(01)

Date 24/03/20

Expt. No.

For B.Sc (Hons) Part II Std

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Phase rule

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$$F = C - P + 2$$

⇒ **Phase (P) :–**

- It is Homogeneous.
- It is physically distinct
- It can be separated mechanically from other part of system is called phase.

(A)

~~Immiscible~~ Immiscible phase

H_2O | CCl_4

H_2O | ether

H_2O | Oil. (Phase = 2)

Miscible phase

water | acetone

coats | Ethyl Alc.

milk | water.

1 Characte. Phase = 1

Gas — mix up with each other,

So phase = 1.

H_2O (Ice) (s) ⇌ H_2O Liquid ⇌ H_2O (Vap) gas

Phase = 3.

Component (C)

Smallest no. of independent variable Constituents of System. is called Component.

eg ①

$H_2O(s)$ —— $H_2O(l)$ —— $H_2O(g)$

Phase = 3

Component = 1

eg ②

$S(\gamma) \rightleftharpoons S(m) \rightleftharpoons S(\alpha) \rightleftharpoons S(v)$

Phase = 4

Component = 1

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Component for chemically Reactive System:

$$C = N - E$$

C = Component

N = No. of Species

E = No. of independent equation.

Eg: Det. no. of Component for following

KCl, NaCl, H_2O.

Soln: $N = 3, \quad E = 0$

$$C = N - E$$
$$= 3 - 0$$
$$\boxed{C = 3}$$

(2) KCl, NaBr, & H_2O

$KCl + NaBr \longrightarrow NaCl + KBr$.

KCl, NaBr, H_2O, NaCl, KBr.

$N = 5$

$E = 1$

$$C = N - E$$
$$= 5 - 1$$
$$= 4$$

(3) $CaCO_3(s)$, $CaO(s)$, CO_2

$CaCO_3 \xrightarrow{\Delta} CaO + CO_2$ (No new Reip)

$N = 3, \quad E = 1,$

$$C = N - E$$
$$= 3 - 1$$
$$\boxed{C = 2}$$

(4) NH_4Cl, NH_3, HCl in form of partial pressure.

$NH_3 + HCl \rightleftharpoons NH_4Cl$

$P_{NH_3} = P_{HCl}$

$N = 3$, $E = 2$

$C = N - E$

$= 3 - 2$

$= 1$

If Partial pressure not given.

then $E = 1$

$N = 3$

$C = 3 - 1 = 2$

(5) Degree of freedom:-

Smallest no. of variable factor i.e T, P, & C (Equilibrium)

$H_2O(l) \rightleftharpoons H_2O(v)$

Phase = 2

Compound = 1

$F = C - P + 2$

$= 1 - 2 + 2$

$= 1$

F = 1 Monovariant, F = 2 Divarient, F = 3. trivariant.

Q. Ice (s) — H_2O (l) — vapour (g)

Phase = 3

Comp = 1

$F = C - P + 2$

$= 1 - 3 + 2$

$F = 0$. Univariant System

Phase: A chemically homogeneous, physically distinct & mechanically separable part of the system is called phase.

Three phases of matter: S, L, & G. Crystals are considered as different phases.

Solid phases: Having different crystal structure.

Fe: BCC (α), Int CCP (γ) with T

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