place the solar cell, with the white side (platen) looking up, on the table and observe what happens with each of the possible polarities of the DC circuit.



Equipment



Position No.	Material	Order No.	Quantity
1	Angled connector module, SB	05601-02	4
2	Interrupted connector module, SB	05601-04	2
3	Socket module for incandescent lamp E10, SB	05604-00	1
4	Straight connector module, SB	05601-01	1
5	Filament lamps 4V/0.04A, E10, 10	06154-03	(1)
6	Solar cell 2.5 x5 cm, with plugs	06752-11	1
7	Connecting cord, 32 A, 250 mm, red	07360-01	1
8	Connecting cord, 32 A, 250 mm, blue	07360-04	1
9	PHYWE power supply DC: 0...12 V, 2 A / AC: 6 V, 12 V, 5 A	13506-93	1

Set-up and procedure

Set-up

Experiment 1

Build the circuit as in Fig. 1 and place the solar cell with the white side (platen) looking up, on the table.

Set the voltage on the power supply to 0 V.

Pay special attention to which cable is connected to which terminal.

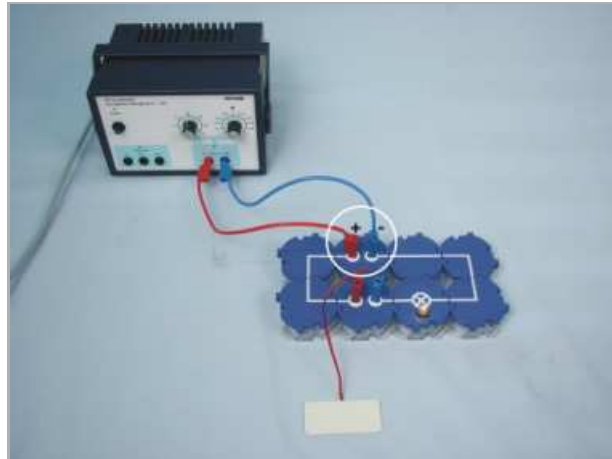


Fig. 1

Experiment 2

Build the circuit as in Fig. 2. The connections to the inputs from the power supply are reversed with respect to Fig. 1.

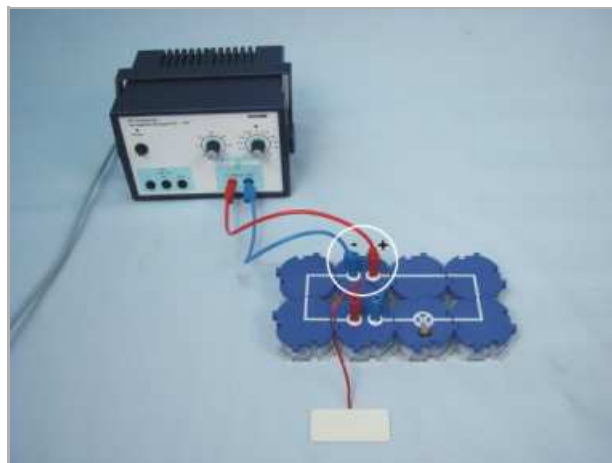


Fig. 2

Procedure

Experiment 1

Turn the voltage knob slowly up to 5 V (Fig. 3), and observe the filament lamp. Record your observations in Result - Observations 1 in the report.



Fig. 3

Set the voltage back to 0 V and turn the device off.

Experiment 2

Switch the inputs from the power supply (see Fig. 2, under "Set-up").

Repeat the experiment and record your observations in Result - Observations 2.

Report: The solar cell as a diode

Result - Observations 1

Record your observations from experiment 1:

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Result - Observations 2

Record your observations from experiment 2:

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Evaluation - Question 1

What properties of solar cells can you deduce from the observations?

Evaluation - Question 2

What does one call the electric circuit elements which have the characteristics mentioned in Question 1?
