CHEM 103
R&R 19
27 June 2024
Adapted from a 25 June 2020 document

1. Predict which substance in each of the following pairs would have the stronger IMFs:

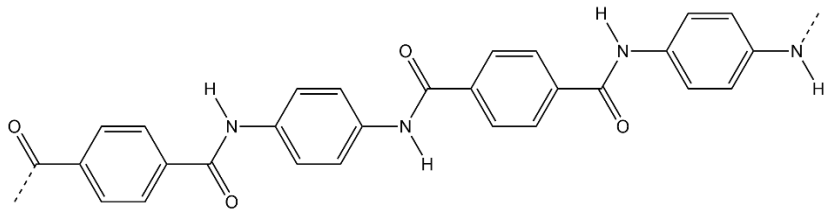
SeO_2 or SO_2

$CH_3CH_2CH_2NH_2$ or $H_2NCH_2CH_2NH_2$

CH_3CH_3 or CH_2O

CH_3OH or CH_2O

2. The structure of Kevlar is shown below. Use IMFs to explain why Kevlar is a strong material.



3. The partial pressure of oxygen was observed to be 156 torr in air with a total atmospheric pressure of 743 torr. Calculate the mole fraction of O_2 present.

4. The partial pressure of CH_4 (g) is 0.175 atm and that of O_2 (g) is 0.250 atm in a mixture of the two gases.

a. What is the mole fraction of each gas in the mixture?

b. If the mixture occupies a volume of 10.5 L at 65 °C, calculate the total number of moles of gas in the mixture.

c. Calculate the number of grams of each gas in the mixture.

5. A person accidentally swallows a drop of liquid oxygen, O_2 (l), which has a density of 1.149 g/mL. Assuming the drop has a volume of 0.050 mL, what volume of gas will be produced in the person's stomach at body temperature (37 °C) and a pressure of 1.0 atm?

6. For each pair of compounds, pick the one with the higher boiling point. Explain your reasoning.

a. CH_3OH or CH_3SH

b. CH_3OCH_3 or CH_3CH_2OH

c. CH_4 or CH_3CH_3

d. $CH_3CH_2CH_2CH_3$ or $CH_3CH(CH_3)CH_3$