

## 2.2 IRON-CARBON EQUILIBRIUM DIAGRAM

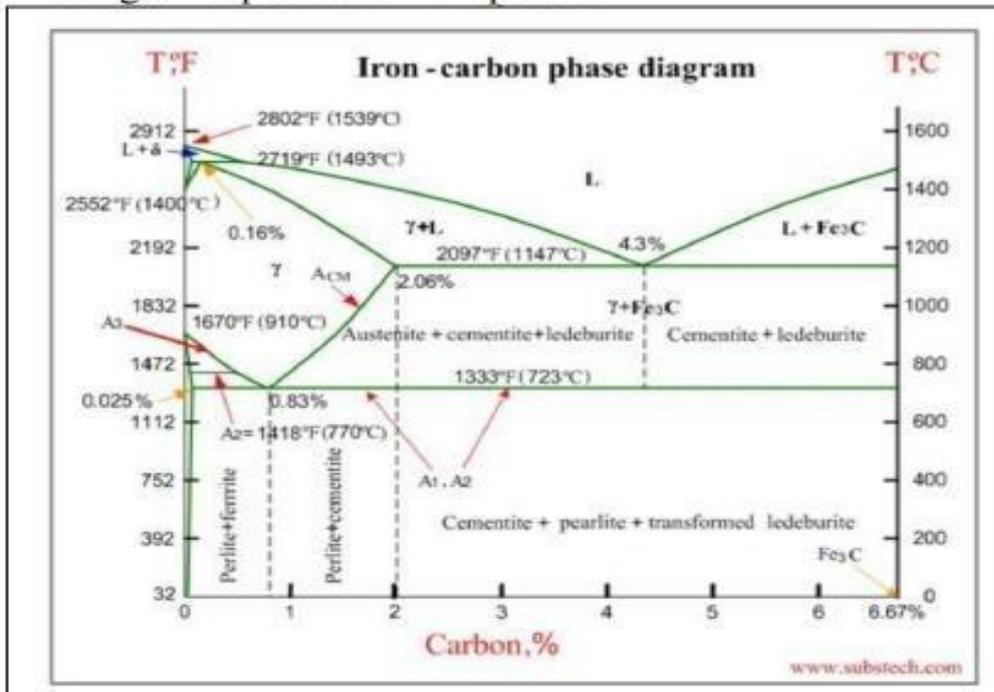


Fig 2.2.1 Iron-Carbon phase Diagram

The following phases are involved in the transformation, occurring with iron-carbon alloys: L-Liquid solution of carbon - iron;

δ- ferrite-Solid solution of carbon iron.

Maximum concentration of carbon in δ-ferrite is 0.09% at 2719 °F (1493°C) – temperature of the peritectic transformation.

The crystal structure of δ-ferrite is BCC (cubic body centered). Austenite - interstitial solid solution of carbon in γ-iron.

Austenite has FCC (cubic face centered) crystal structure, permitting high solubility of carbon-upto2.06%at2097°F(1147°C).

Austenite does not exist below 1333°F (723°C) and maximum carbon concentration at this temperature is 0.83%.

$\alpha$ -ferrite - solid solution of carbon in  $\alpha$ - iron.  $\alpha$ - ferrite has BCC crystal structure and low solubility of carbon - up to 0.25% at 1333 °F (723°C).  $\alpha$ - ferrite exists at room temperature.



