

Metal? Nonmetal? You Decide.

Purpose: The purpose of this lab is to determine if a particular element is a metal or nonmetal.

Materials:

Conductivity apparatus

Hammer

HCl (hydrochloric acid)

CuCl₂ (copper chloride solution)

Wellplate

Forcep

Element Samples

Safety:

- Eye goggles must be worn at all times
- Use the forceps to move your element samples as some people may be allergic to certain samples
- HCl is a strong acid and will attack your skin. If some HCl comes in contact with your skin begin rinsing the area with tap water and have one of your lab partners get the teacher immediately.

Prelab Questions:

- What is a conductor? An insulator?
- Define malleability.
- If an element reacts with HCl or CuCl₂ what types of changes might you observe?

Procedure:

- Observe and record the appearance of each element including physical properties such as color, luster and form (nonmetallic like table salt, or metallic like iron).
- Test each sample to see if it conducts electricity. Record whether the element is a conductor or insulator.
- Gently tap each sample with the hammer to see if it is malleable or brittle. Do no harm to the lab table!
- Test for the reactivity of each sample with CuCl₂ by placing a small sample into a clean well of your wellplate. Add 15 drops of CuCl₂ and observe for 3-5 minutes for any change to your sample.
- Test each sample for reactivity with HCl by repeating the procedure for CuCl₂. Make sure that your wells are clean!

Data:

Construct a data table that will effectively aid you in the lab process and will display your results in a way that is easy for others to understand.

Post-Lab Questions:

1. Classify each of these properties as either chemical or physical:
 - a. Appearance
 - b. Malleability
 - c. Conductivity
 - d. Reaction with HCl
 - e. Reaction with CuCl₂
2. How could you sort your elements into two groups based on their physical and chemical properties?
3. Which elements would belong to each group you described above?
4. Were there any elements that could fit into both groups? Explain.
5. Use the following information to classify each of your elements as a metal, nonmetal or metalloid.
 - Metals: have a shiny luster, are malleable, conduct electricity, usually react with acids and CuCl₂
 - Nonmetals: dull in appearance, brittle and do not conduct electricity
 - Metalloids: have properties in common with both metals and nonmetals
6. What were each of your elements? Use the periodic table to list their chemical symbol and atomic number.