

**Solution** = a homogeneous mixture

In order for a solution to form, dissolving must occur.



Components of a solution:

- **Solvent**: Major component of mixture  
(the (l) if dissolving a (s))
- **Solute**: (or solutes) other dissolved substances

In  $\text{NaCl}(aq)$ ,  $\text{H}_2\text{O}$  = solvent  
 $\text{NaCl}$  = solute

One of the **fluid phases** (l) or (g) must be present in order for a solution to form.

Soluble (s) + (l) solvent  $\rightarrow$  (l) solution. (aq) if  $\text{H}_2\text{O}$  is solvent

(l) + (l)  $\rightarrow$  (l) solution if liquids are miscible

(g) + (l) solvent  $\rightarrow$  (l) solution

(g) + (g)  $\rightarrow$  (g) solution for all gases!

(s) + (s)  $\xrightarrow{\text{melt}}$  (l) soln  $\xrightarrow{\text{cool}}$  (s) solution

brass: (s) soln of Cu + Zn

Like dissolves like

(like polarities)

Recall that polar substances tend to dissolve other polar substances, and nonpolar substances tend to dissolve other nonpolar substances

### Common Polar Solvents

H<sub>2</sub>O

CH<sub>3</sub>OH

Acetone



These tend to dissolve:

Polar solutes

(AND soluble ionic cpds)

### Common Nonpolar Solvents

C<sub>6</sub>H<sub>14</sub> hexane

C<sub>7</sub>H<sub>8</sub> toluene

CCl<sub>4</sub> carbon tetrachloride

These tend to dissolve:

nonpolar solutes

Which solvent, water or hexane, will the following substances be more likely to dissolve in?

- ethanol (C<sub>2</sub>H<sub>5</sub>OH) H<sub>2</sub>O both polar
- CBr<sub>4</sub> hexane (nonpolar)
- I<sub>2</sub> hexane
- CuCl<sub>2</sub> (ionic) H<sub>2</sub>O
- <sup>(+)</sup> NH<sub>4</sub><sup>(-)</sup>Cl H<sub>2</sub>O
- greases, oils, etc. hexane  
nonpolar