Nano-technology:

It refers to a branch of science & technology for designing, producing and using structure, devices and systems by manipulating atoms & molecules at nano-scale. (10^{-9} m)

low carbon steels:

99.75 wt%. Iron + 0.25%. C

Important point:

- Iron is readily available from earth's crust (7%.)
- Iron deforms easily.
  - It is ductile in itself.
  - Brittleness ∝ No. of Carbons.
- Iron is quite machinable than glass as it is ductile.
- Iron is weldable due to it's high resistance towards heat.
- Iron is much tougher than glass, stone etc
  - Impact absorbtion capacity.
- Undesired property:
  - Susceptable to corrosion
  - Brittle under certain conditi

Some properties to consider while contructing / designing:

- Durability
- How it would react in under certain conditions
- Melting point
- Environmental impacts
- chemical properties

How materials react when subjected to:

1) Mechanical force:
   - ↳ Able to withstand force
   - ↳ Materials may bend or resist compression
   - ↳ Materials may break under tension, stress.

2) Electrical force:
   - ↳ Able to handle required amount of current, voltage with catching fire.
   - ↳ Materials may conduct, insulate, semi-conduct electricity.
   - ↳ Materials may resist current

3) Magnetic forces.
   - ↳ Materials can become magnetic or can exhibit varying degrees of susceptibility to magnetic field.

4) Optical forces:
   - ↳ Reacts with light to show effects like shining, absorption, refraction.

5) Temperature gradient:
   - ↳ Materials expand or contract
   - ↳ Materials differ in their ability to conduct heat.

6) Chemical enviroments (Corrosive):
   - ↳ Materials may corrode
   - ↳ Differ in their ability to react with chemicals.

Material. ⟹ COST

1) Electrical → Conductors, Insulators, semi-conductors

2) Mechanical → tough, ductile

3) Chemical → Corrosive, bio-degradeble, inert

4) Thermal → Conductors, Insulators, refactory

5) Radioactivity

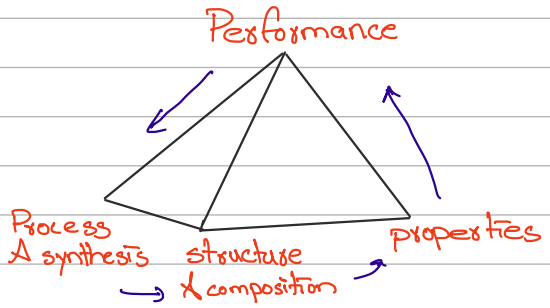
6) Magnetic → Para, diamagnetic

7) Optical → LCD, Optical fibres, Night vision camera

8) Biological → self-replicating

Grain Boundaries:

↳ Materials consists of distinct single, small crystals known as grains.
↳ At boundaries, these grains may not perfectly align.
↳ This affects mechnical, electrical & thermal behaviours.



Conductivity & Energy absorption:

1) Metals
2) Semi-conductors
3) Polymers
4) Ceramics