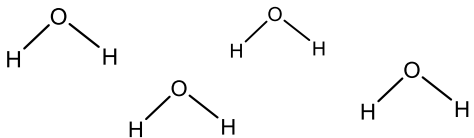


1) Why do **ionic** compounds (like NaCl) often dissolve in a very polar liquid (like water)?

- a) Draw before and after particle diagrams of what occurs when NaCl is mixed with water. Show all full or partial charges and use dotted lines to show a few attractions between particles/molecules.

Before Mixing (NaCl solid and water are separate)	After Mixing Forms NaCl (aq)
NaCl (s)	
H <sub>2</sub> O (l) 	<b>Why does NaCl (aq) conduct electricity?</b>

- b) Describe the basic process that occurs when NaCl and water mix.

- c) In order for the NaCl and water to mix...

(i) what attractions must be broken? \_\_\_\_\_

(ii) what attractions must be made? \_\_\_\_\_

- d) Since NaCl and water mix, it must be that the energy needed to break the bonds is \_\_\_\_\_ the energy that is released when bonds are made.

- e) This overall process is favorable because the
- entropy**
- of the system \_\_\_\_\_ because.....

2) Why are two **nonpolar** substances soluble? (For example: CH<sub>4</sub> and I<sub>2</sub>)

- a) Draw before and after particle diagrams of what occurs when CH
- <sub>4</sub>
- and I
- <sub>2</sub>
- are mixed together. Show all full or partial charges and use dotted lines to show a few attractions between particles/molecules.

Before Mixing	After Mixing
CH <sub>4</sub>	
I <sub>2</sub>	

- b) In order for the CH
- <sub>4</sub>
- and I
- <sub>2</sub>
- to mix...

(i) what attractions must be broken? \_\_\_\_\_

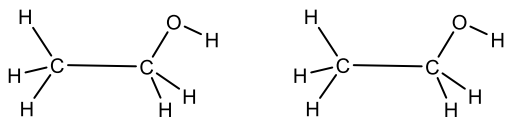
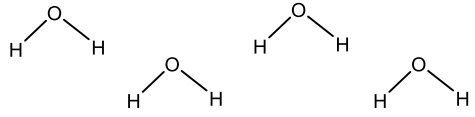
(ii) what attractions must be made? \_\_\_\_\_

- c) Thus, the energy needed to break the bonds is \_\_\_\_\_ the energy that is released when bonds are made. So there is no reason NOT to mix.

- d) This overall process is favorable because the
- entropy**
- of the system \_\_\_\_\_ because.....

3) Why are two polar substances soluble? (For example, ethanol and water)

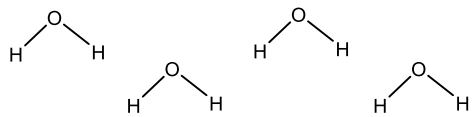
- a) Draw before and after particle diagrams of what occurs when ethanol and water mix. *You must show all full or partial charges and use dotted lines to show a few attractions between particles/molecules.*

Before Mixing	After Mixing
ethanol(l) 	
H <sub>2</sub> O (l) 	Why doesn't this solution conduct electricity?

- b) In order for the ethanol and water to mix...  
 (i) what attractions must be broken? \_\_\_\_\_  
 (ii) what attractions must be made? \_\_\_\_\_
- c) Thus, the energy needed to break the bonds is \_\_\_\_\_ the energy that is released when bonds are made. So there is no reason NOT to mix.
- d) This overall process is favorable because the **entropy** of the system \_\_\_\_\_ because.....

4) Why are polar and nonpolar substances insoluble with each other? (For example, I<sub>2</sub> and H<sub>2</sub>O)

- a) Draw before and after particle diagrams of what occurs when I<sub>2</sub> is mixed with water. *Show all full or partial charges and use dotted lines to show a few attractions between particles/molecules.*

Before Mixing	After Mixing
I <sub>2</sub> (s)	
H <sub>2</sub> O (l) 	

- b) I<sub>2</sub> and water do not mix. However, if they were to mix....  
 (i) what attractions would need to be broken? \_\_\_\_\_  
 (ii) what attractions would be made? \_\_\_\_\_
- c) Thus, the energy needed to break the bonds would be \_\_\_\_\_ the energy that would be released when bonds are made. So there IS a reason NOT to mix.
- d) Since I<sub>2</sub> and water do not mix, the **entropy** of the system is staying the same. If they did mix, the entropy of the system would increase which would be favorable, but this does not happen because....