



Ionic or Covalent Lab

Introduction:

Compounds can be classified by the types of bonds that hold their atoms together. Ions are held together by ionic bonds in ionic compounds; atoms are held together by covalent bonds in covalent compounds.

You cannot tell whether a compound is ionic or molecular simply by looking at a sample of it because both types of compounds can look similar. However, simple tests can be done to classify compounds by type because each type has a set of characteristic properties shared by most members. Ionic compounds are usually hard, brittle, water-soluble, have high melting points, and can conduct electricity when dissolved in water. Covalent compounds can be soft, hard, or flexible; are usually less water-soluble; have lower melting points; and cannot conduct electricity when dissolved in water.

Problem:

How can you identify ionic and covalent compounds by their properties.

Objectives:

- Examine the properties of several common substances.
- Interpret the property data to classify each substance as ionic or molecular.

Materials:

- Glass microscope slide
- Grease pencil
- Hot plate
- Spatula
- 4 small beakers (50 or 100 mL)
- Stirring rod
- Balance
- Conductivity tester
- Small graduated cylinder
- Thermometer (up to 150°C)
- 0.5 g samples of unknowns

Safety Precautions:

- Burns ...
- Electrical ...
- Chemical ...
- Cuts ...

Never use a grease pencil to write on the white label area of a beaker!!!

Procedure:

1. Use a grease pencil to draw lines dividing a glass slide into four parts. Label the parts A, B, C, and D.
2. Record all data in the table under Data and Observations.
3. Use a spatula to place a small amount of the first of the four substances on section A of the slide.
4. Repeat step 3 with your other three substances on sections B, C, and D. Be sure to use a clean spatula for each sample.
5. Place the slide on a hot plate. Turn the heat setting to medium and begin to heat the slide.
6. Gently hold a thermometer so that the bulb just rests on the slide. Be careful not to disturb your compounds.
7. Continue heating until the temperature reaches 90°C. Observe each section on the slide and record which substances have melted and the temperature at which they melted. Turn off the hot plate. Dispose of the microscope slide. Put away any equipment.
8. Wash and rinse 4 beakers with distilled water, label each beaker (E, F, & G) with a pencil.

A
B
C
D

Ionic and Covalent Lab

Name _____
 Period _____ Date _____

9. Add 0.5 g of compound E to one beaker and add 10 mL of DI water. Test the conductivity of controls E, F, & G. Record data in chart below.
10. Clean, rinse and reuse the beakers to test unknowns compounds A - D. Erase pencil label and re-label on the white area.
11. Weigh 0.5 g of each of the 4 substances and place the weighed samples in their beakers.
12. Add 10 mL of distilled water to each beaker.
13. Stir each substance, using a clean stirring rod for each sample. Note on

the table below whether or not the sample dissolved completely.

14. Test each substance for the presence of electrolytes (ions) by using a conductivity tester. Record below whether or not each acts as a conductor.

Analyze and Conclude

1. Classifying: Complete your data table below by classifying each of the substances you tested as ionic or covalent compounds based on your observations.

Data and Observations

Substance	Did it melt? (Y/N)	Melting Point Temperature (°C)	Did it dissolve in water? (Y/N)	Did the solution conduct electricity? (Y/N)	Classification
Unknown A					
Unknown B					
Unknown C					
Unknown D					
E NaCl (control)	XXXX	XXXX	XXXX		
F DI H ₂ O (control)	XXXX	XXXX	XXXX		
G Tap H ₂ O (control)	XXXX	XXXX	XXXX		

Apply and Assess:

1. What are the differences in properties between ionic and covalent compounds?

2. How did the melting points of the ionic compounds and the covalent compounds compare?

3. How did the conductivity of the ionic and the covalent compounds compare?

4. What happened to the bonds between the molecules when a substance melted?
