

Chem 103

Practice problems from Week #1

Do these. Solutions will not be made available until much later.

1) Determine the molar solubility of barium fluoride, BaF_2 ($K_{\text{sp}}=1.7 \times 10^{-6}$) in the following:

a) In a pure water solvent.

b) In a solution of 0.10M NaF.

2) How would you logically conclude that to dissolve gases in water is an exothermic process?

3) 15.0 grams of sodium chloride (NaCl , 58.45g/mol) is dissolved in 80.0 grams of water resulting in a 90.0 mL solution. Calculate each of the following:

a) the molarity:

b) the molality:

c) the % (m/v):

d) the density:

e) the boiling point:

4) The by-product of the reaction of benzene and hot nitric acid has a percent composition (by mass) of 42.86% C, 2.40% H, 16.67% N and the rest O. The freezing point of the solution mixture containing 5.5 g of the by-product in 45 g of benzene was 1.76°C . Pure benzene has a freezing point of 5.45°C . The freezing point depression constant, k_f , for benzene is $5.07^\circ\text{C}/\text{m}$. Calculate the molecular weight of the by-product and determine its molecular formula.