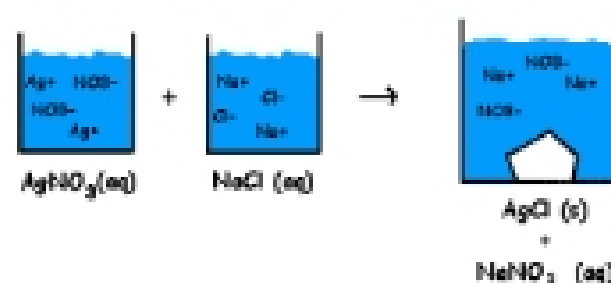
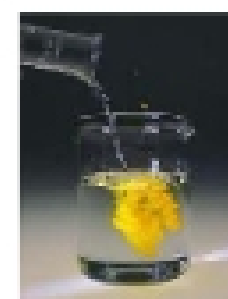
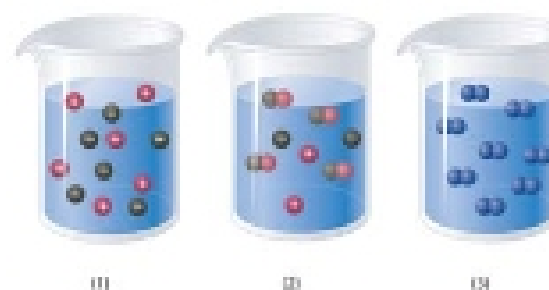


Fri, Nov 8

- Lecture 17 (Change)
 - Predicting Whether a Reaction Will Occur (7.1)
 - Reactions in Which a Solid Forms (7.2)
 - Describing Reactions in the Aqueous Phase (7.3)
- Questions we'll answer:
 - Many important reactions take place in water environment. How do we describe these reactions?
 - What are some common types of chemical reactions?



Solution Formation

- A **solution** is a mixture of a **solute** (thing being dissolved) and a **solvent** (the dissolving medium).
- The term "solvent" comes from the Latin *solvo*: I loosen, untie, undo, free up.

When **ionic compounds** dissolve in water, they separate into ions that can move independently of each other.



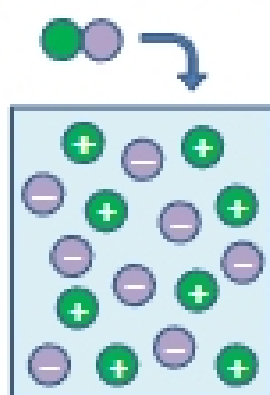
When **molecular compounds** dissolve in water, the atoms in the molecules do not separate from each other...the molecules remain intact.



Conductivity of Solutions

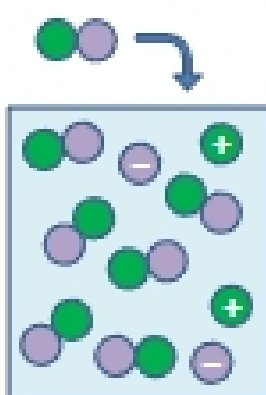
When ionic compounds dissolve in water, the ions separate and move around independently. These charged species can conduct electricity, and are therefore called **electrolytes**.

Strong Electrolyte



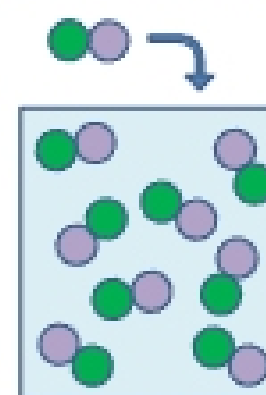
Each unit of the substance that dissolves in water produces separated ions

Weak Electrolyte



Only a small fraction of the units produce separated ions; the majority of the units remain undissociated

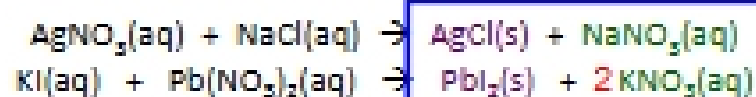
Non-Electrolyte



Covalent compounds (e.g. sugar, ethanol) do not produce charged species in solution.

Precipitation Reactions

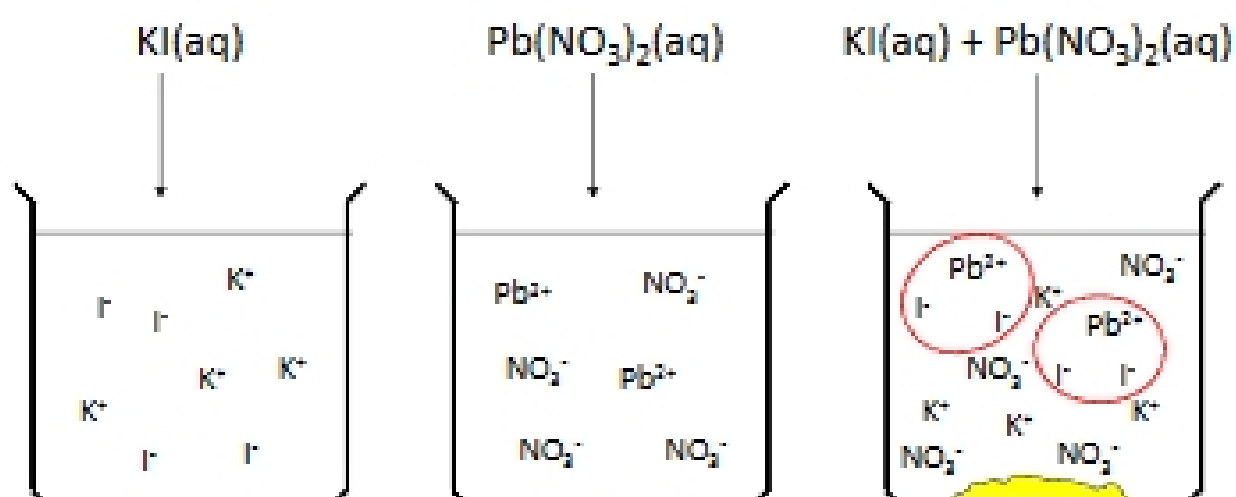
- Sometimes when we mix two solutions, an insoluble solid will form:



- The solid, called a **precipitate** (or **insoluble salt**) is insoluble in water.
- It is so insoluble that when its component ions find each other in solution, they get locked together in large clumps, driving the rxn towards products.
- The main challenge in precipitation reaction is predicting what (if anything) will form.



Precipitation Reactions



Solid lead(II) iodide precipitates out of solution.

Potassium and nitrate ions are left in aqueous solution.

Solubility Rules

- Notice in this example we know that Pb(NO₃)₂ isn't the precipitate since in our first example this compound was soluble in water.
- Therefore, one way to determine if a precipitate will form is to simply study combinations of reactions where you know that one of the potential precipitates is soluble.
- That's exactly how precipitation or "solubility" rules have been determined.