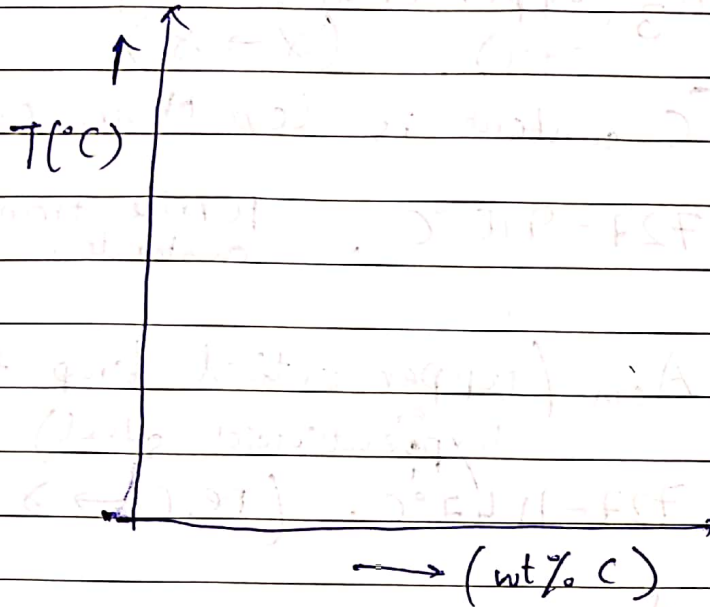


Tempering done to remove micro-cracks.



Critical temp. different types:

①  $A_0$  (Curie temp. of  $Fe_3C$ )

-  $210^\circ C$

↓  
cementite

In this temp, cementite is transformed from ferromagnetic to paramagnetic.

②  $A_1$  (lower critical temp.)

-  $727^\circ C$

In this temp, pearlite is transformed to austenite,  $[\gamma \xrightarrow{\text{cool}} \alpha + Fe_3C]$

(3 phase transformation)

(eutectoid)

③  $A_2$  (Curie temp of  $\alpha$ )

-  $768^\circ C$

(At this temp,  $\alpha$ -ferrite is transformed into paramagnetic material),

④  $A_3$  (upper critical temp. for hypoeutectoid steel). ( $\alpha \rightarrow \gamma$ )

[C content is less than 0.77 wt%]

727 - 910 °C. ferrite transformed into austenite.

⑤  $A_{cm}$  (upper critical temp for <sup>er</sup> hypoeutectoid steel)

727 - 1147 °C. ( $Fe_3C \rightarrow \gamma$ )

⑥  $A_4$   
1400 - 1492 °C. ( $\gamma \rightarrow \delta$  ferrite)

## Tempering

① On the basis of temp.

(a) Low temp. tempering (200 °C)

(b) Med. temp. " (200 - 275 °C)

(c) High temp. " (275 - 375 °C)

② Austempering, (Austenite  $\rightarrow$  Bainite)

③ Martempering.

