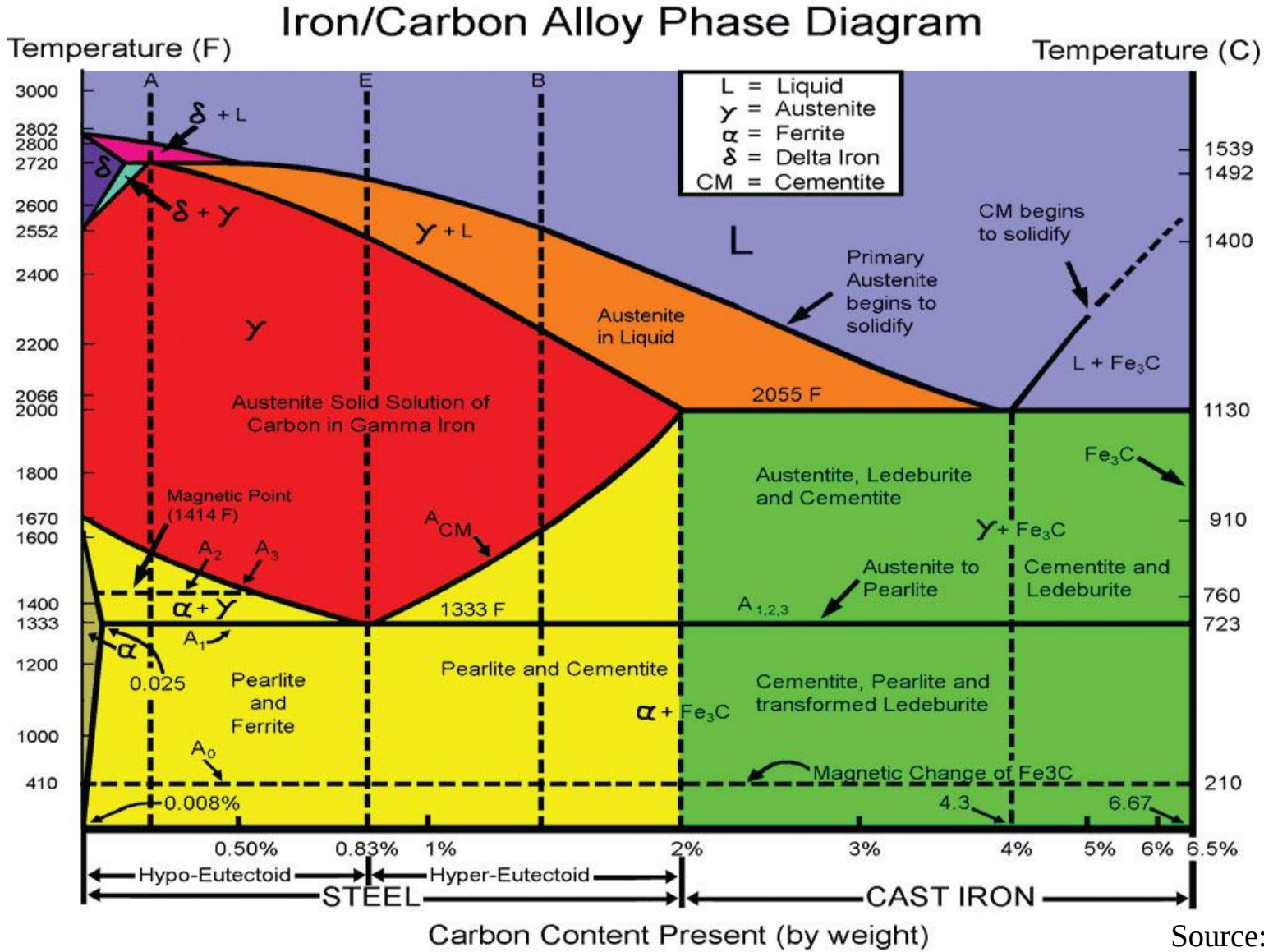
UNIT II

IRON – IRON CARBIDE PHASE DIAGRAM

Engineering Materials and Metallurgy

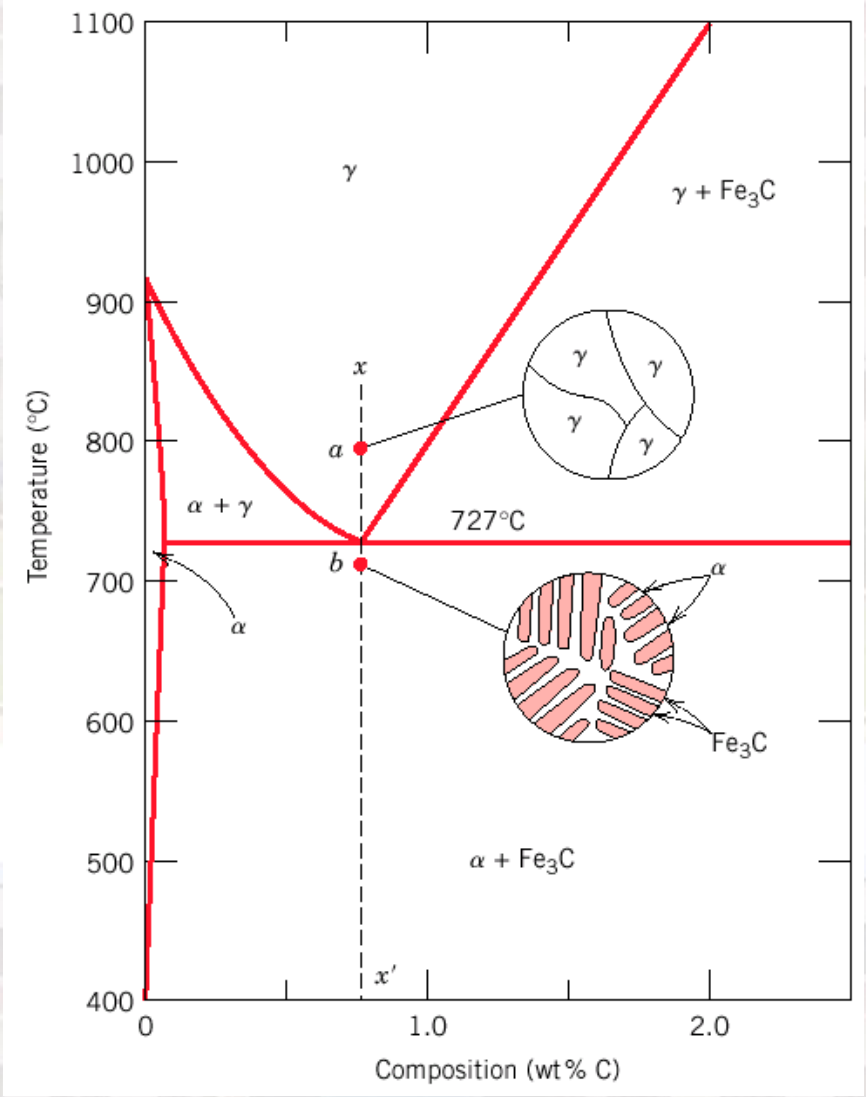
KARTHICK B

ASSISTANT PROFESSOR / MECHANICAL ENGG



Source: Internet

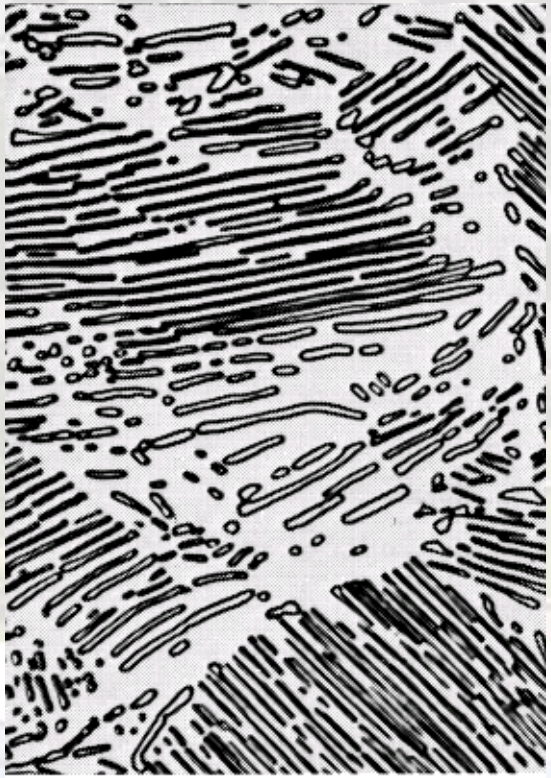
Microstructure of Eutectoid Steel (I)



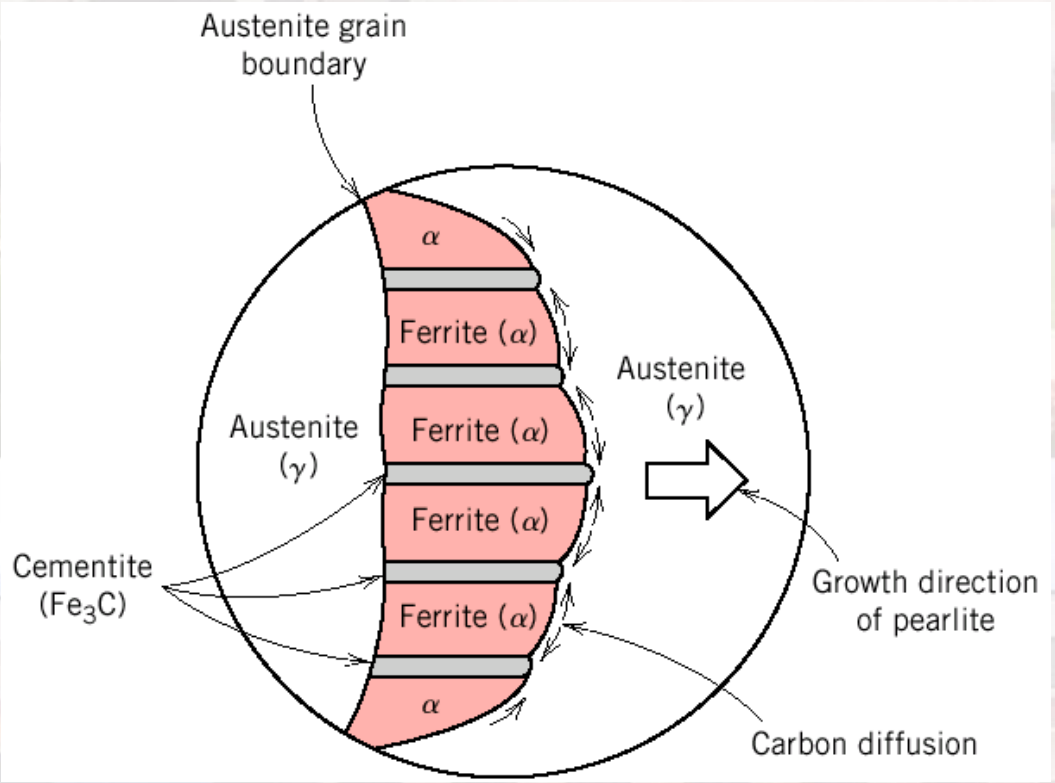
Microstructure of Eutectoid Steel (I)

- When alloy of eutectoid composition (0.76 wt % C) is cooled slowly it forms **pearlite**,
- A lamellar or layered structure of two phases: -ferrite and cementite (Fe_3C)
- The layers of alternating phases in pearlite are formed for the same reason as layered structure of eutectic structures
- Redistribution C atoms between ferrite (0.022 wt%) and cementite (6.7 wt%) by atomic diffusion.
- Mechanically, pearlite has properties intermediate to soft, ductile ferrite and hard, brittle cementite.

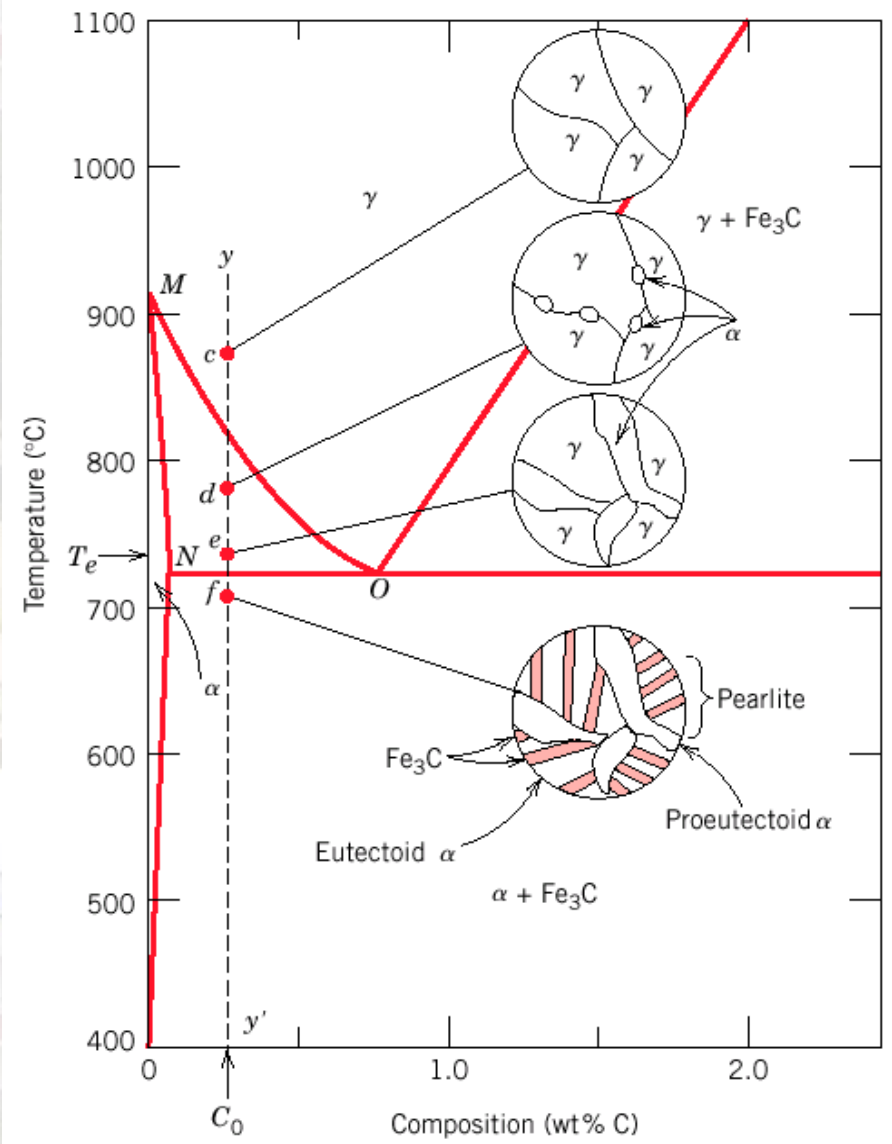
Microstructure of Eutectoid Steel (I)



In the micrograph, the dark areas are Fe_3C layers, the light phase is α- ferrite



Microstructure of Hypoeutectoid steel

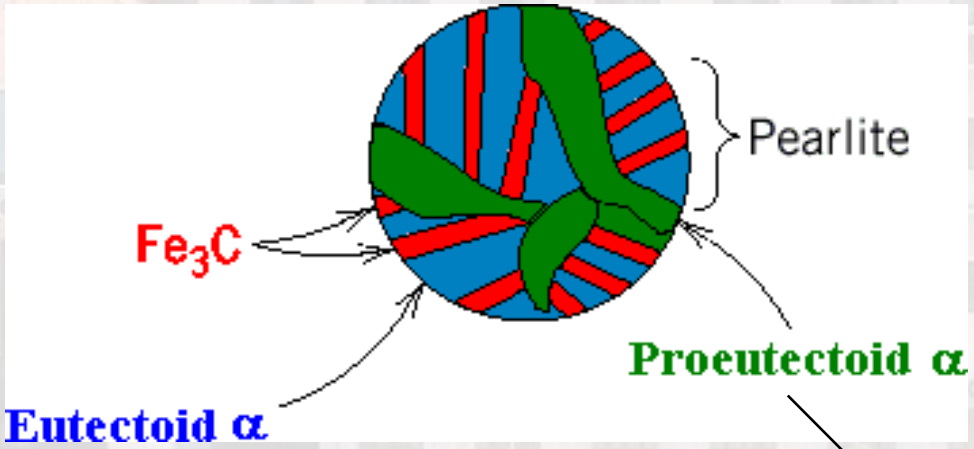


Compositions to the left of eutectoid (0.022 - 0.76 wt % C)

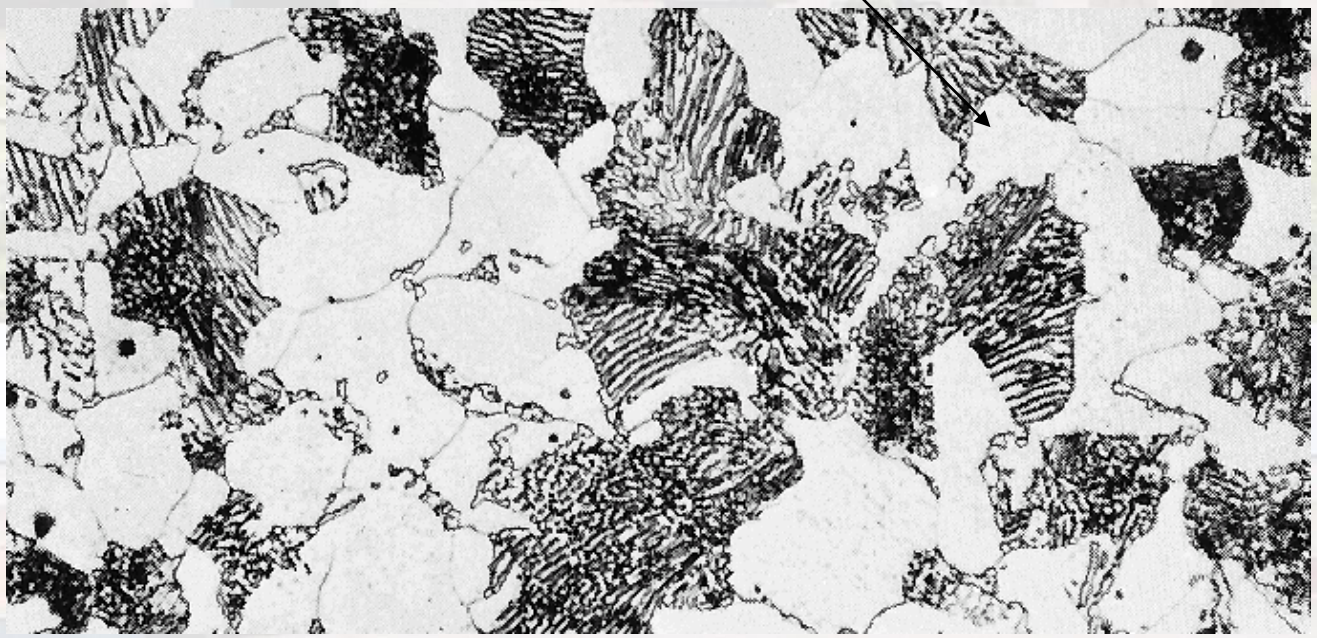
Hypoeutectoid (*less than eutectoid* -Greek) alloys.

$$\gamma \rightarrow \alpha + \gamma \rightarrow \alpha + Fe_3C$$

Microstructure of Hypoeutectoid steel

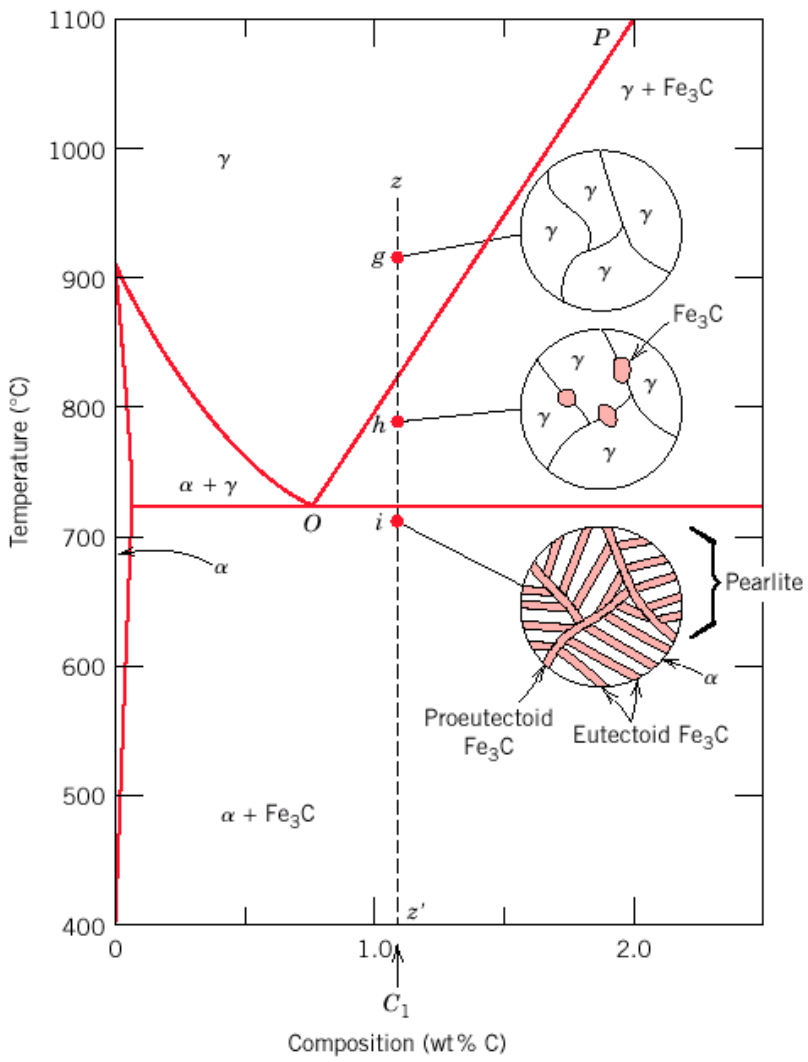


Hypoeutectoid alloys contain proeutectoid ferrite (formed above the eutectoid temperature) plus the eutectoid pearlite that contain eutectoid ferrite and cementite.



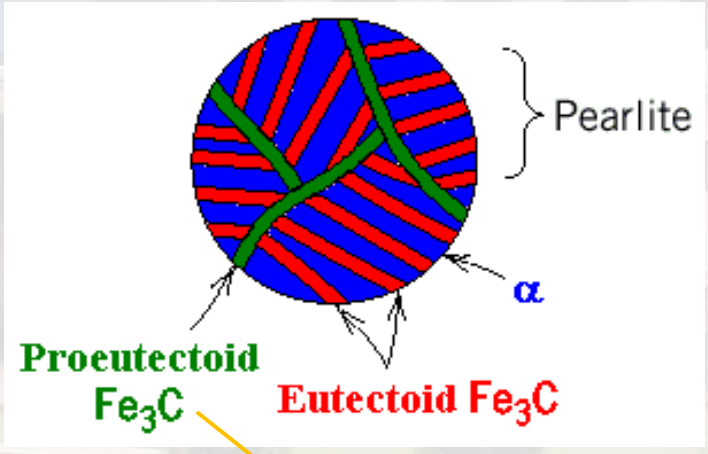
Microstructure of Hypereutectoid Steel

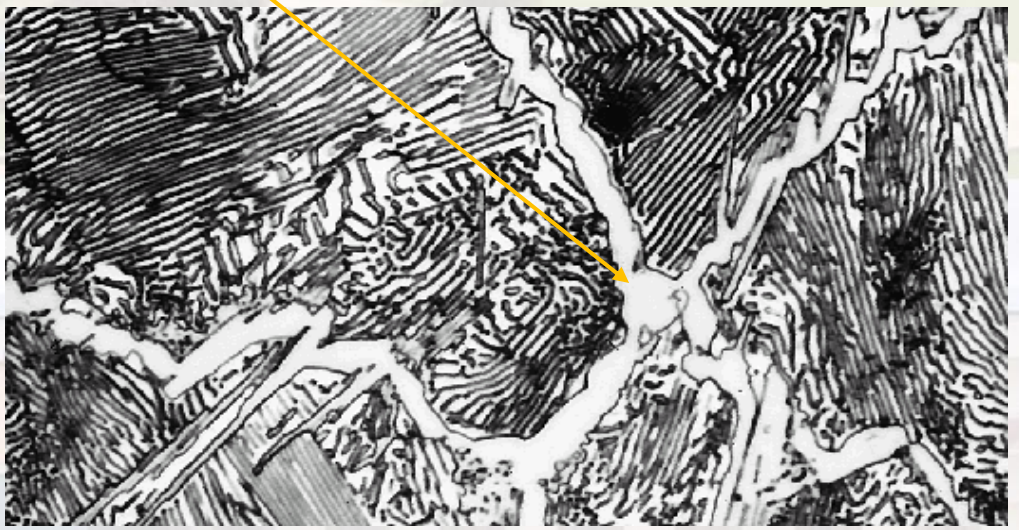
- Compositions to the right of eutectoid (0.76 - 2.14 wt % C)
- **Hypereutectoid** (*more than eutectoid* -Greek) alloys.



Microstructure of Hypereutectoid Steel

Hypereutectoid alloys contain proeutectoid cementite (formed above the eutectoid temperature) plus pearlite that contain eutectoid ferrite and cementite





THANK YOU

Assessment – https://play.kahoot.it/v2/?quizId=0e61acdb-86bf-480c-aab3-8eb6df4dd6a0