

Homework 4 – Physical Transformations of Pure Substances

Name: _____

Exercise 4A.1(a) (5 points)

How many phases are present at each of the points marked in Fig. 4.1a?

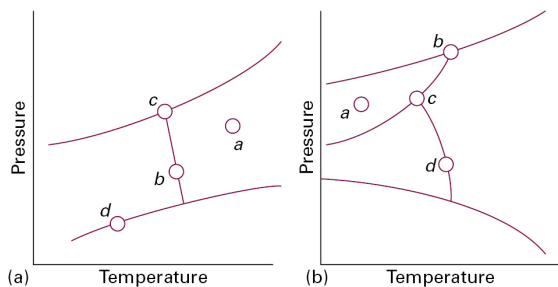


Figure 4.1 The phase diagrams referred to in (a) Exercise 4A.1(a) and (b) Exercise 4A.1(b).

Exercise 4A.3(a) (5 points)

What is the maximum number of phases that can be in mutual equilibrium in a two-component system?

Exercise 4B.6(a) (5 points)

The vapour pressure of dichloromethane at 24.1°C is 53.3 kPa and its enthalpy of vaporization is 28.7 kJ/mol . Estimate the temperature at which its vapour pressure is 70.0 kPa .

Exercise 4B.8(a) (10 points)

The vapour pressure of benzene between 10°C and 30°C fits the expression:

$$\log_{10} \left(\frac{p}{1 \text{ torr}} \right) = 7.960 - \frac{1780 \text{ K}}{T}$$

Calculate (i) the enthalpy of vaporization and (ii) the normal boiling point of benzene.

Exercise 4B.9(a) (5 points)

When benzene freezes at 1.00 atm and 5.5°C its density changes from 0.879 g/cm^3 to 0.891 g/cm^3 . Its enthalpy of fusion is 10.59 kJ/mol . Estimate the freezing point of benzene at 1000.0 atm .

A Litany for Survival

By Audre Lorde

For those of us who live at the shoreline
standing upon the constant edges of decision
crucial and alone
for those of us who cannot indulge
the passing dreams of choice
who love in doorways coming and going
in the hours between dawns
looking inward and outward
at once before and after
seeking a now that can breed
futures
like bread in our children's mouths
so their dreams will not reflect
the death of ours;

For those of us
who were imprinted with fear
like a faint line in the center of our foreheads
learning to be afraid with our mother's milk
for by this weapon
this illusion of some safety to be found
the heavy-footed hoped to silence us
For all of us
this instant and this triumph
We were never meant to survive.

And when the sun rises we are afraid
it might not remain
when the sun sets we are afraid
it might not rise in the morning
when our stomachs are full we are afraid
of indigestion
when our stomachs are empty we are afraid
we may never eat again
when we are loved we are afraid
love will vanish
when we are alone we are afraid
love will never return
and when we speak we are afraid
our words will not be heard
nor welcomed
but when we are silent
we are still afraid

So it is better to speak
remembering
we were never meant to survive.