

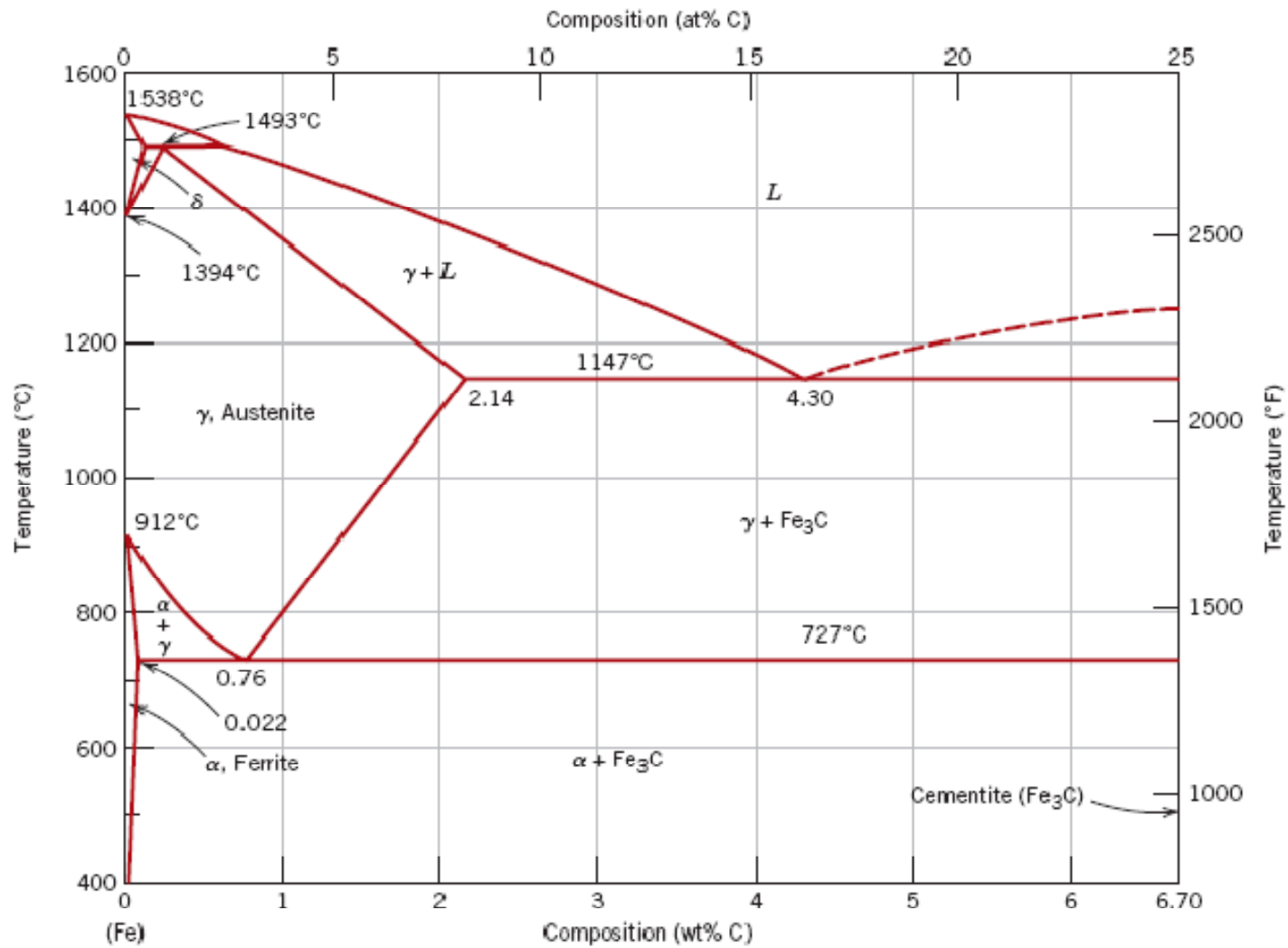
# BAJA KARBON (CARBON STEEL)

Materi Kuliah Bahan Teknik

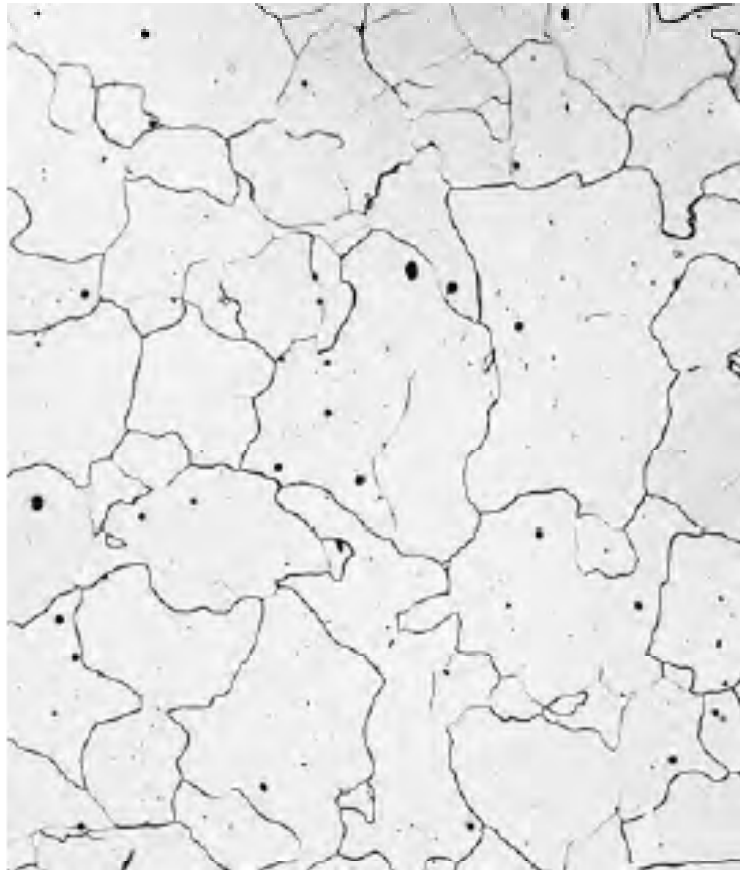
# Definisi

- Baja karbon adalah material logam yang terbentuk dari unsur utama Fe dan unsur kedua yang berpengaruh pada sifat-sifatnya adalah karbon, sedangkan unsur yang lain berpengaruh menurut prosesntasanya.

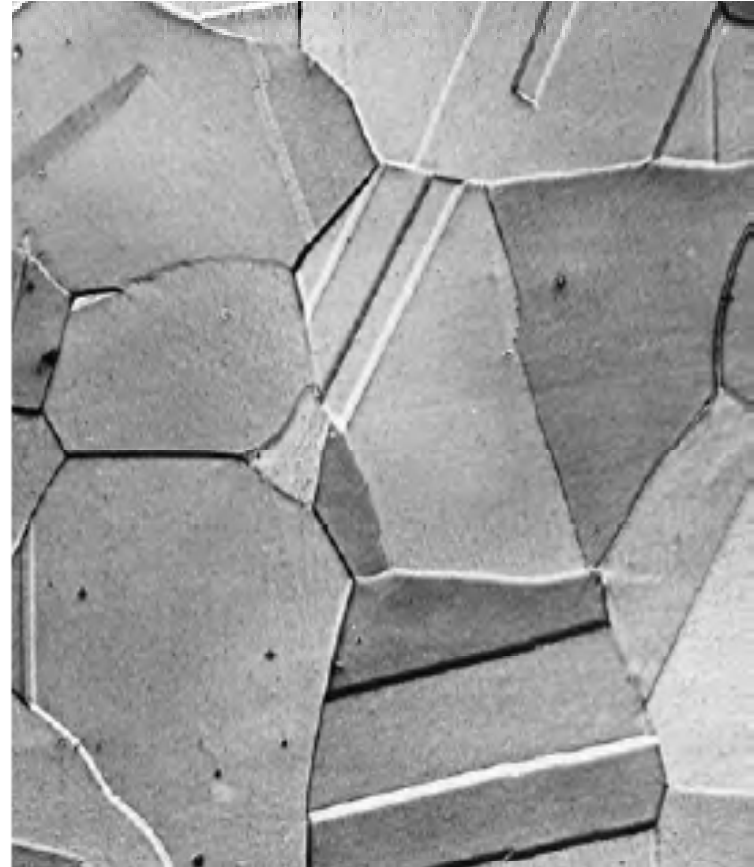
# Diagram Phasa Fe-C



# Photomicrographs of (a) ferrite and (b) austenite



(a)

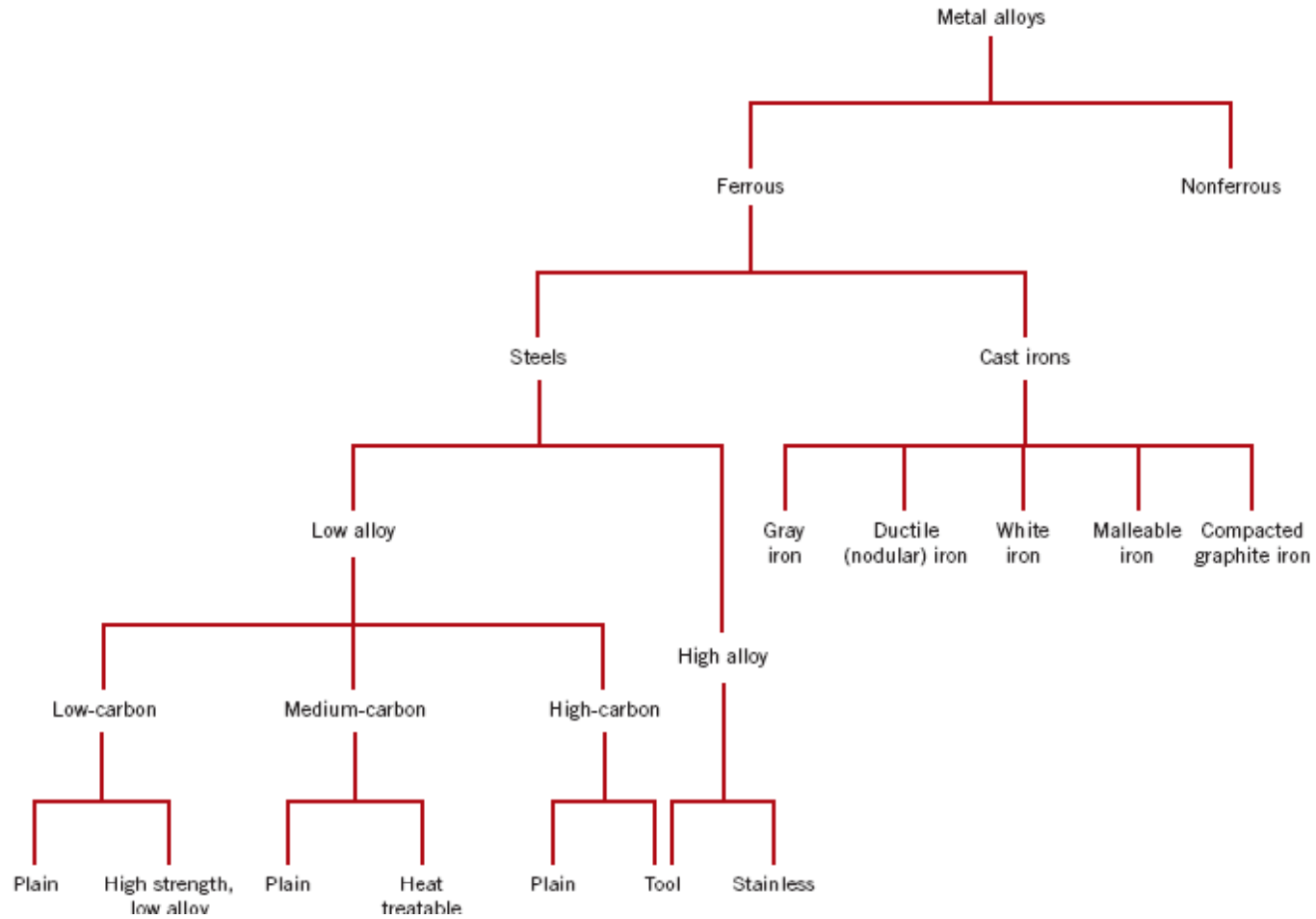


(b)

# Fasa yang terbentuk pada baja karbon

- **$\alpha$  Ferrit** , or  $\alpha$  iron, has a BCC crystal structure at room temperature
- **austenite**, or  $\gamma$  iron, at 912 °C(1674 °F), has a FCC crystal structure.
- **$\delta$  ferrite**, which finally melts at 1538 °C (2800 °F), has a BCC crystal structure
- **cementite** ( $\text{Fe}_3\text{C}$ ), extends only to 6.70 wt% C; at this concentration the intermediate compound iron carbide

# Klasifikasi bahan Logam



# Kalsifikasi Baja Karbon

- *Low-Carbon Steels*, have contain less than about 0.25 wt% C
- *Medium-Carbon Steels*, have carbon concentrations between about 0.25 and 0.60 wt%.
- *High-Carbon Steels*, normally having carbon contents between 0.60 and 1.4 wt%,

# Sifat-sifat Baja Karbon

- Low Carbon Steel
  - relatively soft and weak but have outstanding ductility and toughness; in addition, they are machinable, weldable, and, of all steels, are the least expensive to produce.
  - Typical applications include automobile body components, structural shapes (I-beams, channel and angle iron), and sheets that are used in pipelines, buildings, bridges, and tin cans.
  - have a yield strength of 275 MPa (40,000 psi), tensile strengths between 415 and 550 MPa (60,000 and 80,000 psi), and a ductility of 25%EL.



- Medium Carbon Steel

- The plain medium-carbon steels have low hardenabilities and can be successfully heat treated only in very thin sections and with very rapid quenching rates
- Additions of chromium, nickel, and molybdenum improve the capacity of these alloys to be heat treated , giving rise to a variety of strength–ductility combinations.
- Applications include railway wheels and tracks, gears, crankshafts, and other machine parts and high-strength structural components calling for a combination of high strength, wear resistance, and toughness.

- High Carbon Steel

- the hardest, strongest, and yet least ductile of the carbon steels
- *always used in a hardened and tempered condition and, as such, are especially wear resistant and capable of holding a sharp cutting edge*
- utilized as cutting tools and dies for forming and shaping materials, as well as in knives, razors, hacksaw blades, springs, and high-strength wire