

Name: \_\_\_\_\_

Chem 9, Section: \_\_\_\_\_

Lab Partner: \_\_\_\_\_

Experiment Date: \_\_\_\_\_

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### Electrical Conductivity of Aqueous Solutions

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#### Conductivity Testing - Evidence for Ions in Aqueous Solution

Solution	Observations: red LED   green LED	Conductivity	Strong, Weak, or Non-electrolyte	Ionized, Partially ionized, or Non-ionized
examples: LiOH (aq)	red bright, green dim	high	strong electrolyte	ionized
HNO <sub>2</sub> (aq)	red dim, green off	low	weak electrolyte	partially ionized
methanol (l)	red off, green off	none	non-electrolyte	non-ionized
distilled water, H <sub>2</sub> O (l)				
tap water, H <sub>2</sub> O (l)				
solid sodium chloride, NaCl (s)				
sodium chloride solution, NaCl (aq)				
solid calcium carbonate, CaCO <sub>3</sub> (s)				
calcium carbonate solution, CaCO <sub>3</sub> (aq)				
acetic acid, HC <sub>2</sub> H <sub>3</sub> O <sub>2</sub> (aq)				

aluminum nitrate, $\text{Al}(\text{NO}_3)_3$ (aq)				
ammonium hydroxide, $\text{NH}_4\text{OH}$ (aq)				
calcium hydroxide, $\text{Ca}(\text{OH})_2$ (aq)				
carbonic acid, $\text{H}_2\text{CO}_3$ (aq)				
ethanol, $\text{CH}_3\text{CH}_2\text{OH}$				
hydrochloric acid, $\text{HCl}$ (aq)				
magnesium hydroxide, $\text{Mg}(\text{OH})_2$ (aq)				
magnesium sulfate, $\text{MgSO}_4$ (aq)				
nitric acid, $\text{HNO}_3$ (aq)				
potassium iodide, $\text{KI}$ (aq)				
sodium chloride, $\text{NaCl}$ (aq)				
sodium hydroxide, $\text{NaOH}$ (aq)				
sucrose, $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ (aq)				

## Questions

- 1) Why must the electrodes on the conductivity apparatus, as well as all the beakers, be rinsed with distilled water after each conductivity test?
- 2) Why is distilled water a weaker conductor than tap water?
- 3) Why does solid sodium chloride act as a non-electrolyte while an aqueous while an aqueous NaCl solution acts as a strong electrolyte?

- 4) Classify each of the following as **non-ionized, partially-ionized, or ionized**.

Write each compound as it exists in aqueous solution e.g.  $\text{NaCl (aq)} \rightarrow \text{Na}^+ \text{(aq)} + \text{Cl}^- \text{(aq)}$

$\text{HCl (aq)}$  – a strong acid

$\text{Ca(OH)}_2 \text{(aq)}$  – a strong base

$\text{HC}_2\text{H}_3\text{O}_2 \text{(aq)}$  – a weak acid

$\text{Ba(OH)}_2 \text{(aq)}$  – a weak base

- 5) For the chemical reaction  $\text{H}_2\text{SO}_4 \text{(aq)} + 2 \text{NaOH (aq)} \rightarrow \text{Na}_2\text{SO}_4 \text{(aq)} + 2 \text{H}_2\text{O (l)}$

Write the complete ionic equation:

Write the net ionic equation:

- 6) For the chemical reaction  $\text{KNO}_3 \text{(aq)} + \text{NaCl (aq)} \rightarrow \text{NaNO}_3 \text{(aq)} + \text{KCl (aq)}$

Write the complete ionic equation:

Write the net ionic equation: