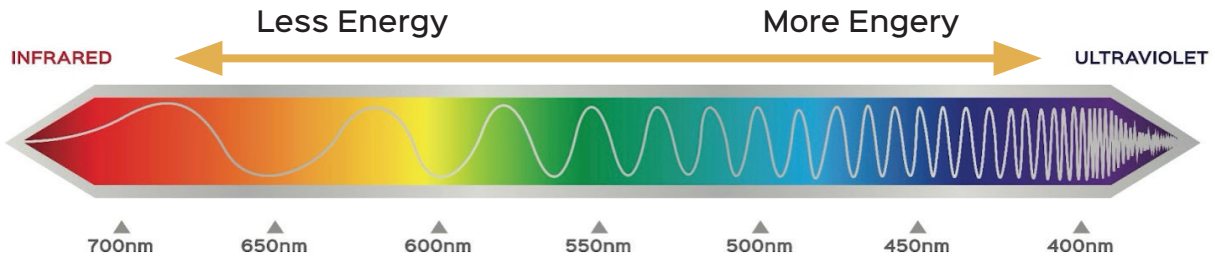
LESSON 8

EXCITED ELECTRONS FLAME TEST

Knowing how atoms absorb and release energy is a helpful way to identify different elements. When electrons in certain elements go from an excited state back to their ground state, they release energy, and sometimes that energy is released in the form of light. In this lab, you'll be watching the colors emitted by certain elements when held over a flame.



NOTE: While this is a fascinating lab, it can also be dangerous if proper safety protocols are not followed. Make sure you read through ALL directions and follow ALL safety protocols before you start the experiment. It is important that you use safety goggles and gloves. Follow all guidelines when completing this experiment. Also, make sure you know the location of the nearest fire extinguisher and how it works. It's always best to err on the side of caution.

Supplies

- 6-in. cotton swabs
- Candle
- Calcium chloride
- Potassium chloride
- Sodium chloride (table salt)
- Gloves
- 2 beakers (or small glass bowls)
- Lighter or matches
- Copper chloride
- Iron chloride
- Safety goggles

Instructions

1. Read the lab instructions through before beginning. Then write your title, introduction, and hypothesis to your lab report. Be sure to include a prediction of the colors you think each metal salt will burn.
2. Ensure your station is completely clear, especially of any flammable objects. Arrange your supplies so they are in reach but away from the flame of the candle.
3. Put on safety goggles and gloves. Then place your candle in the center of your workspace and light it.
4. Fill your beaker ¼ of the way full of water. Place your water beaker and an empty waste beaker to the upper left of your candle.
5. Sprinkle a small amount of each metal salt on to a small plate or bowl. Label the chemicals and place them in the same order as the materials list and table below.
6. Dip your first cotton swab into the beaker of water to moisten the tip. Now gently dip your swab into one of the metal salts and dab it around until the tip is covered.
7. Place your now-covered cotton swab over the flame, making sure to keep your hands to the side of the flame, not over the flame. Allow the top of the cotton swab to engulf in flames. Note the color you see in the flame.
8. When you remove your cotton swab from the flame, the cotton swab should extinguish itself. Place this cotton swab in the waste beaker.
9. Record the color you saw in the flame on your table below.
10. Repeat steps 6-9 for your remaining metal salts.

11. Once you finish observing the flame color for each of your metal salts, blow out your candle, dispose of your chemicals, and pour out the water and the waste in your waste beaker. Clear your area and wipe down any surfaces. Rinse out and clean your beakers.

Metal salt	Observed flame color
Calcium chloride	
Copper chloride	
Iron chloride	
Potassium chloride	
Sodium chloride	

Discussion Question

Why do the metals you observed show colors when heated? Did the elements' flame colors match your predictions?