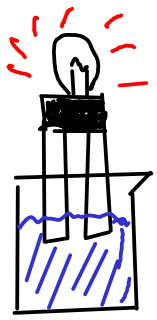
Ionic theory experiment



Simple conductivity tester: The more ions present in solution, the brighter the light.

SOME PURE COMPOUNDS (MOLECULAR AND IONIC)

DISTILLED WATER

Water is a simple molecular compound, so we don't expect it to be a conductor.

SOLID SODIUM CHLORIDE

In the solid state, ionic compounds have their ions bound to one another. They can't move freely, so they don't conduct!

SOLID SUCROSE $C_{12}H_{22}O_{11}$ (molecular)

Sucrose is a simple molecular compound, so we don't expect it to be a conductor. (No obvious charge carriers)

SOLUTIONS

SODIUM CHLORIDE + WATER

This solution conducts. The water pulls apart the sodium chloride crystals into their component ions (Na^+ and Cl^-)

SUCROSE + WATER

Sugar water is a nonconductor. Sucrose does not ionize in water (like most molecules).

ACIDS

PURE (GLACIAL) ACETIC ACID

Like the other molecules we tested, pure acetic acid is a nonconductor.

ACETIC ACID + WATER

Adding water to the acetic acid caused the bulb to light up. Acetic acid interacts with water (like other acids) to make ions. (H+ and acetate ions for this acid)

0.1M HYDROCHLORIC ACID (AQUEOUS)

Very good conductor. Hydrochloric acid exists in water almost entirely as ions (unlike acetic acid which is much "weaker")

EXCHANGE REACTION

SODIUM PHOSPHATE AND MAGNESIUM NITRATE

$$Na_3PO_4(aq) + Mg(NO_3)_2(aq) \rightarrow NaNO_3(aq) + Mg_3(PO_4)_2(s)$$

Na^+ PO_4^{3-} Mg^{2+} NO_3^-