# Properties of Covalent and Ionic Compounds

Lab Challenge

Classify three unknown substances as ionic compounds or covalent compounds. Support your answers with data.

Data Collection

1. 🞎 Find the conductivity of distilled water and record it below.

Conductivity of distilled water: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ µS/cm

2. 🞎 Follow the instructions at each station and record your observations in Table 1.

**Table 1: Observed properties of salt and sugar**

|  |  |  |  |
| --- | --- | --- | --- |
| Property | Location | Ionic Compound: salt (sodium chloride) | Covalent Compound sugar (sucrose) |
| Hardness (soft and waxy or brittle and granular) | Station 1 |  |  |
| Melting point (high or low) | Station 1 |  |  |
| Soluble in water (soluble or not soluble) | Station 2 |  |  |
| Conductivity in water (µS/cm)  (conductor or non-conductor) | Station 2 | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ µS/cm | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ µS/cm |

3. 🞎 List two properties that will be the most helpful when you determine whether an unknown substance is an ionic compound or covalent compound. Explain your choices.

4. 🞎 Draw a diagram that illustrates the particles of salt and sucrose below. Show several formula units of each to clearly illustrate the difference between ionic and covalent bonding.

5. 🞎 Fill in Table 2 for your unknown substances.

**Table 2: Observed properties of unknowns**

|  |  |  |  |
| --- | --- | --- | --- |
| Property | Unknown A | Unknown B | Unknown C |
| Hardness (soft and waxy or brittle and granular) |  |  |  |
| Melting point (high or low) |  |  |  |
| Soluble in water (yes or no) |  |  |  |
| Conductivity in water (µS/cm)  (conductor or non-conductor) | \_\_\_\_\_\_\_\_\_\_\_ µS/cm | \_\_\_\_\_\_\_\_\_\_\_ µS/cm | \_\_\_\_\_\_\_\_\_\_\_ µS/cm |

6. 🞎 Fill in Table 3 below. Provide at least two piece of evidence for each unknown.

**Table 3: Identify the type of bonding (ionic or covalent) for each unknown substance**

|  |  |  |  |
| --- | --- | --- | --- |
| Unknown | Type of Bonding (Ionic or Covalent) | Draw the unknown at the molecular level | Evidence |
| Unknown A |  |  |  |
| Unknown B |  |  |  |
| Unknown C |  |  |  |

7. 🞎 Are the properties you tested physical or chemical properties? How do you know?

8. 🞎 How can you determine whether a pure substance is an ionic compound or a covalent compound?