

## INTERMOLECULAR FORCES/INTERACTIONS

Name : \_\_\_\_\_

Bonding covered so far involved intramolecular bonding or forces, i.e. bonding or forces within a molecule.

"Bonding" between molecules are called intermolecular which depend to a large extent on the polarity or non-polarity of the molecules.

Three kinds:

1. van der Waals forces
2. dipole-dipole forces
3. Hydrogen bond

1. Inert gases:

	b. pt./°C
He	- 269
Ne	- 246
Ar	- 186
Kr	- 152
Xe	- 108
Rn	- 62

i. Nature of van der Waals forces:

Accounts for the observed trend in the boiling point of the inert gases, and all non-polar molecules. Furthermore, van der Waals forces are operative in all substances.

Q. How does boiling point vary going down the group?

Q. What does that tell you about how mass affects van der Waals forces? Explain.

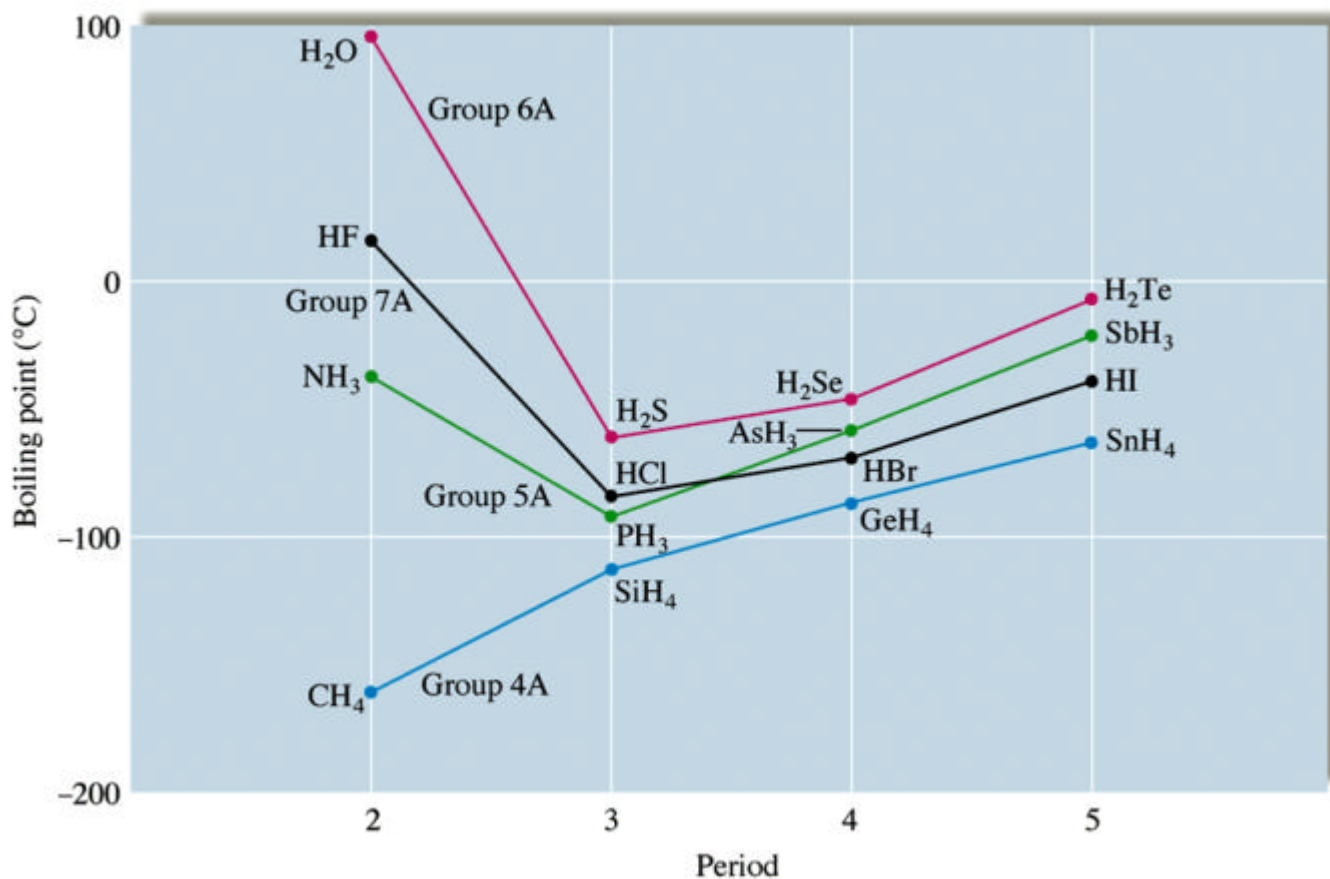
2. Inert gases, hydrogen halides, and group IV hydrides:

	RAM	b. pt./°C		RMM	trend	b. pt./°C
Ar	39.948	- 186	HCl	36.460		
Kr	83.80	- 152	HBr	80.912		
Xe	131.30	- 108	HI	127.912		
			SiH <sub>4</sub>	32.118	-	112
			GeH <sub>4</sub>	76.62	-	90
			SnH <sub>4</sub>	122.72	-	52

Nature of Dipole-dipole force of attraction:

Q. What is the difference between van der Waals forces of attraction and Dipole-dipole forces of attraction?

3. Variation within the group in V, VI, and VII; the higher boiling points of the first hydride in each group:



Nature of Hydrogen bonding:

Hydrogen bonding in water

Hydrogen bonding in ammonia

Hydrogen bonding in hydrogen fluoride