

Ceramic & composite materials

Ch:1 Ceramic Materiales

1-1 Definition and Principles

Ch:2 Classification of Ceramic Materiales

2-1 Traditional Ceramic

- a- Kaolinites
- b- Montemornites

2-1-1 Crystal structures of traditional Ceramic

- a- Kaolinite crystal structures
- b- Montemornite crystal structures

2-2 Engineering Ceramic

- a- Oxide b- Carbide c- Chloride d- Nitride e- Magnatic ceramic
- f- Graphite

2-2-1 Selection and uses of Engineering Ceramic

2-2-2 Properties and behavioures

Ch:3 Industrial Processing

- a- Raw materials
- b- Crushing
- c- Washing
- d- Sizing (seving)
- e- Size distribution and interfering
- f- Binding
- g- FOrming
- h- Drying
- i- Firing

3-1 Forming Technology

- a- Slip Casting b- Injection c- Extrusion d- Cold pressing (uniaxial)
- e- Hot pressing f- HIP

Ch4: Draying Theories

Ch5: Sintering

- a- Theory of sintering
- b- Furnaces Types

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c- Crystal Growth

d- Solidification, Close packing and Densification

Ch6: Phase transformation

a- Inversion and Conversion b- Mager phases and Internal phases properties and applications

Ch7: Physical test and Measurements

a- Metallic test

1-XRD 2- FRD

b- Thermal expansion (DTA)

C- Porosity measurement

d- Mechanical properties

1- Tensile. 2- Compression.

3- Bending. 4- Hardness.

Ch8: Composite Materials.

a- Matrix Classifications

b- Reinforcement types applications.

Ch9: Carbon materials Technology and applications.