

CH104 Assigned Problems Chapter 11

Section	Problems
11.1-11.2	Chang: 1-3, 7, 9, 13, 14, 20. SP: 1
11.3	Chang: 24, 27, 29, 33
11.4	Chang: 37, 51, 52, 54
11.5	Chang: 59-61. SP: 2
11.6	Chang: 39-41, 55
11.7	Chang: 63, 65. SP: 3
11.8	Chang: 66, 67, 69, 73, 75, 88-90, 93, 95, 100. SP: 4-6
11.9	Chang: 101-103. SP: 7

CH104 Supplementary Problems: Chapter 11

Study this chapter, do the assigned problems from Chang, and make sure you understand the concepts. Then attempt the problems below without referring to the book, except as noted. Use a periodic table when necessary.

$$q = ms\Delta t$$

$$q = m (1/M.W.) \Delta H$$

$$\ln (P_1/P_2) = (\Delta H_{\text{vap}}/R)(1/T_2 - 1/T_1)$$

$$2d\sin\theta = n\lambda$$

Specific heat of ice: 2.03 J/g °C

Specific heat of water: 4.184 J/g °C

Specific heat of steam: 1.99 J/g °C

$\Delta H_{\text{fus}}(\text{H}_2\text{O}) = 6.01 \text{ kJ/mol}$

$\Delta H_{\text{vap}}(\text{H}_2\text{O}) = 40.79 \text{ kJ/mol}$

$\Delta H_{\text{vap}}(\text{benzene}) = 31.0 \text{ kJ/mol}$

For cubic cells:

$$\text{scc: } a = 2r$$

$$\text{bcc: } a = 4r/\sqrt{3}$$

$$\text{fcc: } a = \sqrt{8}r$$

- List the types of intermolecular forces that exist between molecules of:
 - KBr
 - IBr
 - Xe
 - NH₃
- A crystal of silver metal scatters x-rays of wavelength 0.7093 Å at an angle of 14.21°. If this is first-order Bragg scattering, find the distance between planes of Ag atoms.
 - The distance between planes of Ag atoms in Problem 2a is equal to the radius of the Ag atoms in this cell. Ag crystallizes in a face-centered cubic structure. What is the length of the unit cell edge?
 - Find the density of Ag.
- Classify solids of the following as amorphous or crystalline. If crystalline, classify them as ionic, molecular, covalent, or metallic crystals.

- (a) RbCl (b) nylon (c) Sr (d) I₂ (e) CO₂
4. Arrange the following in order of increasing vapor pressure:
H₂O, CO₂, NaCl, SnO₂
5. You're at the north pole and need to heat ice at -40 °C to 80 °C for a cup of tea. How much energy will it take? (1 cup = 8 oz; 1 oz = 28.35 g)
6. The vapor pressure of benzene is 87.0 mm Hg at 25.0 °C. What is the vapor pressure of benzene at 70.0 °C?
7. Liquid N₂ is less dense than solid N₂. The normal boiling and melting points of N₂ are 77.35 K and 63.29 K, respectively. The triple point is at 63.29 K and 0.123 atm, and the critical point is at 126.19 K and 33.3978 atm. Sketch the phase diagram for N₂ and label all points.