HPS Ionic vs Covalent Compounds Virtual Lab 2021 Name:

**Objective 6:** Compare and contrast the physical & chemical properties of ionic and covalent compounds.

**Introduction**

Chemical compounds can be separated into two major categories: ionic compounds and covalent compounds. The properties of these compounds are summarized in the table below.

|  |  |
| --- | --- |
| Ionic Compounds | Covalent Compounds |
| Made of a metal and a nonmetal | Made of a nonmetal and a nonmetal |
| One atom takes electrons, one loses | Atoms share electrons |
| Higher melting and boiling points | Lower melting and boiling points |
| Generally solids at room temperature | Often liquids and gases at room temp |
| Usually hard/brittle | Often softer |
| Conduct electricity (electrolytes) | Do not conduct electricity |
| Dissolve readily in water | Do not dissolve readily in water |

**Purpose:** To determine whether a given list of substances are ionic or covalent compounds.

**Procedure:** While you watch the [video](https://live.myvrspot.com/iframe?v=fNjFhMGM5MTQ3NTU1N2I3YzcwMjhmYjhmNmZkZDE2NzI), there are four properties listed below that should be observed (read through them carefully before watching the video), record your observations in the space provided below. You will be asked to complete an organized data table, so keep things detailed, clear, and organized.

**4 properties:**

**A)** Physical Appearance - color, texture, physical state of solid, liquid, or gas. **(~ :10-1:30)**

**B)** Solubility in room temperature water. Water is a very polar molecule—it has both partial (+) and partial (-) charge. If the substance disappears when mixed with the water, that means it has dissolved. **(1:30-4:10)**

**C)** Ability to conduct electricity when mixed with water, using a light bulb. Record not just whether the bulb lights up but how bright, such as using none, +, ++, or +++ for amount of brightness **(~4:10-7:30)**

**D)** Melting time: given the same amount of heat, which compounds have a LOW melting point (melting time is relatively quick), or a HIGH melting point (melting time is relatively high or does not melt at all). NOTE that for melting time, YOU will time the melting, starting at zero when the flame is put under the substance, to when the substance begins to melt. Record this melting time. **(~7:30-end)**

**Data (~ :10-1:30) (1:30-4:10) (~4:10-7:30) (~7:30-end) *Predict!***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Compound | Physical Appearance  (color, texture, state of matter) | Solubility test (how easily substance dissolved) | Conductivity test  (+, ++, +++) | Melting point test (time it took for substance to melt) | Ionic or Covalent |
| Potassium iodide  KI |  |  |  |  |  |
| Potassium Chloride  KCl |  |  |  |  |  |
| Glucose  C6H12O6 |  |  |  |  |  |
| Paradichlorobenzene (PDCB) C6H4Cl2 |  |  |  |  |  |
| Potassium nitrate KNO3 |  |  |  |  |  |
| Benzoic acid C6H5COOH |  |  |  |  |  |
| paraffin wax C24H50 |  |  |  |  |  |
| Acetic acid CH3COOH |  |  |  |  |  |
| Hydrogen chloride HCl (aq) |  |  |  |  |  |

**Analysis**

1. What does the fact that acetic acid is a liquid, and HCl is a gas, tell you about their melting points compared to the solids tested?

2. Is there any one property that best indicates whether a compound is ionic or covalent? Explain your reasoning.

3. Are ionic and covalent compounds always different in every way described in the data table? Give examples from your lab.

4. What do you imagine are some uses for ionic compounds? What would be some uses for covalent compounds?