

1. PROPERTIES OF SOLUTIONS

UNIT 1 AQUEOUS CHEMICAL REACTIONS

CH40S

MR. WIEBE

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SOLUTIONS



Solutions are defined as homogeneous mixtures of two or more pure substances.

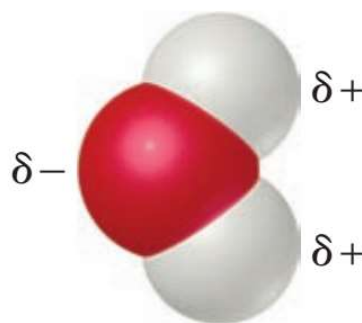
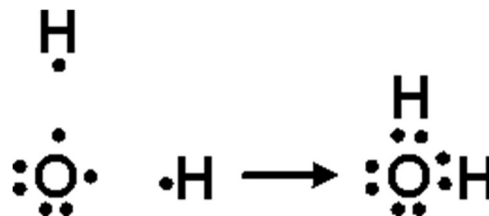
The **solvent** is present in greatest abundance.

All other substances are **solute**s.

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WATER IS POLAR

- Water is a covalent compound.
- Each atom of hydrogen and oxygen are bonded together with a shared pair of electrons.
- Oxygen pulls the pair of electrons closer to its nucleus.
- This creates a slight negative charge on each oxygen atom and a slight positive charge on the hydrogen atom.



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VISUALIZING POLARITY

Privacy & Terms

Molecule Polarity

Two Atoms

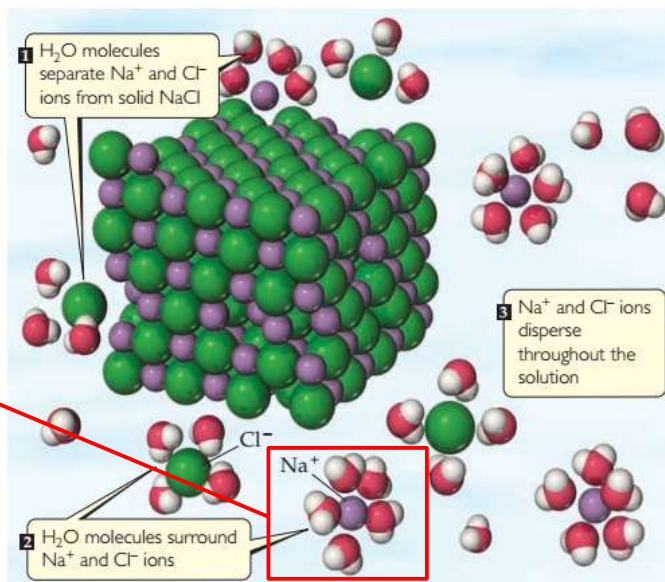
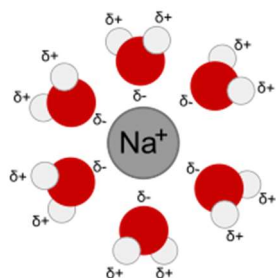
Three Atoms

Real Molecules

PIET

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DISSOCIATION

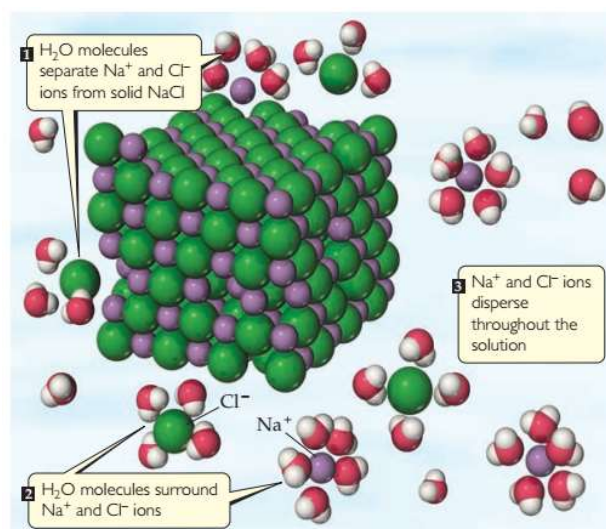


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ELECTROLYTES

When a solute dissolves and ions are produced, the solution conducts electricity.

This type of solution is called an **electrolyte**.



All soluble ionic compounds dissolved in water are electrolytes!

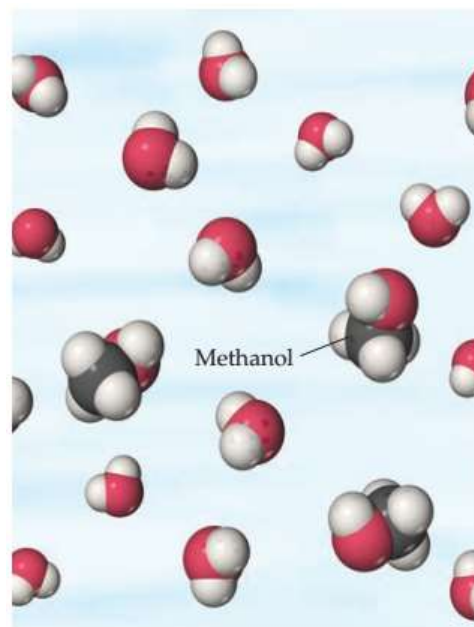
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NON-ELECTROLYTES

A **non-electrolyte** may dissolve in water, but it does not dissociate into ions when it does so.

Examples of this are:

- Low soluble ionic compounds
- Aqueous covalent compounds



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ELECTROLYTES

Pure water does not conduct electricity



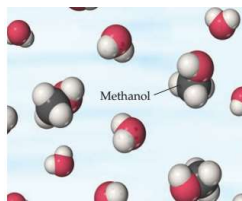
Pure water,
 $\text{H}_2\text{O}(l)$



An nonelectrolyte solution does not conduct electricity



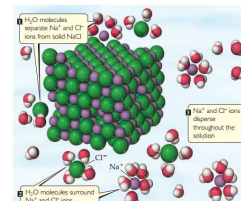
Sucrose solution,
 $\text{C}_{12}\text{H}_{22}\text{O}_{11}(aq)$



An electrolyte solution conducts electricity

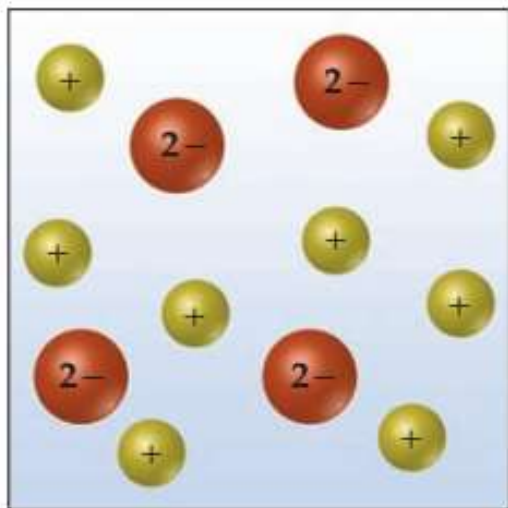


Sodium chloride solution,
 $\text{NaCl}(aq)$



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THINK ABOUT IT...



Which of the following soluble salts, when dissolved in water do you think would produce the model on the left? Why?

- Magnesium chloride
- Potassium chloride
- Potassium sulphate

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DISSOCIATION EQUATIONS

Write the dissociation equation for the dissolving of sodium carbonate in water.

Soluble Ionic Compounds	Important Exceptions
Compounds containing	NO ₃ ⁻ None
	CH ₃ COO ⁻ None
	Cl ⁻ Compounds of Ag ⁺ , Hg ₂ ²⁺ , and Pb ²⁺
	Br ⁻ Compounds of Ag ⁺ , Hg ₂ ²⁺ , and Pb ²⁺
	I ⁻ Compounds of Ag ⁺ , Hg ₂ ²⁺ , and Pb ²⁺
	SO ₄ ²⁻ Compounds of Sr ²⁺ , Ba ²⁺ , Hg ₂ ²⁺ , and Pb ²⁺

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DISSOCIATION EQUATIONS

Write the dissociation equation for the dissolving of aluminum sulphate in water.

Soluble Ionic Compounds	Important Exceptions
Compounds containing	None
NO_3^-	None
CH_3COO^-	None
Cl^-	Compounds of Ag^+ , Hg_2^{2+} , and Pb^{2+}
Br^-	Compounds of Ag^+ , Hg_2^{2+} , and Pb^{2+}
I^-	Compounds of Ag^+ , Hg_2^{2+} , and Pb^{2+}
SO_4^{2-}	Compounds of Sr^{2+} , Ba^{2+} , Hg_2^{2+} , and Pb^{2+}

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THINK ABOUT IT...

If you had a solution with 1.5 moles of CaCl_2 dissolved in it, how many moles of each ion would be present in the solution?

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