

SURREY SUPPLEMENT: INTERMOLECULAR FORCES AND SOLUTIONS

- 1) What is the relationship between intermolecular forces in liquids and their boiling points? **[Refer to your class notes.]**
- 2) The vapor pressure of CCl_4 is 55% greater at 30°C than it is at 20°C . Calculate the heat of vaporization of carbon tetrachloride. **[32.3 kJ/mol]**
- 3) The heat of fusion of a substance is typically much less than its heat of vaporization. Explain why this is so. **[Refer to your class notes.]**
- 4) A one molal solution of HCl in benzene has a freezing point of 0.4°C . Is HCl an electrolyte in benzene? EXPLAIN. ($K_f(\text{benzene}) = 5.1^\circ\text{C/molal}$ and $T_f(\text{benzene}) = 5.5^\circ\text{C}$) **[The calculated value of i is 1.00, so no.]**
- 5) The K_f for water is 1.86°C/molal .
 - a) Calculate the freezing point of a 0.0100 molal aqueous acetic acid solution assuming that the acetic acid does not ionize. **[-0.0186°C]**
 - b) The actual freezing point of a 0.0100 molal acetic acid solution has been reported as -0.0195°C . What fraction of the acetic acid molecules are ionized? **[4.8%]**
 - c) Determine K_a for acetic acid based on the above data. **[2.3×10^{-5}]**