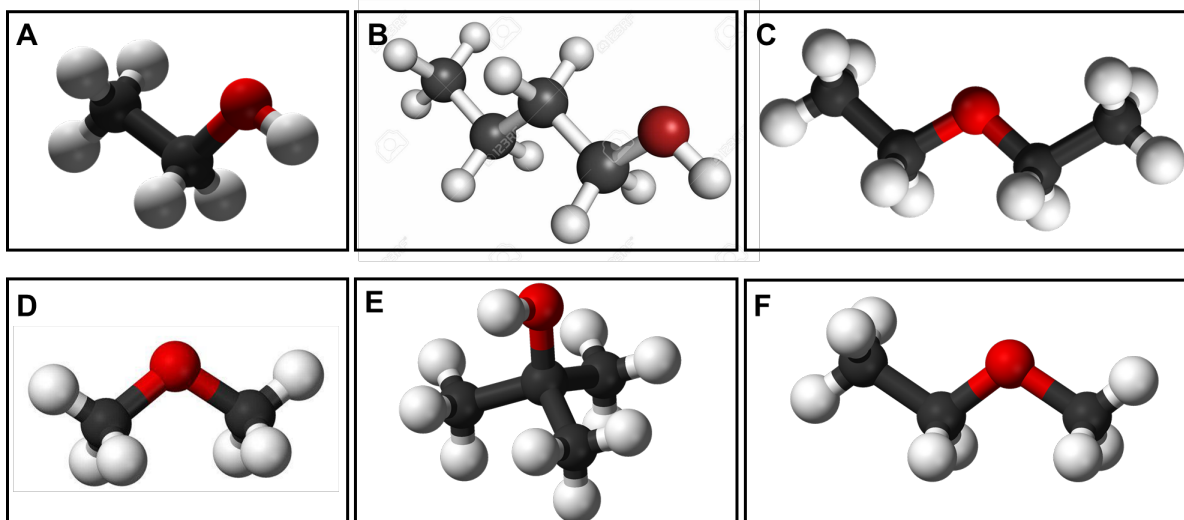


Intermolecular Forces

In lecture last week we learned about intermolecular forces and how they affect compounds. The presence of stronger or weaker IMF has huge implications on how a compound behaves, especially in phase transformations! Using the material we learned in lecture and your previous knowledge, work with your group to match the molecule with the correct boiling point:

Molecules:

● C ● O ● H



The slightly different image of B is not significant for the worksheet

Boiling Points:

BP (°C)
118
82
78
35
7.4
-24

First things first, determine the formula for each molecule and calculate the molar mass of each compound.

	Formula	Molar Mass (g/mol)
A		
B		
C		
D		
E		
F		

If molar mass were the only factor affecting phase transitions, then how would you match up the molecules to boiling point?

BP (°C)	Molecule
118	
82	
78	
35	
7.4	
-24	

Can you fully assign the boiling points? Why or why not? Explain why the above assignments are potentially not correct. What else might need to be taken into account?

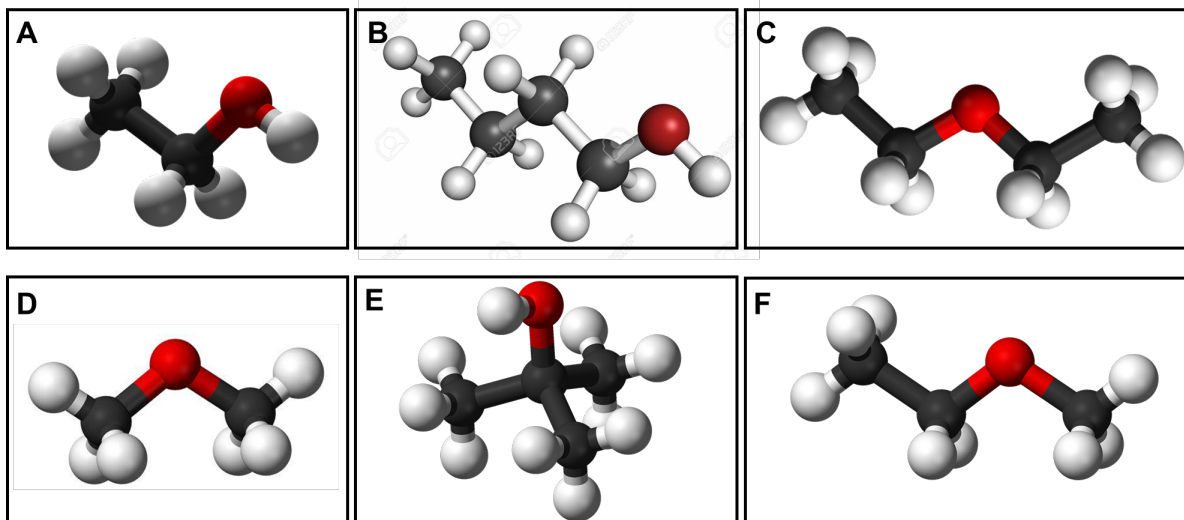
List the four different types of intermolecular forces (IMF) in order of strength and what types of charges are present for each.

Based on the molecules, which forces should we consider when assigning boiling points of our molecules?

When first identifying the order of boiling point, let's consider if the molecules only had dispersion forces. What would the order be if there was no dipole-dipole or hydrogen bonding? When considering dispersion forces, do not forget to consider the size and shape of the electron cloud.

BP (°C)	Molecule
118	
82	
78	
35	
7.4	
-24	

Now, highlight all of the polar bonds in the molecule and identify if the molecule is polar. If it is polar, draw the dipole arrow and indicate the $\delta+$ and $\delta-$ regions.



Do any of the molecules have bonds which could result in hydrogen bonding? Circle them.

Remember, when a molecule has a stronger force it also has the weaker forces too. For each molecule list all of the IMF present:

A	B	C
D	E	F

Based on the assignments above, break the molecules into two groups:

	Molecules
Higher BPs	
Lower BPs	

Now that we've broken them into two groups let's decide the order within the groups. Consider the "**Higher BPs**" group. Using the order based on dispersion, put this group in order of boiling point.

	Molecule
Highest	
Middle	
Lowest	

For the molecules with "**Lower BPs**" complete the same analysis, the molecule with the strongest dispersion force, would have the highest BP.

	Molecule
Highest	
Middle	
Lowest	

Now using your two lists and assign a boiling point to each molecule:

BP (°C)	Molecule
118	
82	
78	
35	
7.4	
-24	

Does your final list match the list that was solely based on molar mass? Why or why not?