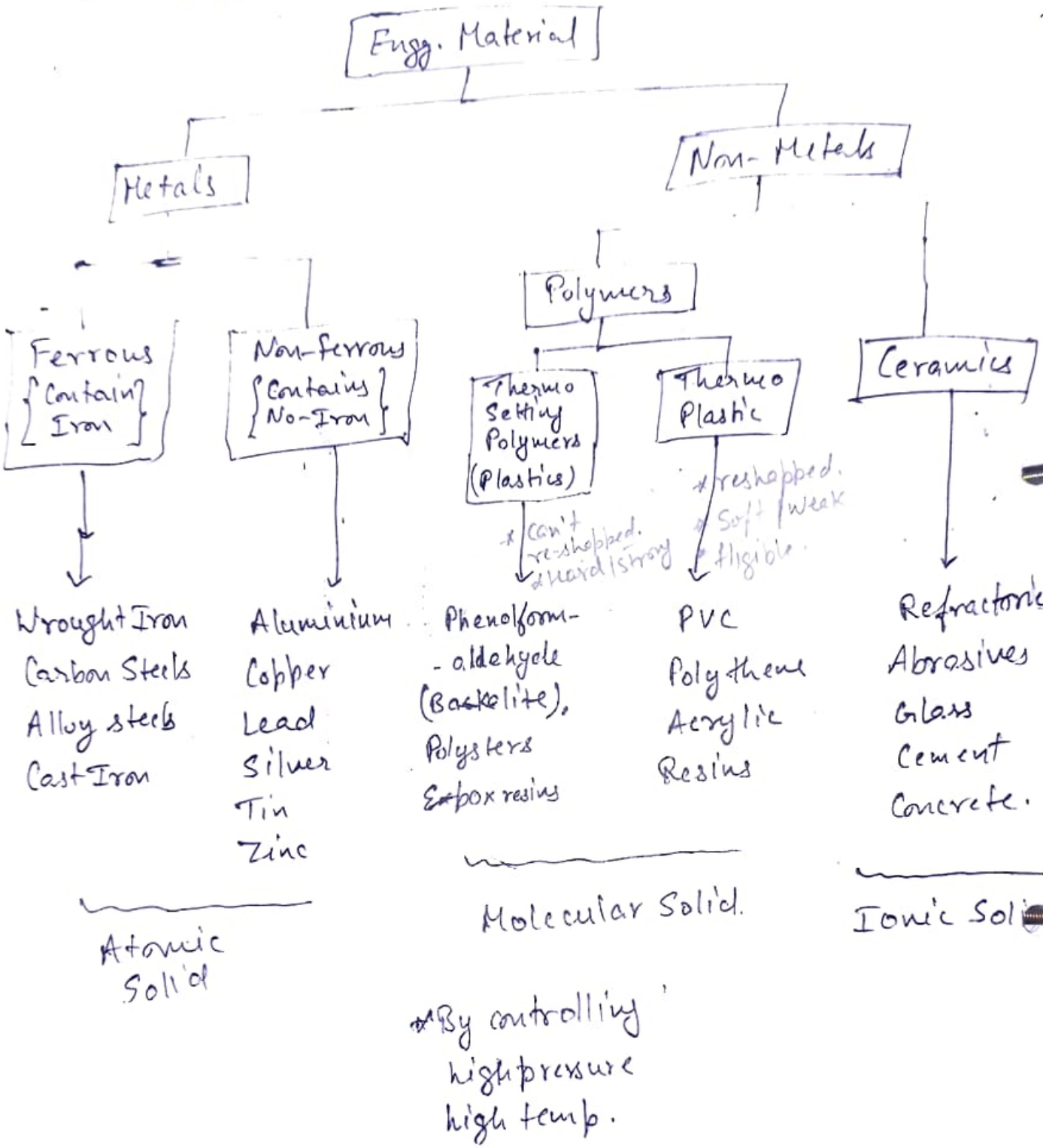
Classification of Engineering Materials.



* By controlling high pressure high temp.

* Ceramics are crystalline but also amorphous.

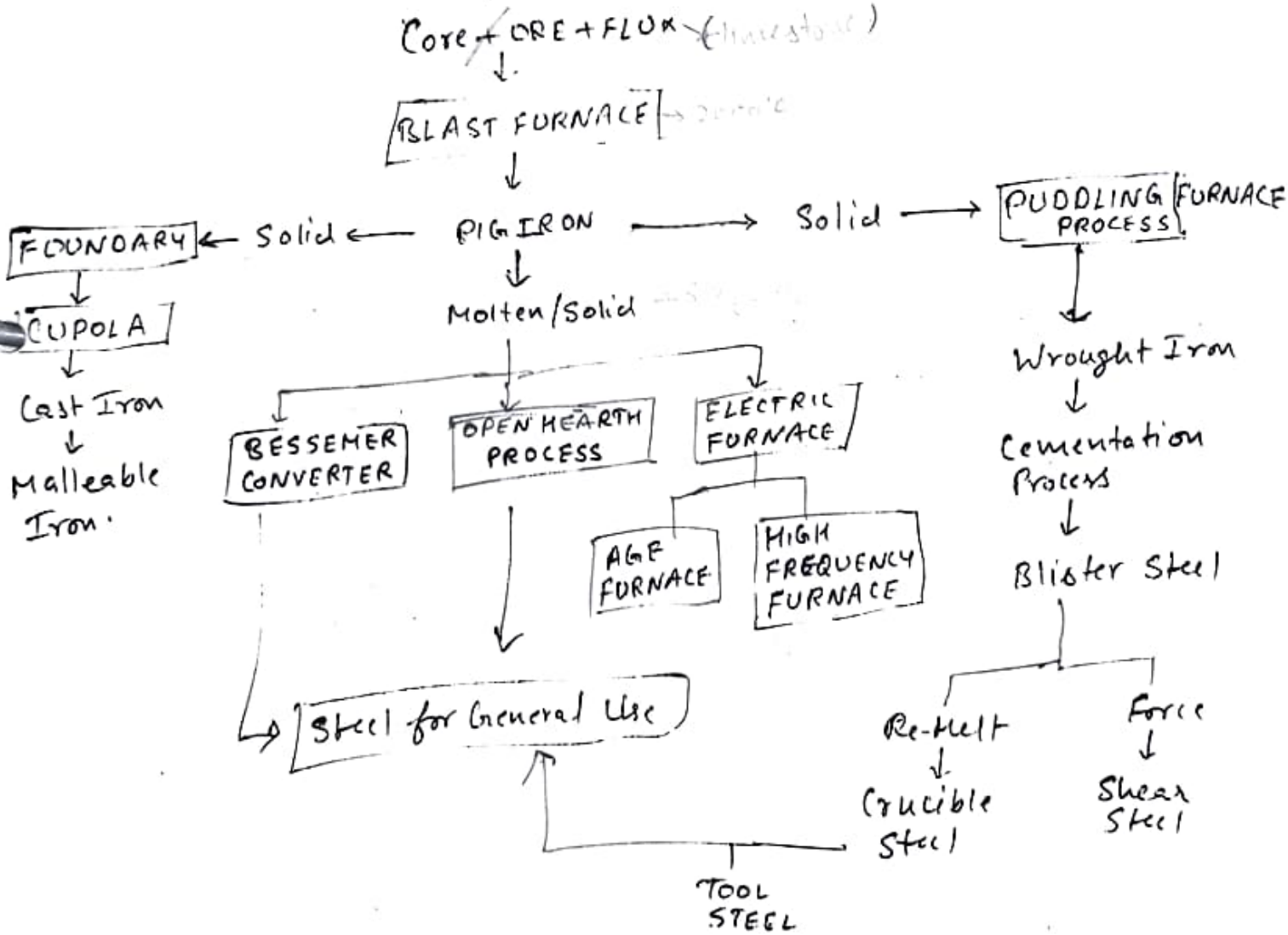
* Crystal structure of unknown materials are determined by X-Ray diffraction Technique.

Means it is not visible. It is being mathematical calculated. => I

Steel

Iron Ore.

	Name of the Ore	Iron Content	Chemical formula	Countries where available.
1.	Magnetite	72.5 %.	Fe_3O_4	India, Salem [Chennai] Sweden, U.S.A., U.S.S.R.
2.	Haematite	65-70 %.	Fe_2O_3	India [Bihar, Orissa, Andhra MP, Mysore] U.S.A.
3.	Limonite	60 %.	$2Fe_2O_3.3H_2O$	France, U.K. Spain, India.
4.	Siderite	40-44 %.	$FeCO_3$	U.K, U.S.S.R, India [Raniganj + Bengal]



FLOW SHEET FOR PRODUCTION OF IRON & STEEL

Cast Iron may be classified as

Cast Iron (C.I)

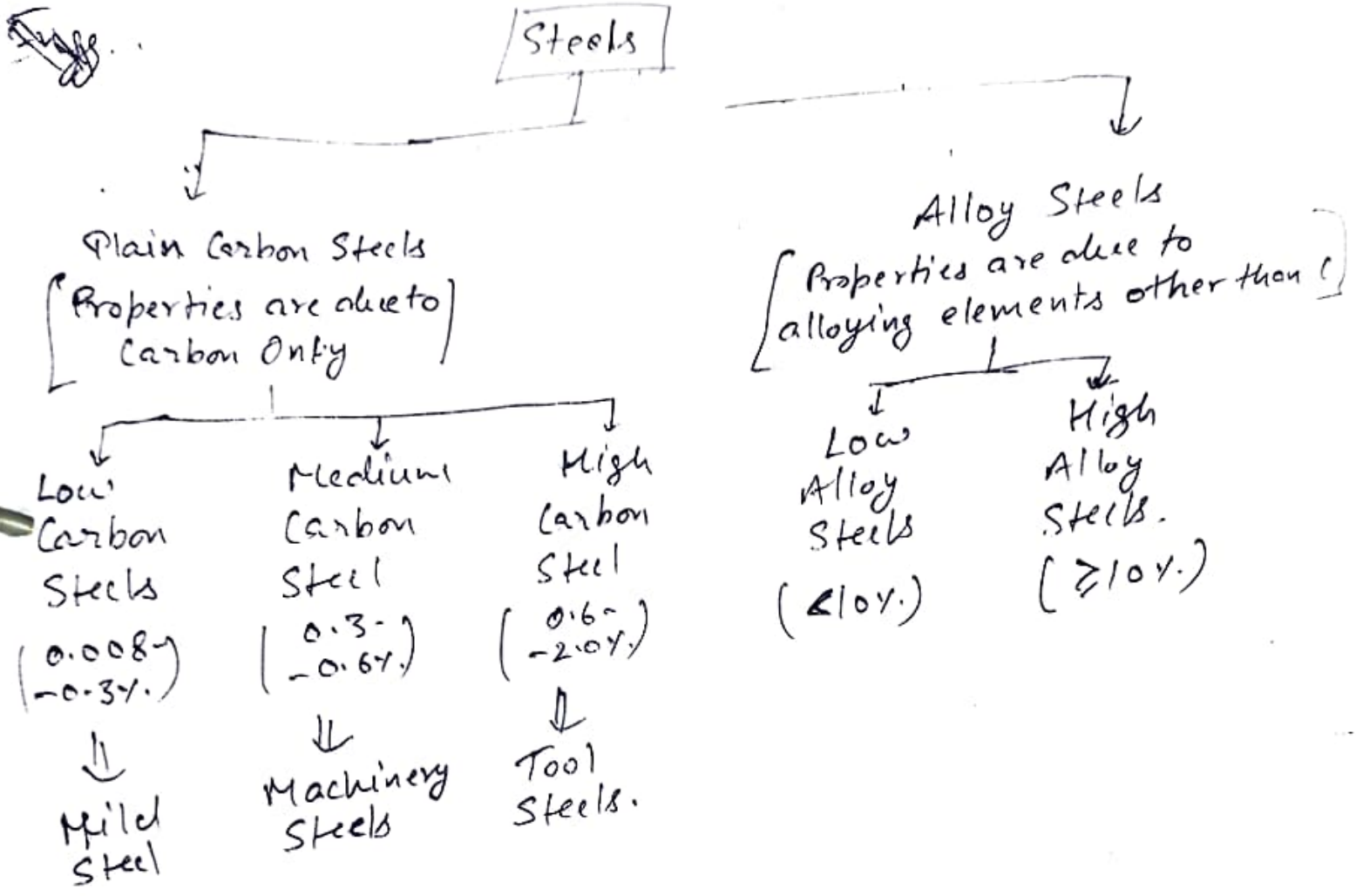
1.) White Cast Iron : Made under fast cooling rates.
- Made with low silicon content.
- Fe_3C needles present in Pearlite matrix.
- Hard brittle & Wear resistant.

2.) Grey Cast Iron : Made under slow cooling rates.
- made with high Silicon content.
- $Fe_3C \rightarrow$ graphite flakes.
- long graphite flakes disturbs continuity of lattice & hence decrease strength & Hardness.

3.) Meehanite C.I : Originally grey C.I.
- Added with CaSi to refine flakes.
- CaSi breakes flakes & Distribute uniformly.
- Composite type strength is observed.

4.) Chilled C.I : Produced in chilled moulds
- Outer layer - fast cooling. } Due to this
- Inner layer - Slow cooling } transforms in flakes.

5.) Spheriodal C.I or Nodular C.I : Originally grey C.I
- Li/Na/K/Ba are added as alloying elements
- Graphite flakes are added as alloying elements.
- Machinability ↑.


Steels
Plain Carbon Steels
[Properties are due to Carbon Only]
Low Carbon Steels
(0.008% - 0.3%)
Mild Steel
Medium Carbon Steel
(0.3% - 0.6%)
Machinery Steels
High Carbon Steel
(0.6% - 2.0%)
Tool Steels.
Alloy Steels
[Properties are due to alloying elements other than C]
Low Alloy Steels
(< 10%)
High Alloy Steels.
(≥ 10%)