

## Chapter 11 lecture practice problems:

We've already discussed chapter 11. However, the homework did not go enough into some of the lecture topics.

To give you some experience calculating problems involving the topics we discussed in lecture, let me give you some practice problems. This is all optional work so please don't feel obliged to do them. Do them if you have the time. These topics may show up in future exams.

### 1) Clausius-Clapeyron Equation:

- write down the Clausius-Clapeyron equation. What value of R do you use?
- Calculate the  $P_{\text{H}_2\text{O}}$  at  $5^\circ\text{C}$  given that  $\Delta H_{\text{vap}} = 40.7\text{kJ/mol}$ .
- Calculate the boiling point of water on top of Mt. Wilson (where it is 600 mmHg).

2) Using the phase diagram, explain whether the boiling point of water is higher or lower at higher elevations (like Mt. Wilson).

### 3) Crystals and unit cells:

- Step by step: calculate the % occupancy in a face-centered cubic cell.
- derive an expression for the radius of a metal atom in the 3 examples below:  
(i) simple cubic      (ii) face-centered cubic      (iii) body-centered cubic  
given only the density and the identity of the metal element (like we did in class for the simple cubic case)

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