# Glowing Pickle Demonstration: Veatta Berry

# Teacher's Guide

## Goals

- To learn about electrons, and how electrons can exist in different energy levels
- To see evidence of electronic transmissions from colored light

## The Demonstration

In this demonstration, students see what happens when electricity is passed through a pickle. They see light glowing, and make the connection between electrical energy and light energy given off by the salt solution inside the pickle.

## Materials

- Ground Fault Interrupt (GFI) wall outlet
- A big dill pickle
- 2 ring stands
- 2 clamps for the ring stands
- A Variac power supply; with the Variac you can control the electricity that is applied
- 2 forks
- A six-foot extension cord
- Heat shrink tubing—about four inches for each fork
- Paper towels

## SAFETY

Electricity is extremely dangerous and can be deadly!

Take all safety considerations to make sure that no one approaches your electric circuit while you do the experiment.

Wear safety goggles at all times during the demonstration.

Open the window, because it smells!

## Preparation

Make sure that the extension cord is disconnected from any electric source before beginning!

Cut off the outlet end of the extension cord.

Split the extension cords at the end for about a foot. They should be well separated so you can put the forks into the pickle.

Connect the wires of the extension cord to the forks and cover them with heat shrink tubing for safety.

Set up the ring stands about a foot apart.

Put the forks onto the ring stands with the clamps, making sure the forks are facing each other.

Make sure that no one approaches the circuit before, during and after the demonstration, while it is still connected!

## The Demonstration

Put the pickle in position: stick one fork into the pickle—it is best to put all the teeth of the fork into the pickle, maybe even a little further in.

Now stick the other fork into the pickle. BE CAREFUL THAT THE FORKS DO NOT TOUCH EACH OTHER, otherwise they will arch!

WITH THE VARIAC OFF AND AT ZERO POWER, plug the extension cord into the Variac, and ONLY THEN plug the Variac into the GFI wall outlet.

LEAVE THE VARIAC POWER AT ZERO and turn on the switch.

SLOWLY turn up the voltage to 120 volts on the Variac (the standard voltage from a regular wall outlet).

The pickle will start dripping. Then it will hiss, and smoke will be seen coming out of it. Shortly after that it will start glowing yellow. Go on until it stops, or do it several times. For best results, turn off the lights.

At the end of the demonstration, TURN THE VARIAC BACK TO ZERO, SWITCH IT OFF AND UNPLUG IT. Only then can you touch the other parts of the system.

## Comment

If you soak the pickle for one week ahead of time in salt solutions other than NaCl, it will glow in different colors, for example: KCl, yields pink glowing, $CuCl_2$ glows green, and so on.

## Lecture Notes

I will add energy, by introducing electricity into the pickle.

You see some smoke already.

Energy is going through the solution.

(Turn off the lights) I have a glowing pickle!

Lets talk about how I can get a pickle to glow? What is going on?

I added electricity, I'm adding energy, so, what inside that pickle is actually glowing? The electricity excites the sodium inside the NaCl solution to emit yellow light.

## References: Links

http://www.exploratorium.edu/cooking/pickles/activity-kosher_dill.html
How to make a pickle battery, with illustrations.

## References: Readings

Weimer, P.M., and Battino, R. (1996) "The Incredible 'Glowing' Pickle and Onion and Potato and...," *Journal of Chemical Education,* Vol. 73, No. 5, p: 456 (abstract only).