

For Teachers Electrochemistry lab experiences with CRMs

Module 2

Objective: Potato galvanic cell construction

Necessities

List of materials/tools

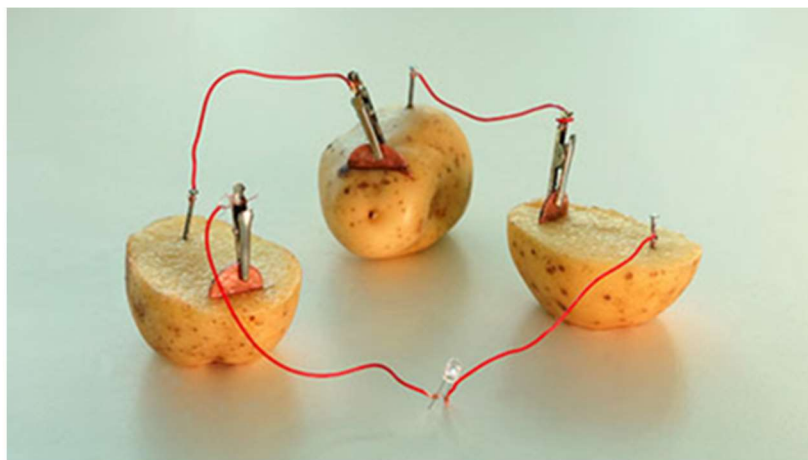
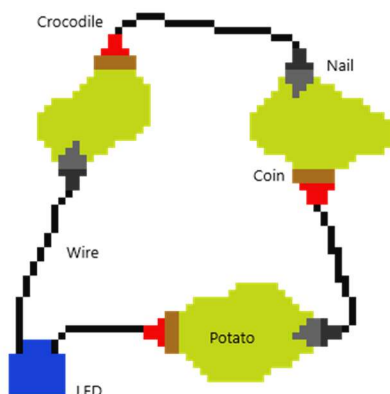
- 3 potatoes
- 3 galvanized nails (coated in zinc)
- 3 copper coins
- 3 crocodile clips
- Copper wire
- Butter knife and/or scissors
- 1 LED

Lab Procedure

- First, Insert a copper coin into one end of the potato and a nail into the other end. We may need to use the knife to make a groove in the potato to insert the coin.
- Cut four pieces of wire, each about 15 cm long. With each piece of wire, use the scissors to remove the plastic covering on both ends of the wire. About 3 cm of covering should be removed on each side.
- Wrap one end of the exposed wire around the crocodile clip. Make sure there is good contact with the metal of the clip and the copper. Attach the crocodile clip to the coin. Repeat with all three potatoes.
- Wrap the other end of the wire around a nail on a different potato. Make sure the exposed wire is in tight contact with the nail.
- Take the fourth wire and wrap one end around the last free nail.
- Wrap the free wire on the coin/crocodile end around the long leg of the LED. Wrap the nail wire around the short end of the LED, closing the circuit and making it light up. You may also measure the voltage with a multimeter.

Note: You should make sure the copper wires do not touch each other. A LED needs at least 1.5 volts and 10 milliamps of current, and the potato battery supplies around 0.5 V, **so if students don't get enough voltage to illuminate it tell them to connect more potatoes in series.**

For Teachers Electrochemistry lab experiences with CRMs



Conclusions

Connecting several potatoes in series using pieces of wire adds the power of each potato to create a stronger battery.



Questions/Quiz and Solutions

Q1) Complete the gaps with: Zn or Cu

- Zn oxidizes in this process.
- Electrons flow from the Zn end to the Cu end through the wire.
- Zn metal is the negative end of the battery, while Cu metal is the positive one.

Q2) What happens to current and voltage when we connect potato cells in series, as in the experiment?

Current is the same for all elements, total Voltage is the sum of the individual potatoes voltages.

Q3) How will current and voltage change if we connect potato cells in parallel instead of in series?

Voltage is the same for all elements, total Current is the sum of the individual intensities.