SOLID PARTICULATES COURSE INTRODUCTION DEFINITIONS

Some applications in chemical industry

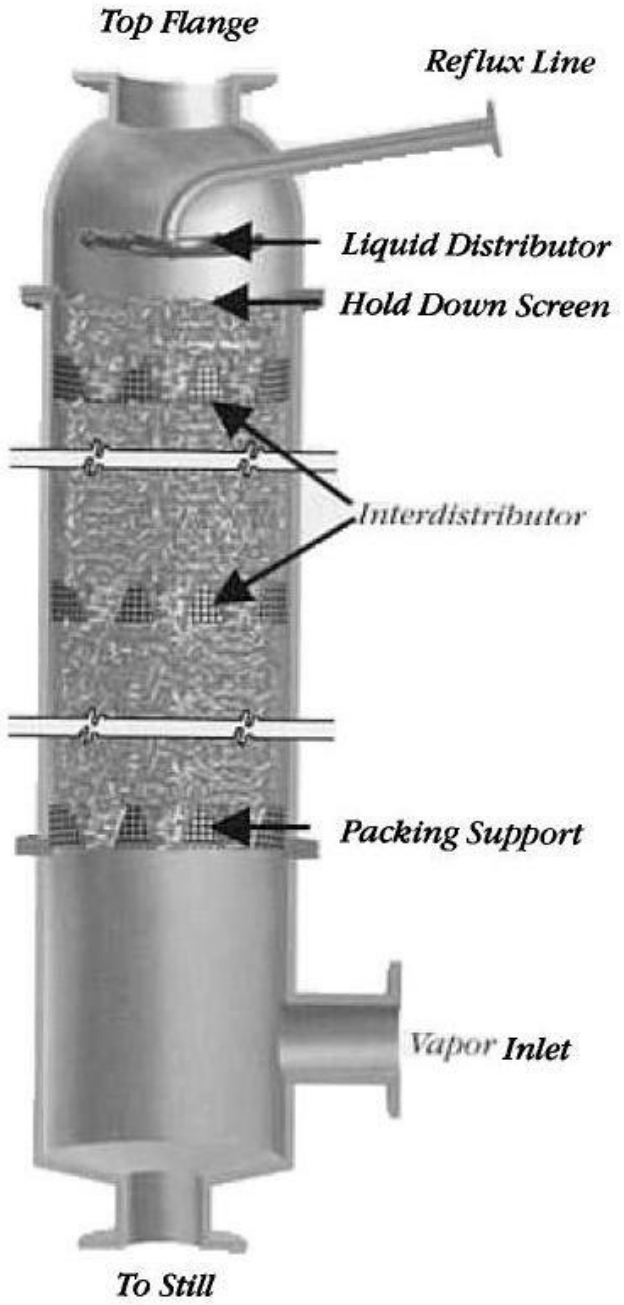
Significance of this course

QUESTION

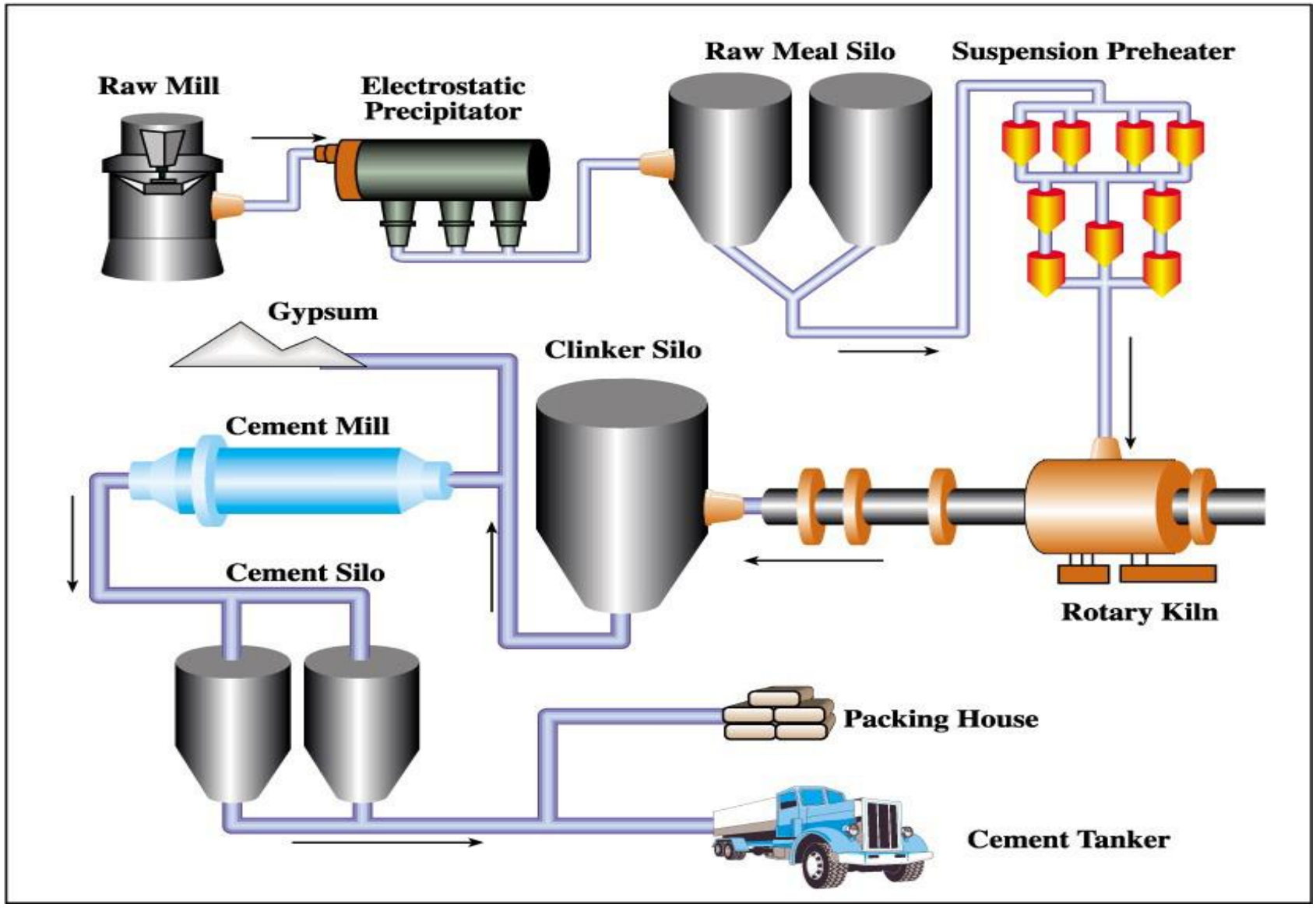
What is the significance or importance of the solid particulates course in chemical engineering field?

LOOK TO THE FOLLOWING EXAMPLES

Packed column Distillation

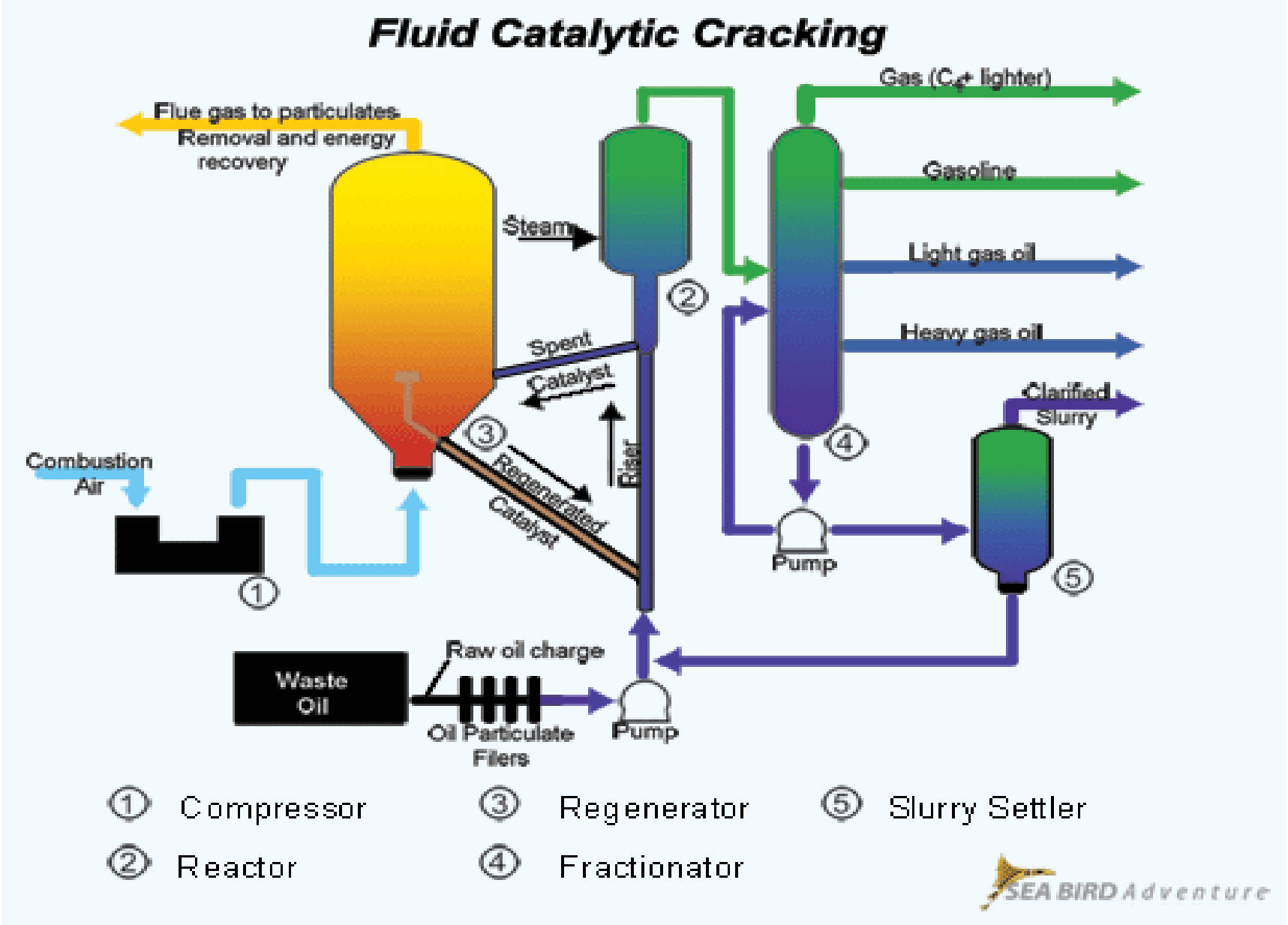


Cement Production Process



Pharmaceutical Applications mixing equipment

Petroleum Industry / FCC process



Absorption column

Absorption column

Laboratory absorber

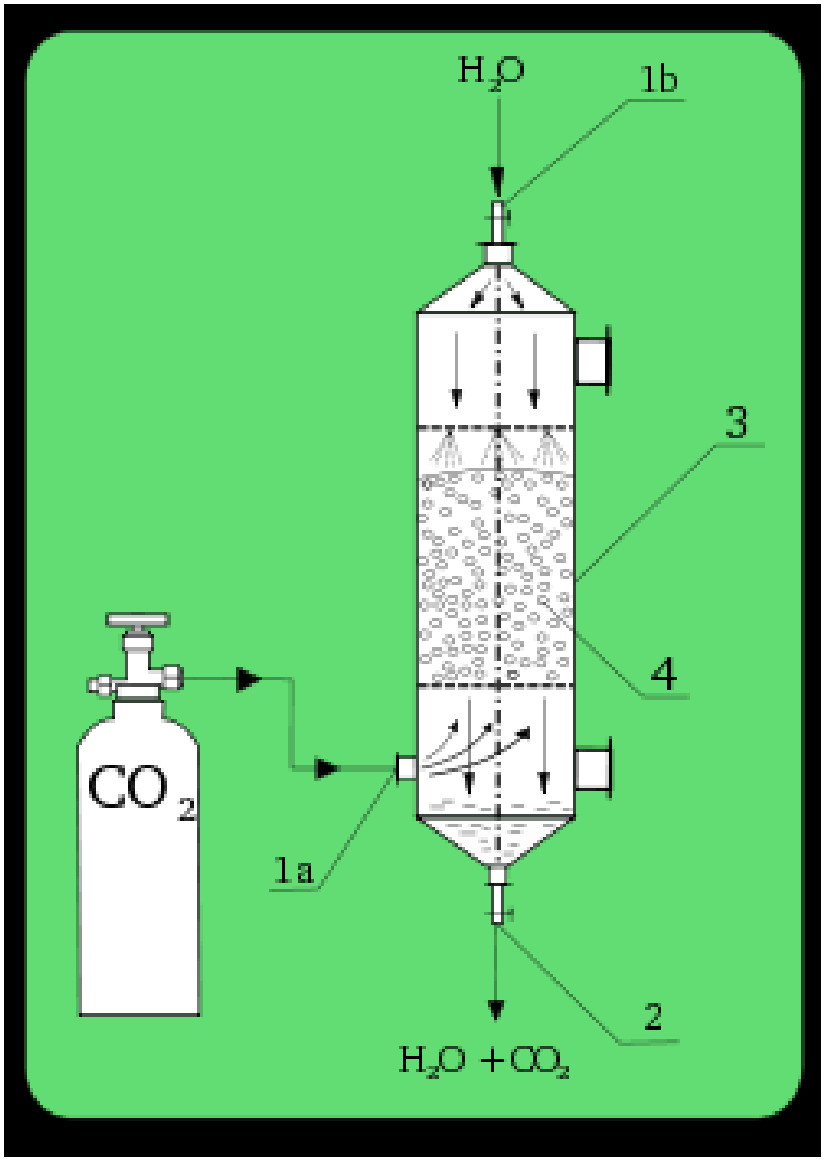
(1a): CO_2 inlet;

(1b): H_2O inlet;

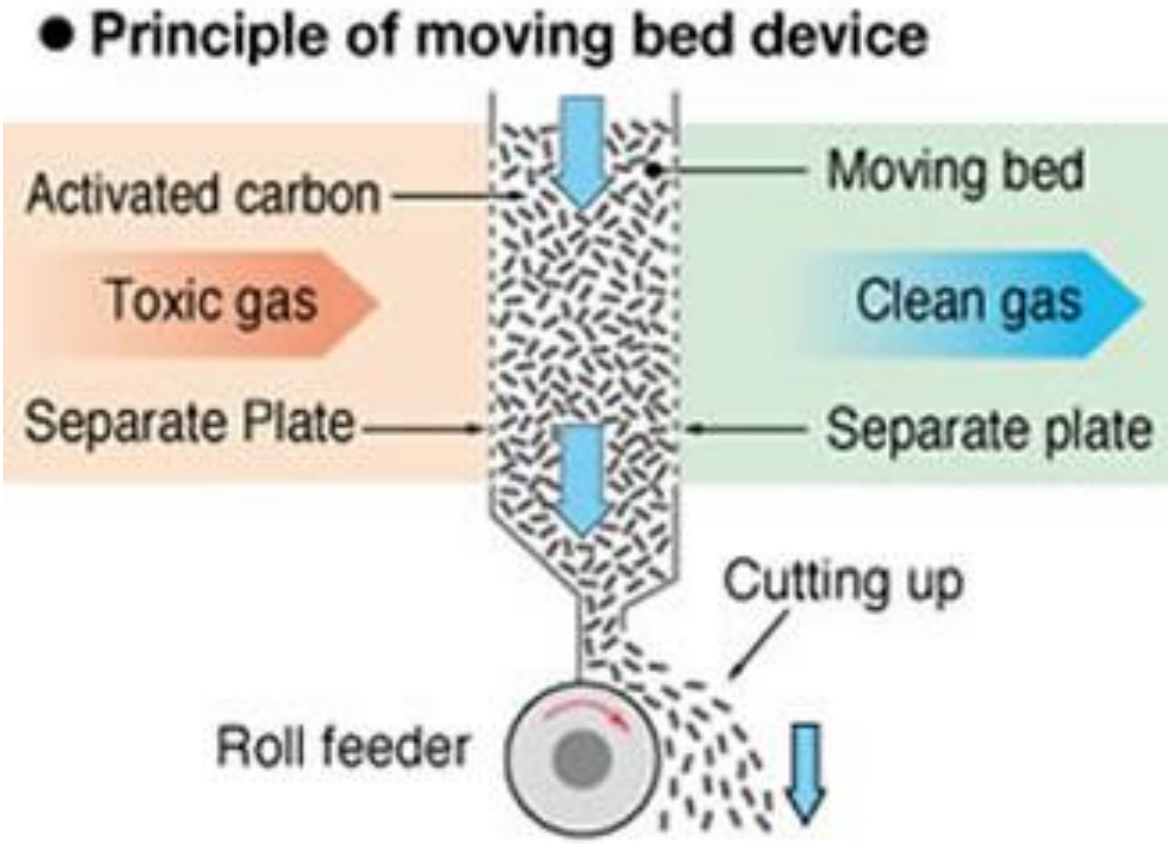
(2):outlet;

(3): absorption column;

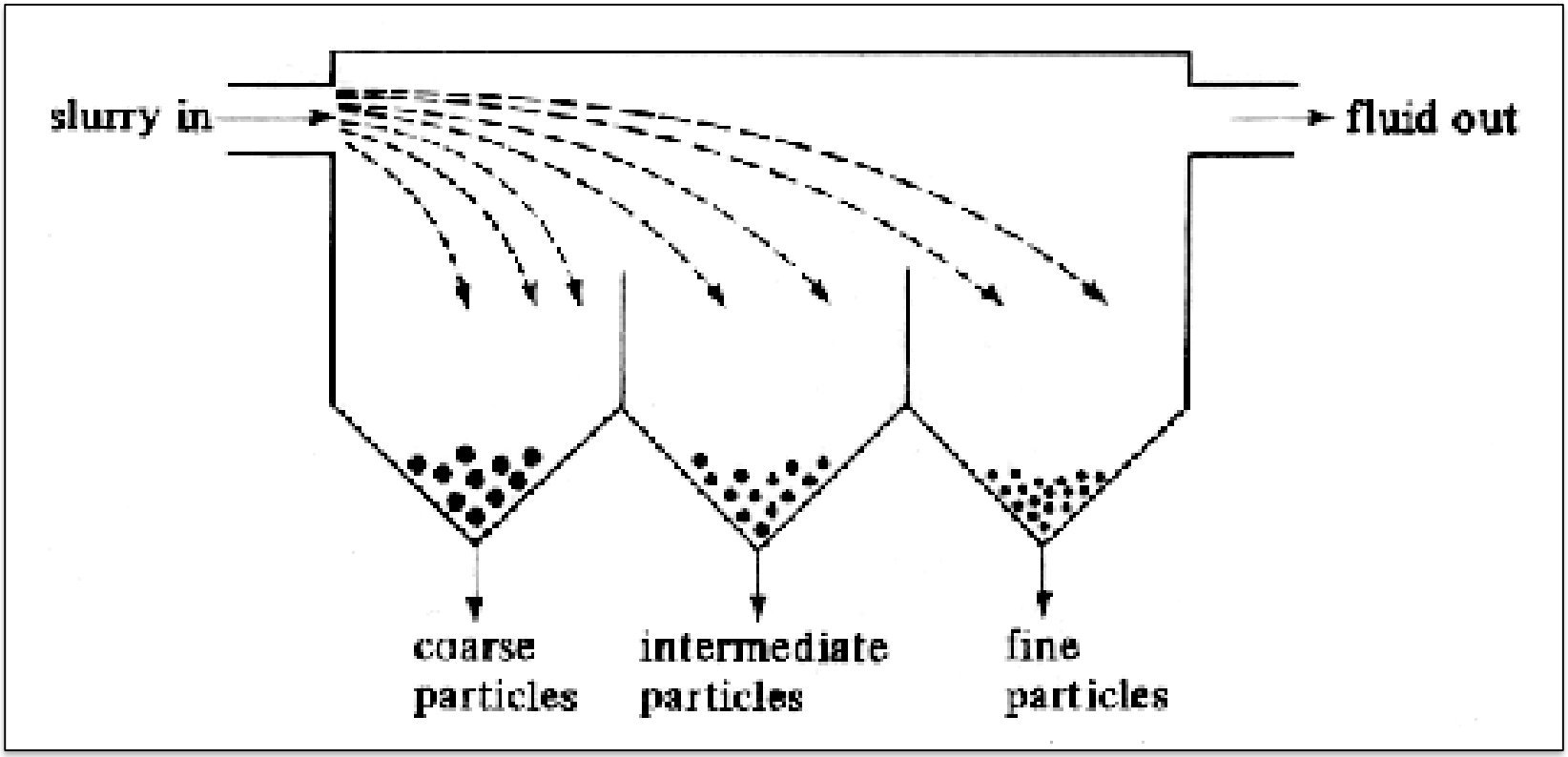
(4): **packing**.



Moving Bed of solid particles



Sedimentation

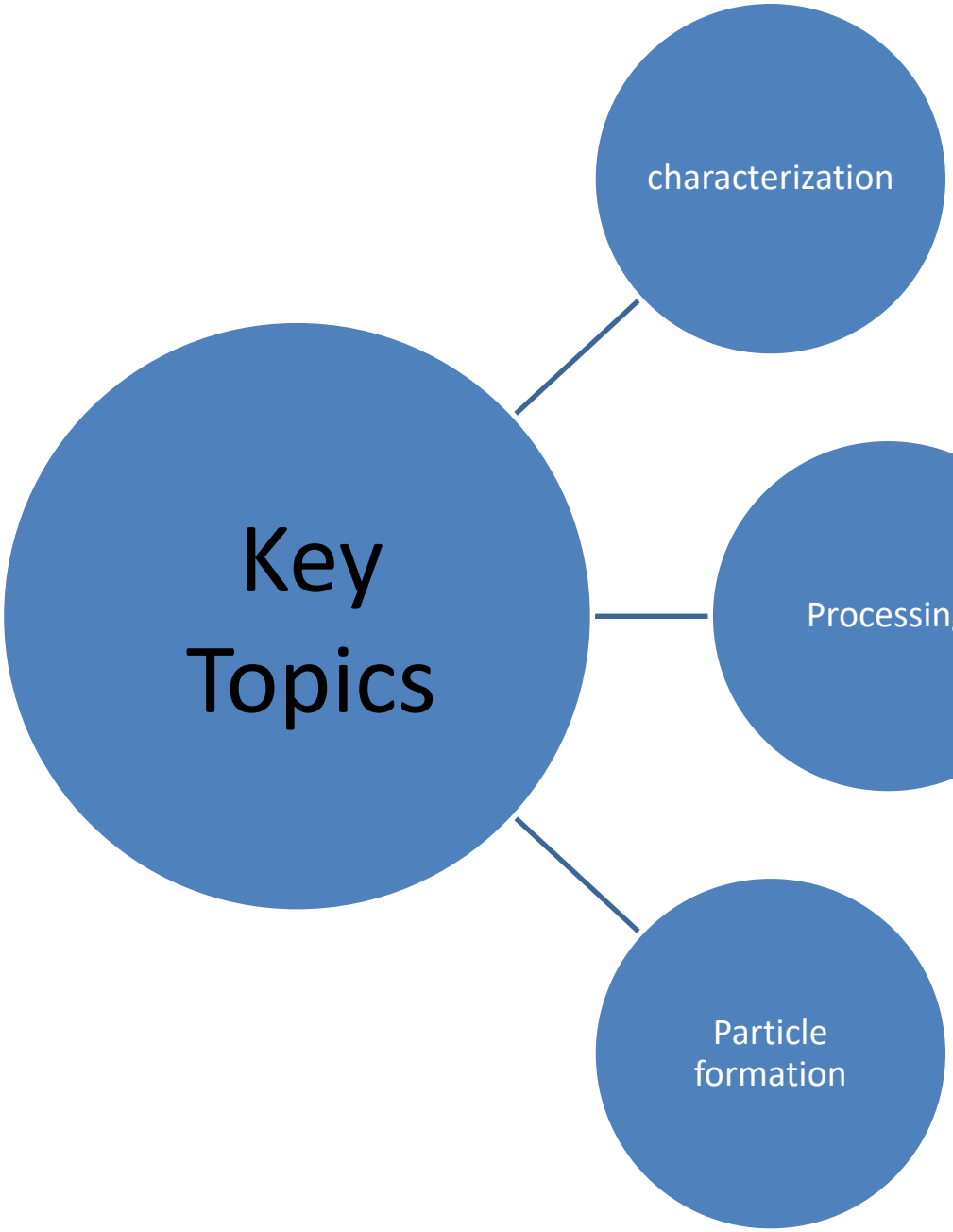


Solid Particulate

Introduction, Definitions, particle size analysis, size distribution, mean particle size, and measuring techniques

Topics of Particle Technology

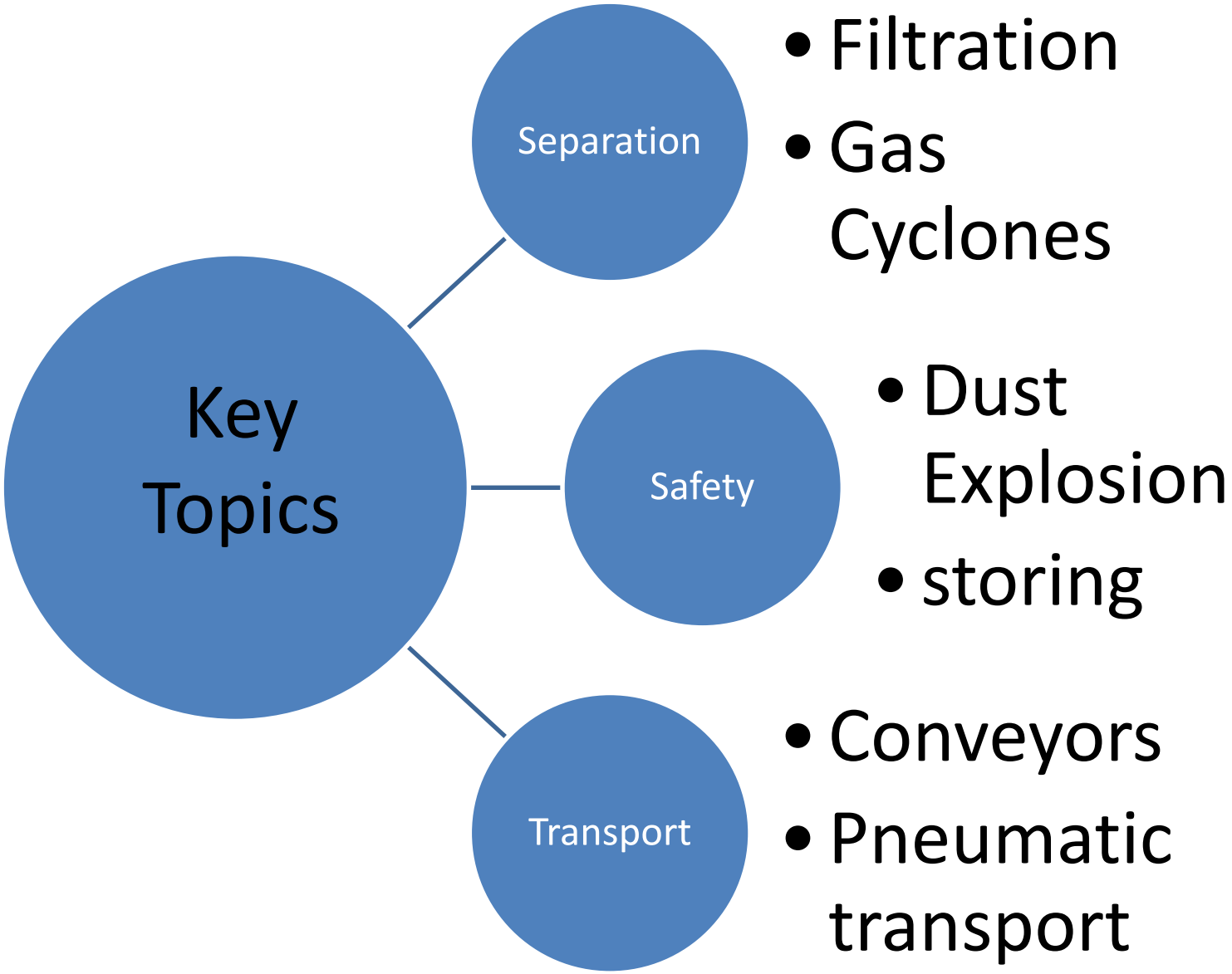
- Characterization of solids
- Motion of Particles through fluids
- Size Reduction
- Mechanical Separations

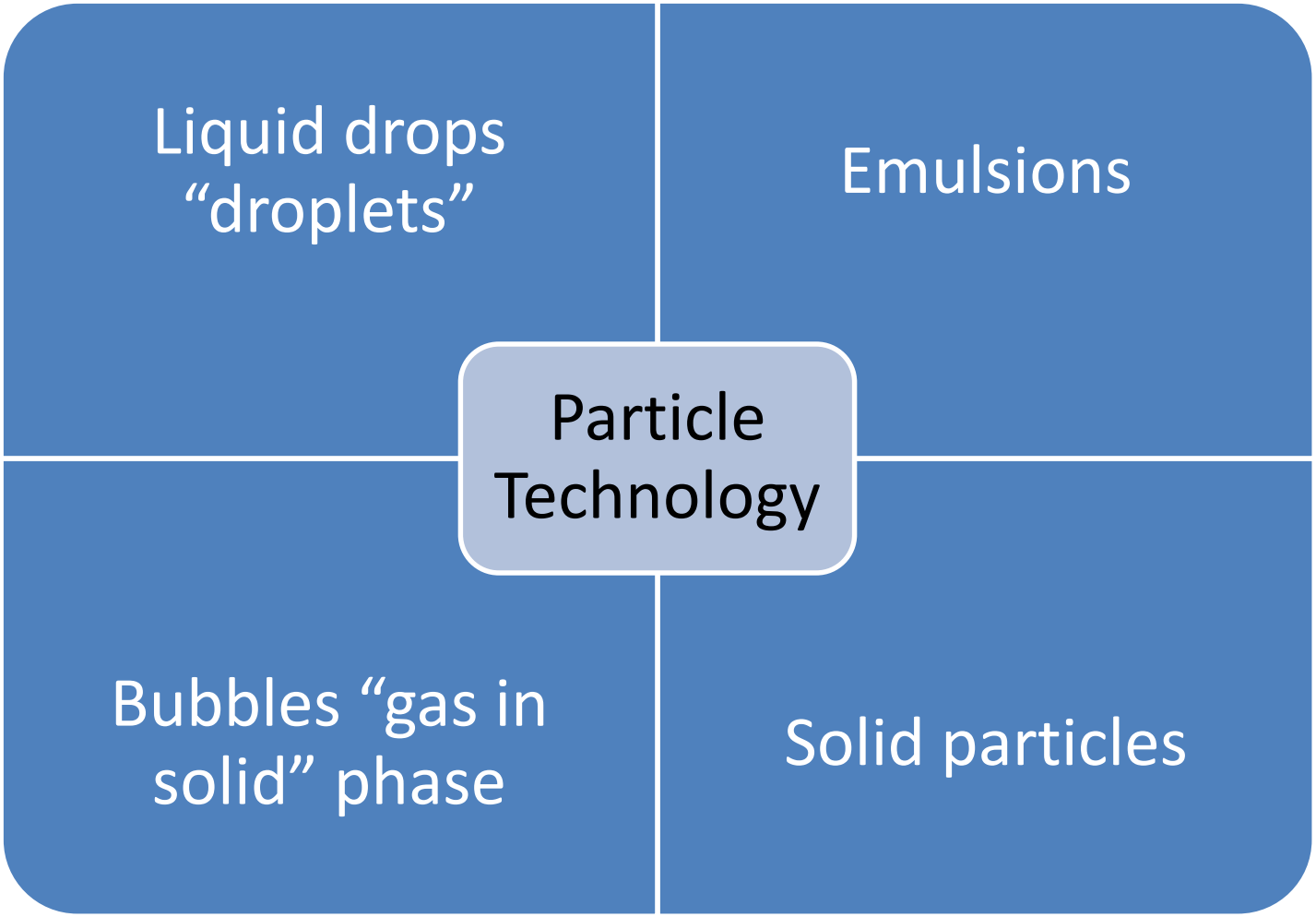


- Size analysis
- Size measurement

- F.B
- Granulation

- Size reduction
- granulation


Key Topics
Separation
Safety
Transport
• Filtration
• Gas Cyclones
• Dust Explosion
• storing
• Conveyors
• Pneumatic transport

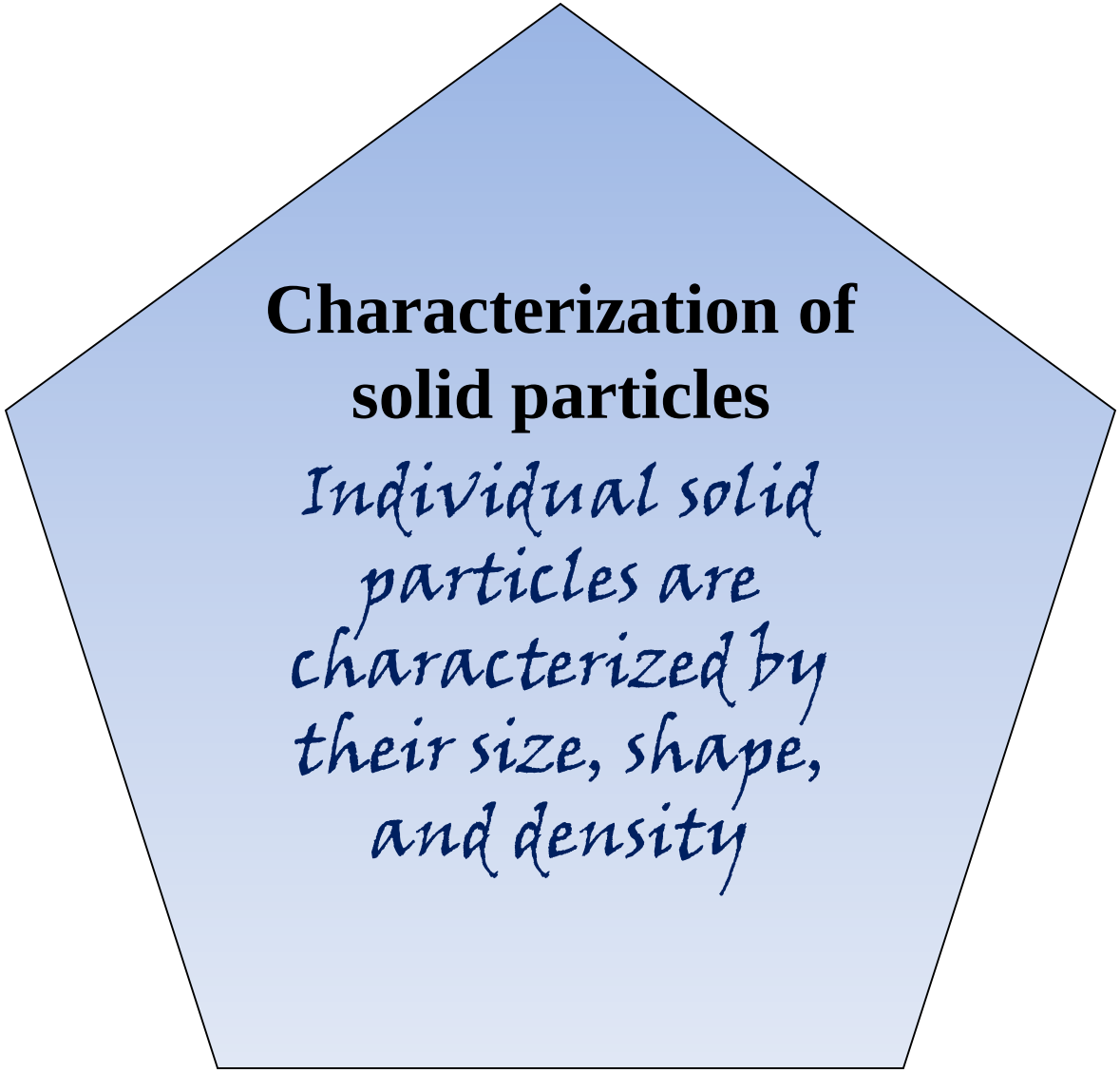

Liquid drops "droplets"
Emulsions
Particle Technology
Bubbles "gas in solid" phase
Solid particles

What is particle technology?

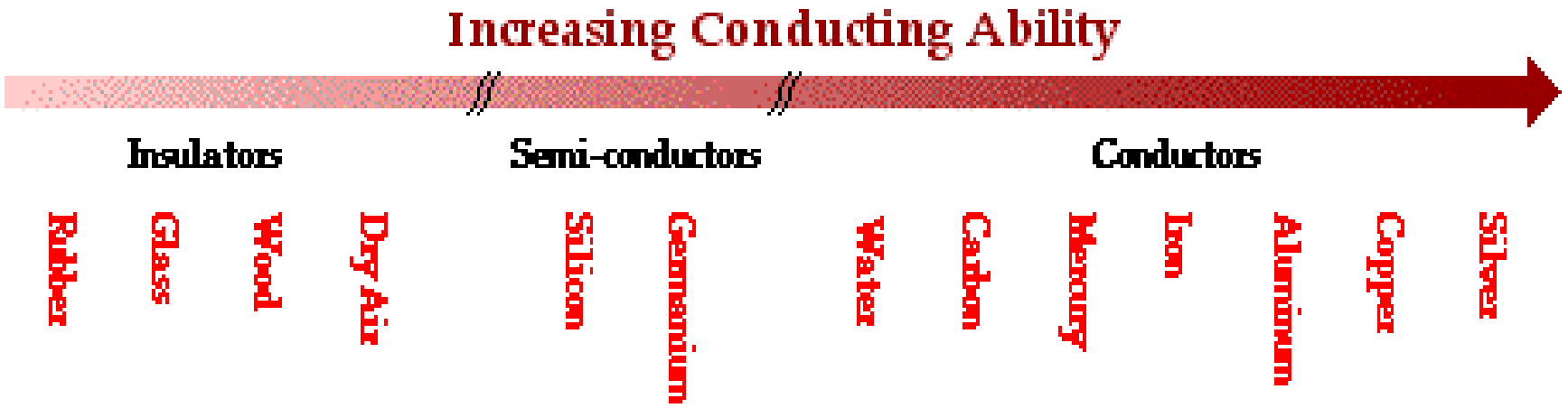
Techniques for processing and handling particulate solids. It plays a major role in the production of materials in industry.

Units used for particle size depend on the size of particles.

Particles	Size
Coarse particles	inches or millimeters
Fine particles:	screen size
Very fine particles	micrometers or nanometers
Ultra fine particles	surface area per unit mass, m^2/g


Characterization of solid particles
Individual solid particles are characterized by their size, shape, and density

Types of Material



CHARACTERIZATION OF SOLID MATERIAL

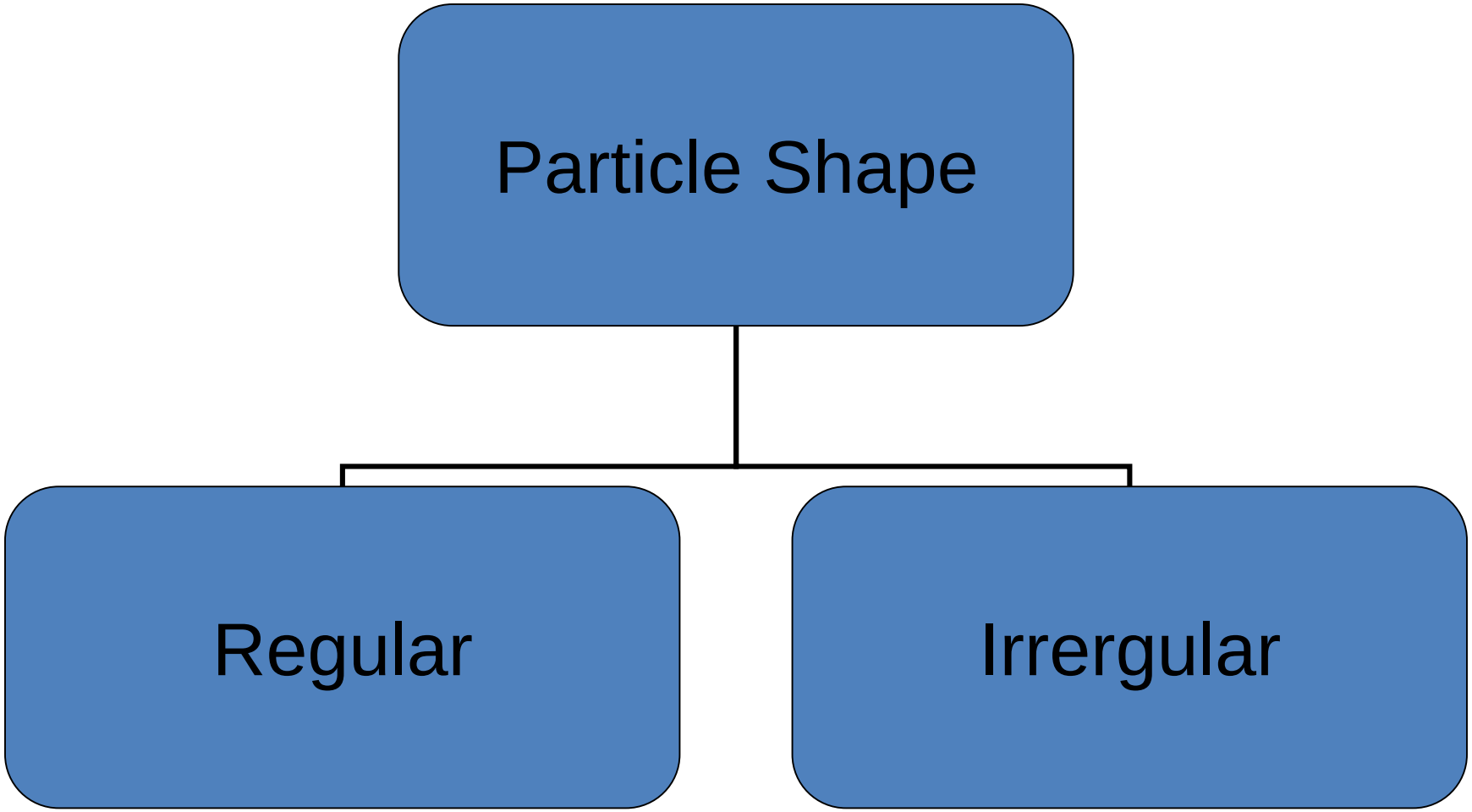
- Density and porosity
- Composition
- Thermal conductivity
- Particle size and shape
- Mechanical properties ‘Strength and hardness’

Definitions

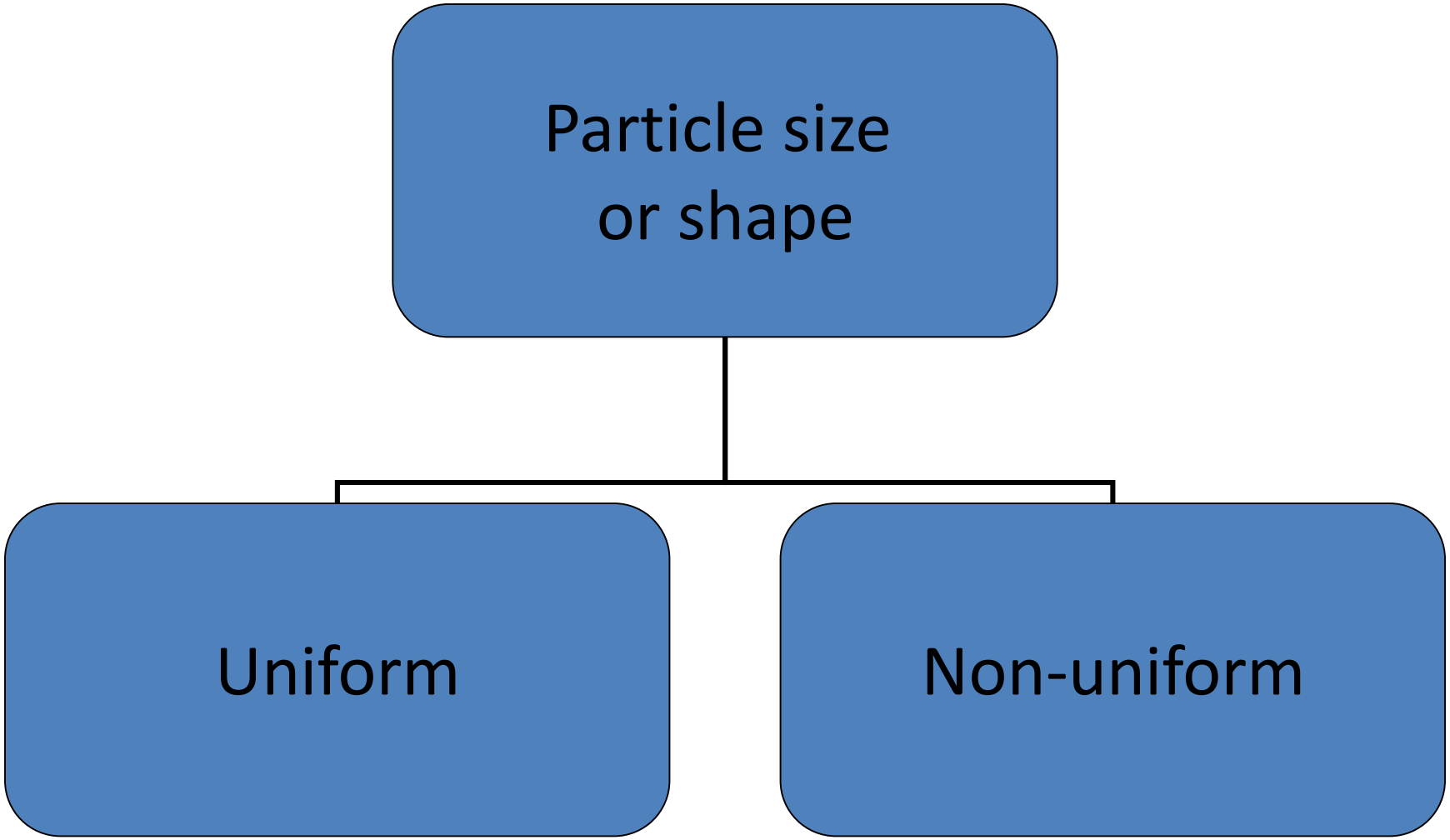
- A particle
- Particulate material

Dust	Shape is not visible by eye
Powder	Produced by comminution Shape is not visible by eye
Granules or Fibers	Shapes are visible to eye rounded or elongated
Lump	Manipulated by hand

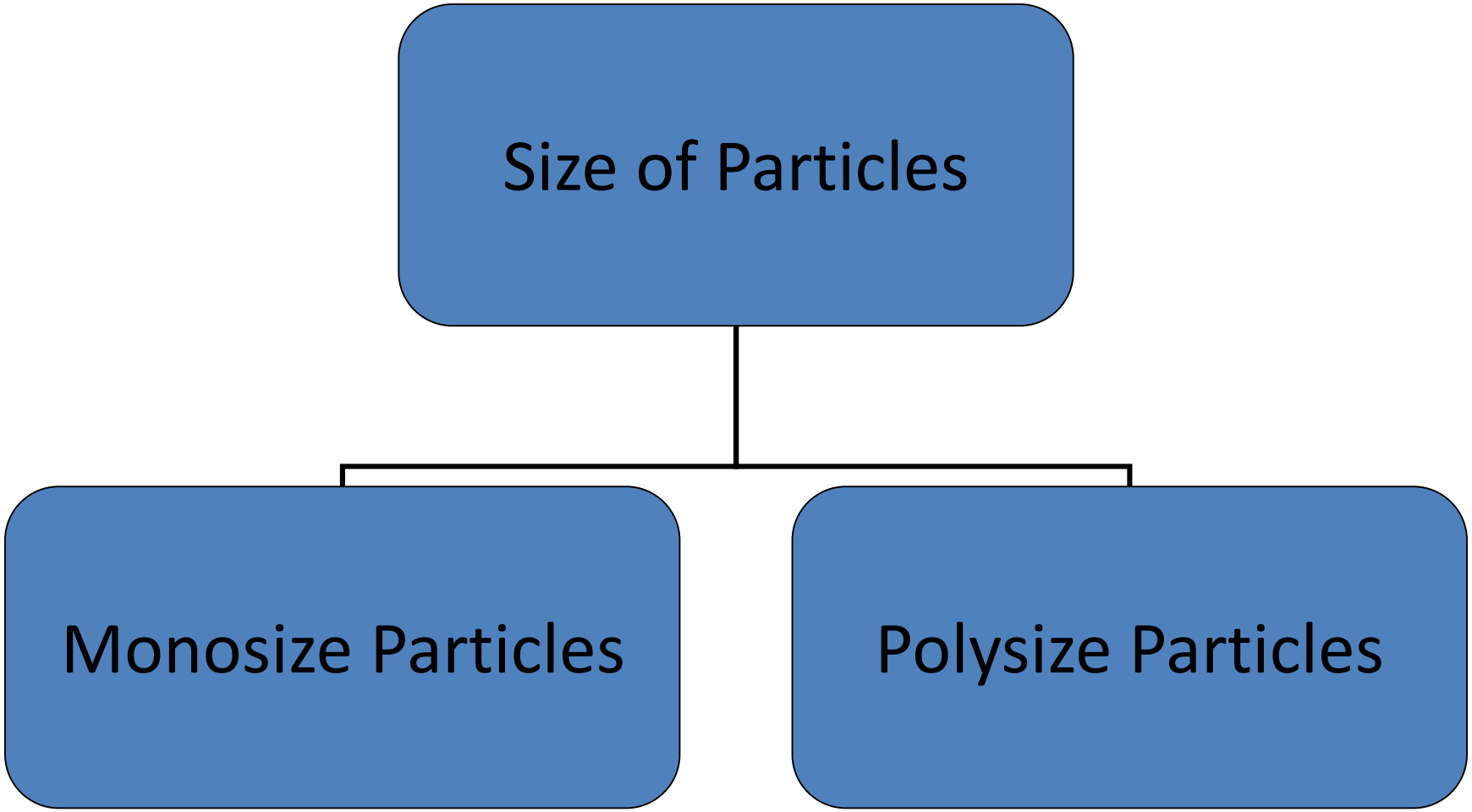
Definitions



Definitions



Definitions



Definitions

- A particulate system
- Porosity
- Specific surface area of particle
- Specific surface area of particulate system
- Fixed bed of solids
- Porous mass of solids
- Moving bed
- Fluidized bed