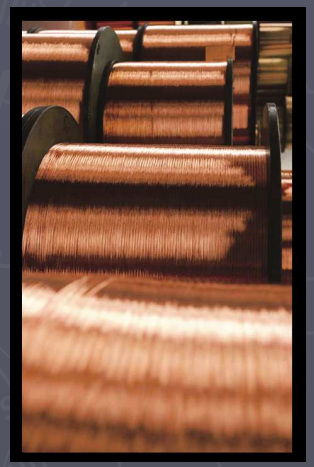
Classification of materials



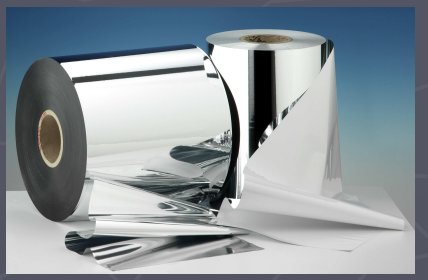
Josep Poch March 07

General classification

- 1. Metals and alloys
- 2. Polymers
- 3. Woods
- 4. Ceramic materials
- 5. Composites
- Materials

1. Metals

- Metals are usually lustrous, ductile, malleable, and good conductors of electricity
- They are divided into 2 categories:
  - FERROUS: the group which contains mainly iron (Fe). Iron is the most important metal in industrialized countries
  - NON-FERROUS: other metallic materials containing no iron like copper (Cu) or aluminium (Al)

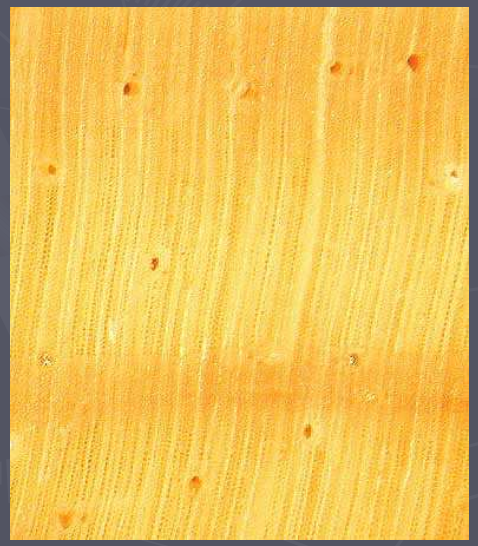


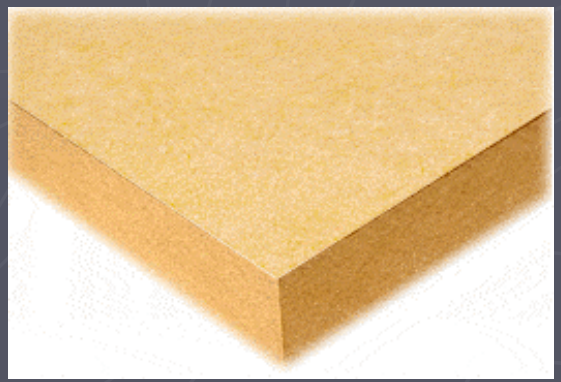
2. Polymers

- Crude oil supplies the majority of the raw material for the production of polymers, also called plastics
- Polymers can be divided into 3 categories:
  - Thermoplastics: usually soft and easy to be recycled
  - Thermosetting plastics: usually stiff and not easy to be recycled
  - Elastomers: flexible (rubbers)

3. Woods

- Different species of tree provide many types of wood or timber
- Manufactured boards such as plywood or MDF are widely used nowadays





Pine wood (natural), plywood and Medium-density fibreboard or MDF (manufactured)

4. Ceramic materials

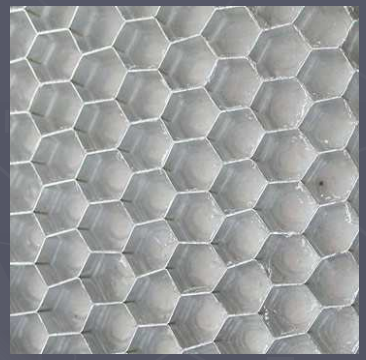
- The word ***ceramic*** is derived from the Greek word *keramikos*. The term covers inorganic non-metallic materials whose formation is due to the action of heat
- Clays, bricks, cements, glass are the most important ones




Clay (to make pottery), bricks, cement and glass

5. Composites

- Bonding 2 or more materials together changes their properties and characteristics
- Bonded materials are called Composites



Aluminium honeycomb composite panel, light and strong

Kevlar is used in bullet-resistant vests. It's a tough and light material

Modern tennis racquets are made of carbon-fibre composite

Past and Present

In prehistoric times humans made tools and weapons using STONE, WOOD and BONES

With modern technology we can use a wide range of metals, polymers, ceramic materials and composites, like the bodywork of a Formula-1 race-car, made or carbon-fibre composite

Past and Present