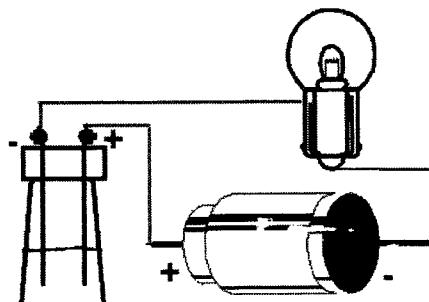


JHS Regents Chemistry Department
Conductivity Lab.



conductivity apparatus

Introduction:

The electrical conductivity of a substance is a measure of its ability to transport an electric current. The ability to conduct an electric current depends on the number and mobile charged particles, either electrons or ions. Dissociation describes the behavior of ionic compounds. In the solid state, ions are held rigidly in the crystal structure by ionic bonds. Dissociation occurs when ionic solids are dissolved in water or melted. In either case, the bonds holding the ions in the crystal lattice are broken and the ions are free to move. Ionization describes the behavior of polar substances.

In this investigation, you will test the ability or lack of ability various substance and solutions to conduct an electric current and use this similar set-up to detect the presence of ions.

Materials:

Conductivity apparatus

Chemicals listed on data page

Spot plate

Water bottle half filled with distilled water

Procedure:

1. Work in teams of two.
2. Do not touch the electrodes. Hands and surfaces of work area should be kept dry.
3. Place your spot plate on a sheet of white paper. Create a label system to keep track of chemical used in this experiment.
4. Place a *small* scoopful of each chemical that is to be tested in its own spot well.
5. Set the conductivity apparatus into each well (make sure to clean and dry the electrodes between each trial) and test for conductivity. Record your observation.
6. Add a small amount of water to each chemical.
7. Repeat step #5.

Name: _____

period: _____

Data Table:

Compound	Formula	Conductivity	Conductivity (Mixed with H ₂ O)	Bonding Type
Calcium chloride	CaCl ₂	X	✓	I
Distilled Water	H ₂ O	X	X	C
Copper	Cu	✓	✓	M
Sucrose	C ₁₂ H ₂₂ O ₁₁	X	X	C
Copper Sulfate	CuSO ₄	X	✓	I/C
Magnesium	Mg	✓	✓	M
Mineral oil		X	X	C
Starch	C ₆₀₀ H ₁₀₀₀ O ₅₀₀	X	X	C

Questions:

1. What class of solids conducts electricity?

metals

2. Explain why ionic compounds, in the solid state do not conduct an electric current?

they do not have free ions to conduct electricity

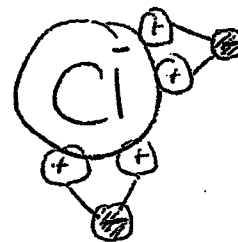
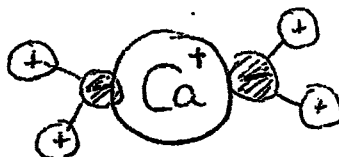
3. Explain why the liquid state (molten) and aqueous solutions of ionic compounds conduct electricity?

e⁻ are freed + able to conduct charges

4. Explain why molecules generally don't conduct electricity.

do NOT form ions (except acids!)

5. Define molecule-ion attraction. Illustrate this type of intermolecular of attraction using calcium chloride dissolved in water.

attraction btwn a molecule (H₂O) & an ion from an ionic solid

6. Describe metallic bonding and explain they conduct electricity.

sea of mobile e⁻ that allow electricity to travel through the sea of e⁻