

Student experiment
(5th - 10th grade)

The Daniell cell

🕒 Time: max. 15 min.

Safety:

safety glasses



Instruments:

- empty pill packaging
- copper wire (or nails)
- zinc wire (or nails)
- 9-Volt flat battery
- tape
- two alligator clips
- cable material
- voltmeter
- paper towel (or a wick)

Chemicals:

- 1M copper sulfate solution (H: 302-319-315-410; P: 273-305+351+338-302+352)
- 1M zinc sulfate solution (H: 302-318-410; P: 280-273-305+351+338)

Experiment:

- Fill one chamber of the empty pill packaging with copper sulfate solution and a second with zinc sulfate solution.
- Place the copper wire (or nail) into the copper sulfate solution and the zinc wire (or nail) into the zinc sulfate solution.
- Use the alligator clips to connect the nails to the voltmeter using the cable material.
- Connect the contents of the two chambers using either a paper towel bridge (or a wick) Observe what happens to the voltmeter.

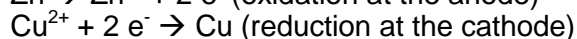


Observations:

An electric current of approximately 1,1V is observed.

Results:

Reduction and oxidation reactions take place in the two spatially separated chambers:



As this process begins, electrons flow from the zinc wire to the copper wire. The electrical current can be explained as the difference in electrical potential between the two types of wire.

Disposal:

The copper and zinc sulfate solutions must be disposed of in the container for heavy metal waste.
