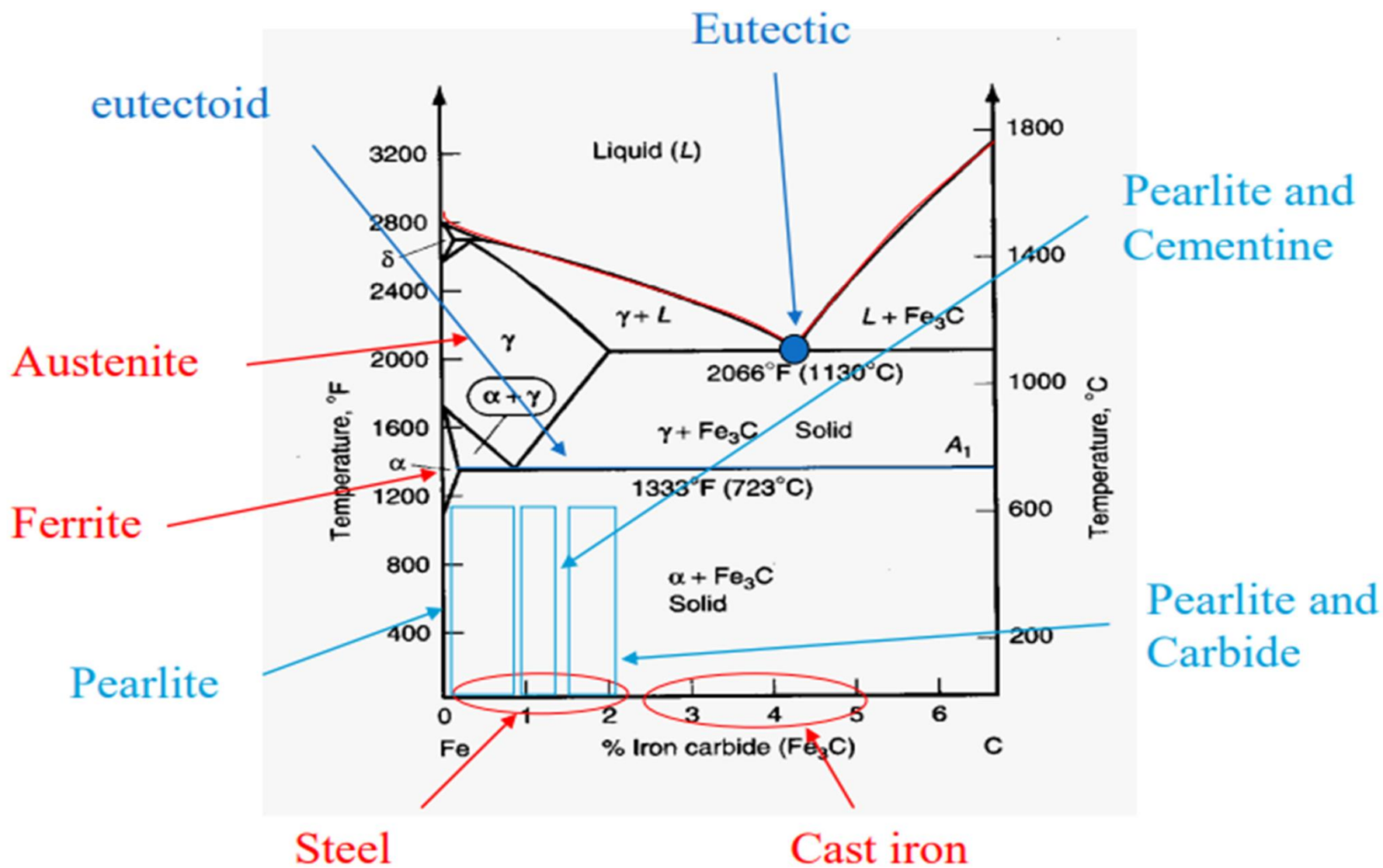


How to read the Fe-C phase diagram



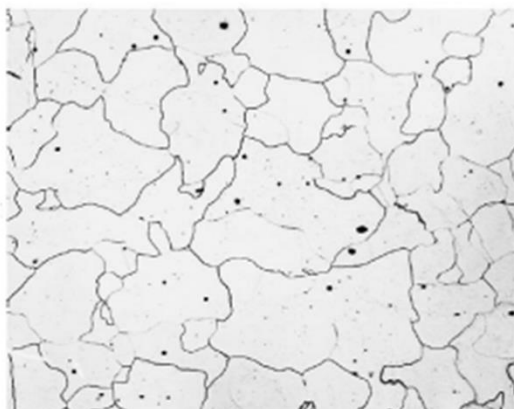
Definition of structures

Various phases that appear on the Iron-Carbon equilibrium phase diagram are as under:

- Ferrite
- Pearlite
- Austenite
- Cementite
- Ledeburite
- Martensite

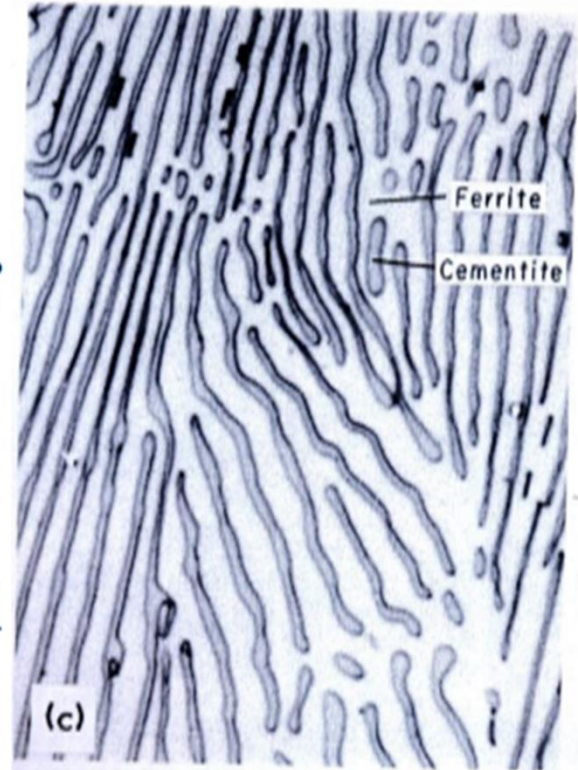
Definition of structures

- **Ferrite** is known as α solid solution.
- It is an interstitial solid solution of a small amount of carbon dissolved in α (BCC) iron.
- stable form of iron below 912 deg.C
- The maximum solubility is 0.025 % C at 723°C and it dissolves only 0.008 % C at room temperature.
- It is the softest structure that appears on the diagram.



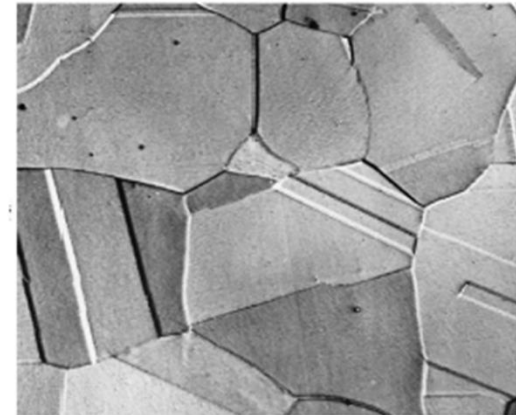
Definition of structures

- **Pearlite** is the eutectoid mixture containing 0.80 % C and is formed at 723°C on very slow cooling.
- It is a very fine platelike or lamellar mixture of ferrite and cementite.
- The white ferritic background or matrix contains thin plates of cementite (dark).



Definition of structures

- **Austenite** is an interstitial solid solution of Carbon dissolved in γ (F.C.C.) iron.
- Maximum solubility is 2.0 % C at 1130°C.
- High formability, most of heat treatments begin with this single phase.
- It is normally not stable at room temperature. But, under certain conditions it is possible to obtain austenite at room temperature.



Definition of structures

- **Cementite** or iron carbide, is **very hard, brittle** intermetallic compound of iron & carbon, as Fe_3C , contains 6.67 % C.
- It is the hardest structure that appears on the diagram, exact melting point unknown.
- Its crystal structure is orthorhombic.
- It is has
 - low tensile strength (approx. 5,000 psi), but
 - high compressive strength.

