Section 17A – Intermolecular Forces

IMFs

For each compound**, determine** the primary intermolecular force.		
1) CH_3OH	**2) C_6H_5OH**	3) CCl_4
4) $NH_2CH_2NH_2$	5) CH_3CH_2F	**6) MgO**
7) H_2S	**8) PCl_3**	9) C_2H_2
10) $CH_3(CH_2)_8CH_2OH$		

Look up the boiling points for each of the following compounds and determine which has a stronger IMF. Discuss why this may be the case.

1) CH_3OH vs $HOCH_2CH_2OH$ (ethylene glycol)		2) Hg vs Cu
3) HF vs HCl	4) CO vs CO_2	5) RbI vs $C_{10}H_8$ (naphthalene)
6) Kr vs I_2	7) AsH_3 vs SO_2	8) SF_6 vs SF_4
9) $N(CH_3)_3$ vs $NH(CH_3)_2$	10) H_2O vs NaCl	

Liquids

Rank the following compounds from highest viscosity to lowest:

1) $CH_3CH_2CH_2OH$	2) $HOCH_2CH(OH)CH_2OH$	3) $HOCH_2CH_2OH$
4) CH_3OH	5) CH_3CH_3	6) H_2CO
7) Hg	8) $C_{12}H_{22}O_{11}$	9) C_6H_6

Good Times

In making computer chips, a 4.00 kg of ultrapure silicon cylinder has a diameter of 5.20 in. The silicon is then sliced in discs that are 1.12×10^{-4} m thick. The density of silicon is 2.34 g/cm^3

i) Assuming no waste, how many discs can be created?

ii) What is the mass of each disc?

iii) A key step in making p-n junctions in computer chips is the chemical removal of the oxide layer on the wafer through the treatment with gaseous hydrofluoric acid. Write a balanced equation for the reaction.

d) If 0.750% of the Si atoms are treated during the process, how many moles of HF are required per wafer? What mass of HF is required to clean all the discs?

Demonstration

This demonstration is quite easy, but requires good observation and careful measurement. In two 10.0 mL graduated cylinders, obtain 5.0 mL water and 5.0 mL methanol. After making sure the measurements are exact, pour the water into the methanol and observe what happens.

1) What did you observe?

2) What does this tell you about the interactions between water and methanol?

3) Why would you want to pour the water into the methanol, and not the other way around?