

Two Component System

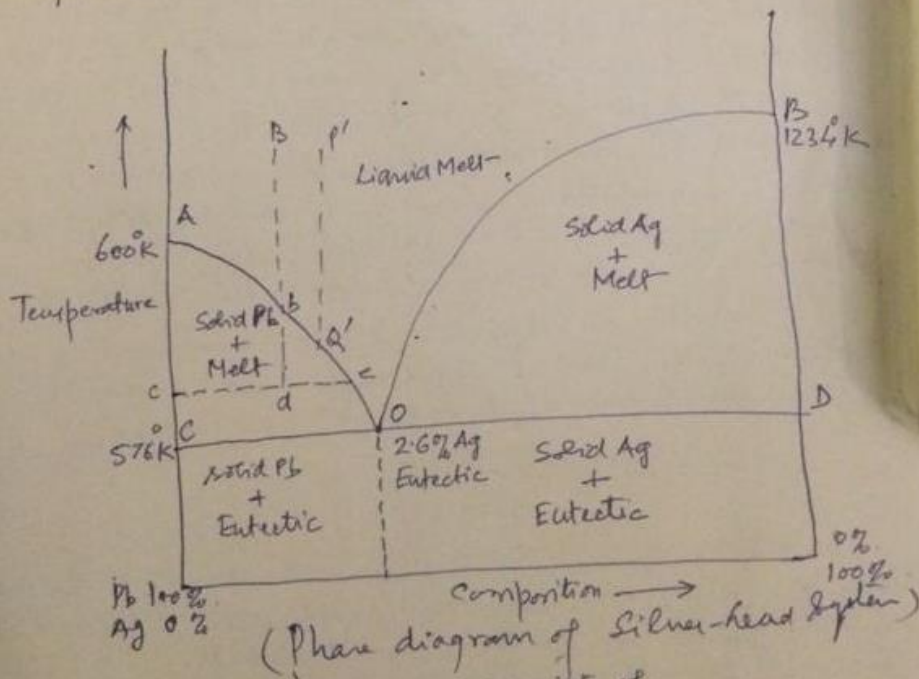
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1. Silver-lead System.

These metals are completely miscible in liquid state and do not give to any compound formation. When molten silver is mixed with lead in all proportions a homogeneous solution is produced. They form four possible phases.

1. Solid silver
2. Solid lead
3. solutions of silver and lead
4. vapour.

Since the b.p. of two metals are very high, the gaseous phase has practically no effect. The phases are represented by temperature-composition diagram.



The equilibrium diagram consists of

- i) Curves
- OA: Freezing point of Lead
- OB: Freezing point of Silver

$$F = C - P + 2$$

$$= 2 - 2 + 2 = 2$$

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$$= 2 - 2 + 2 = 2$$

ii) Areas

Area above the curve AOB

Area AOC

Area BOD

Below line COD

iii) Eutectic point O

Eutectic point O - It is the point where AO and BO melt. This point gets its name from the fact that the eutectic composition has the lowest mp. At this point O lead and silver freeze out simultaneously. The composition of the melt is the same as that of the solid mixture of lead and silver. The liquid melt freezes out as a pure compound at a constant temperature known as eutectic point and the solid mixture is called eutectic which has the characteristic composition of each system. Eutectic is not a chemical compound of lead and silver since its composition does not correspond of lead and silver since its composition does not correspond to any chemical formula and composition depends upon temperature.

The point O represents the conditions under which solid silver, solid lead and melt coexist.

The degree of freedom at this point is

$$F = C - P + 1$$

$$= 2 - 3 + 1$$

This point lies at a temperature which is lower than the mp. of either component. If the liquid is cooled below this temperature, both of the components separate simultaneously in solid form without change of temperature and composition. The temperature corresponding to eutectic point O is called eutectic temperature.