Concept of Gibbs Triangle

MSE-S203
(Phase Equilibria in Materials)

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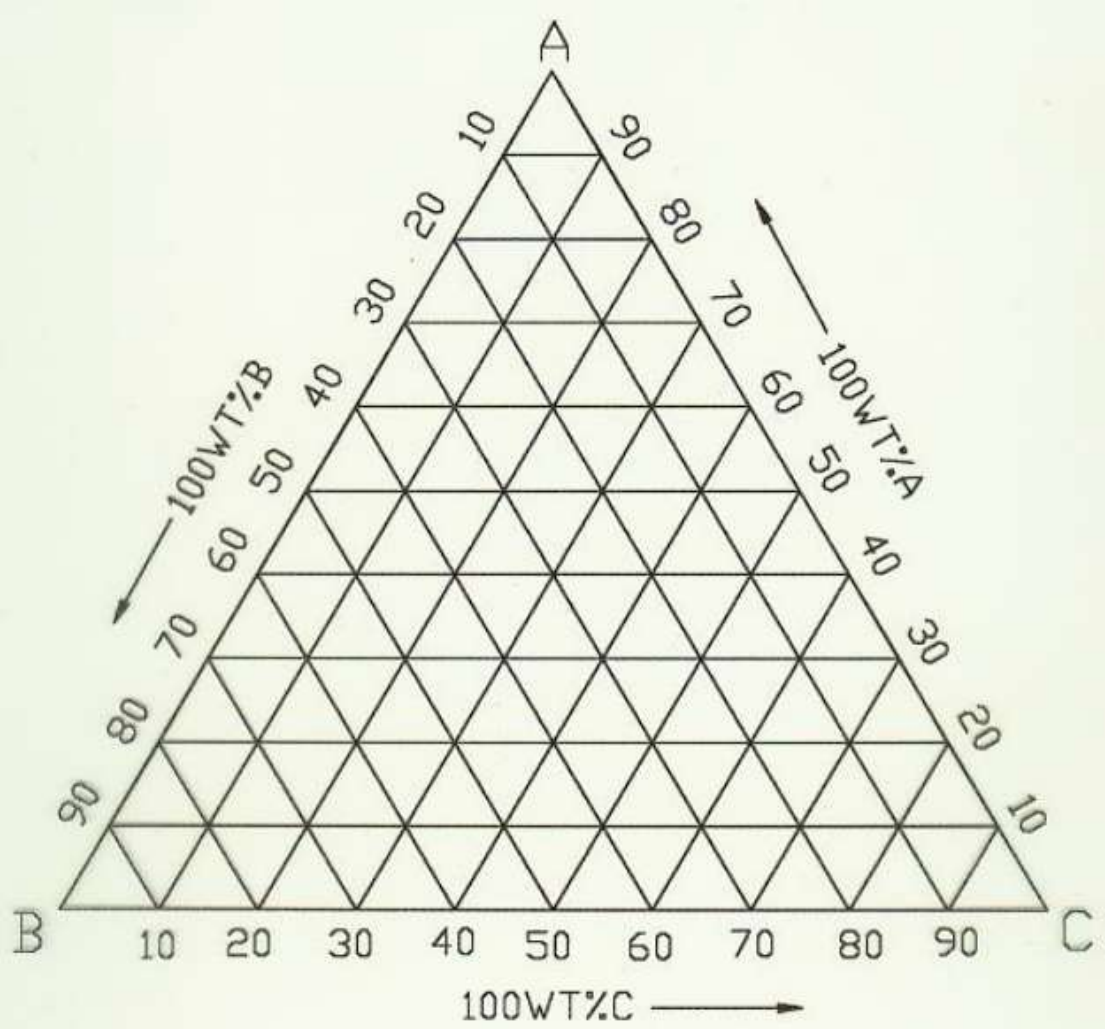
Ternary Phase Diagram

- ***The Gibbs Triangle***



Ternary Phase Diagram

➢ *Overall Composition*

- The concentration of each of the three components Can be expressed as either "wt. %" or "molar %".

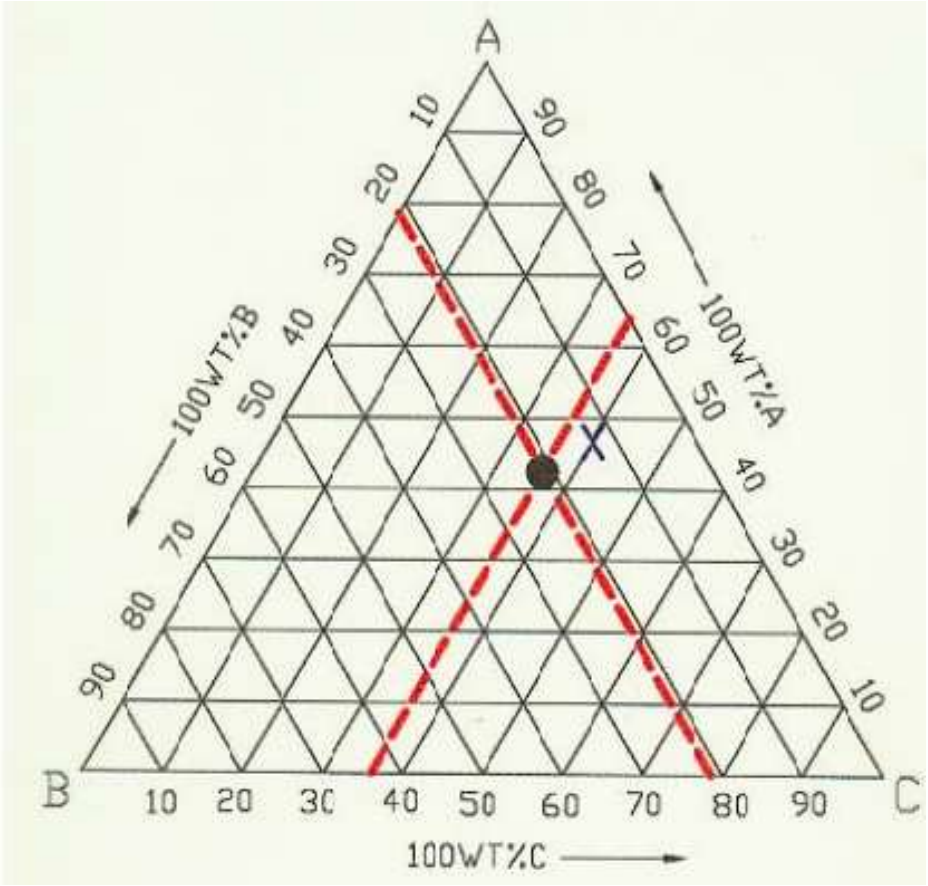
- Sum of the concentration of the three components must add up to 100%.

- There are three ways of determining the overall composition.

Ternary Phase Diagram

➢ *Overall Composition*

- ***Method 1:***



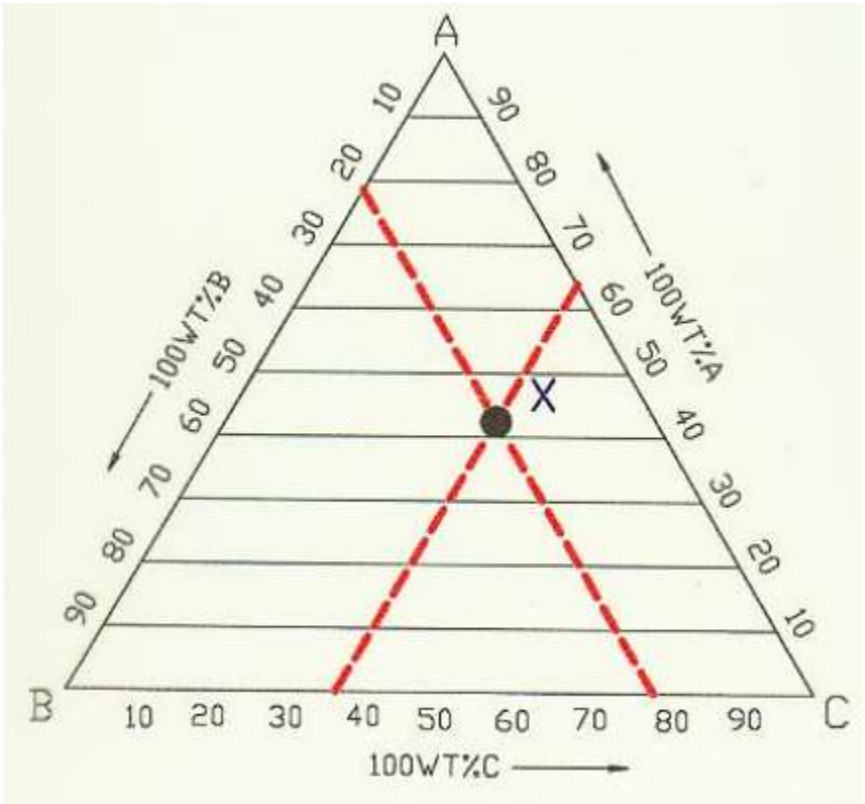
- Let the overall composition be represented by the point X.

- Draw lines passing through X, and parallel to each of the sides.

Ternary Phase Diagram

➢ *Overall Composition*

- ***Method 1:***



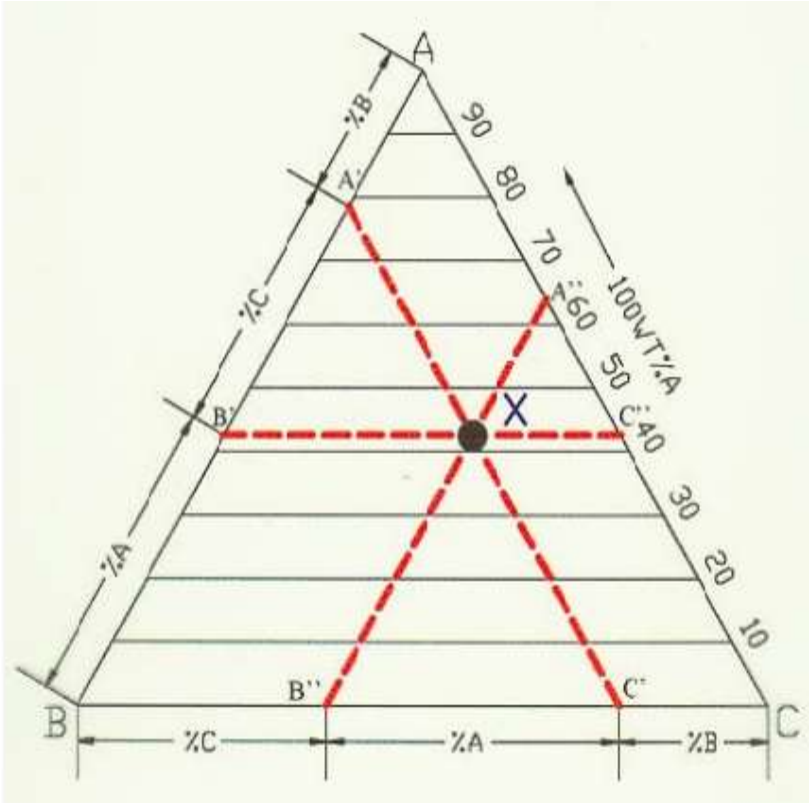
- Where the line A'C' intersects the side AB tells us the concentration of component B in X.

- The concentrations of A and C, in X, can be determined in an identical manner.

Ternary Phase Diagram

➢ *Overall Composition*

- ***Method 2:***



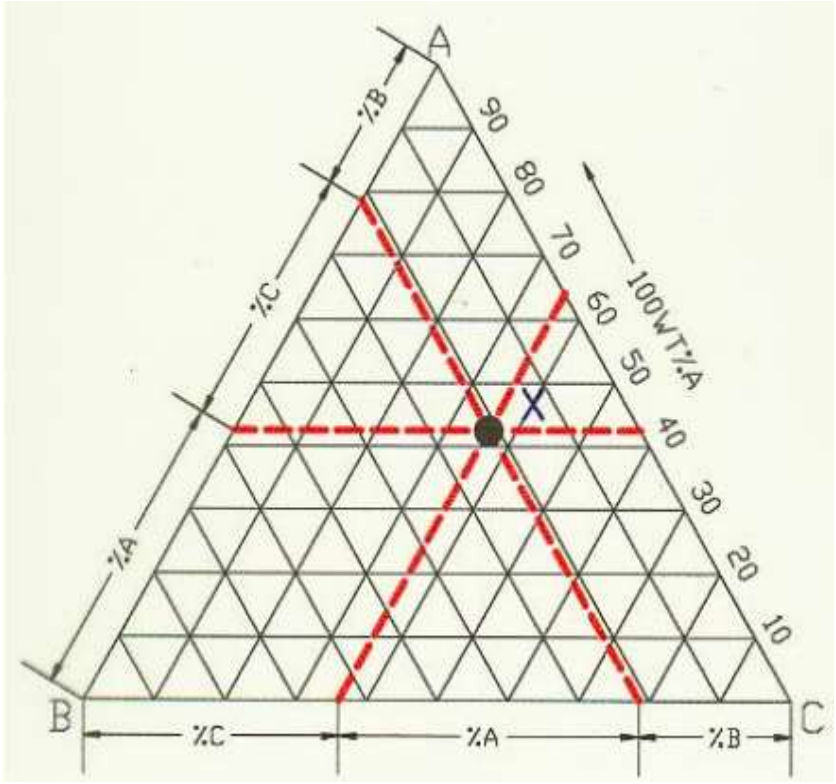
- Draw lines through X, parallel to the sides of the Gibbs Triangle.

- A'C' intersects AB at A' B'C" intersects AB at B'.

Ternary Phase Diagram

➢ *Overall Composition*

- ***Method 2:***

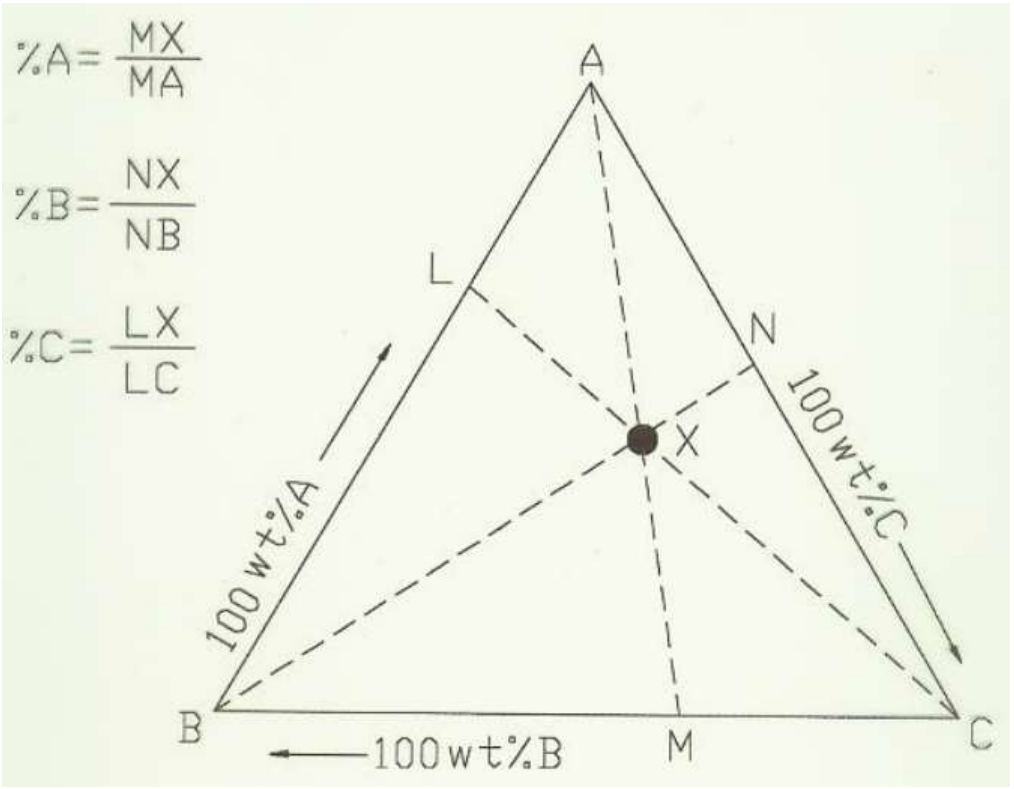


- Concentration of B = AA’ Concentration of C = A’B’ Concentration of A = B’B.

Ternary Phase Diagram

➢ *Overall Composition*

- ***Method 3:***



- Inverse Lever Rule: Draw straight lines from each vertex, through X.

%A = ***AX/ AM***

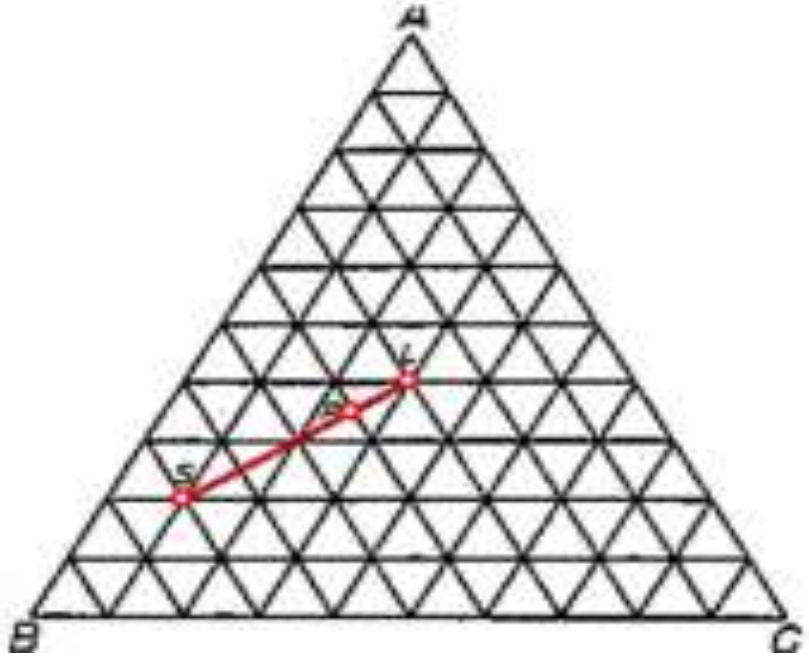
%B = ***BX/ BN***

%C = ***CX/CL***

Ternary Phase Diagram

➢ *Overall Composition*

1- Find out the composition at point P. where one part of S mix with 3 parts of L.



- ***Answer:***

***%A* = 35**

***%B* = 40**

***%C* = 25**