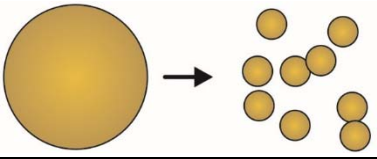
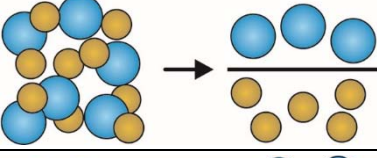
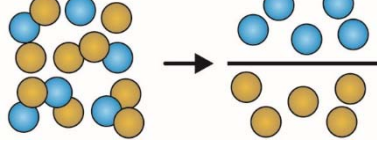
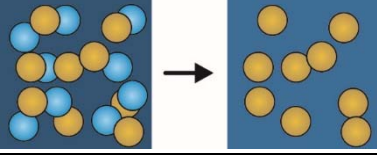
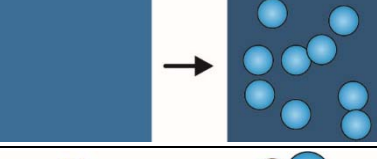
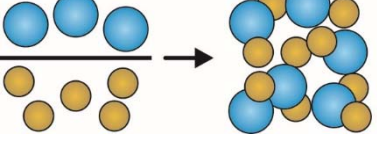
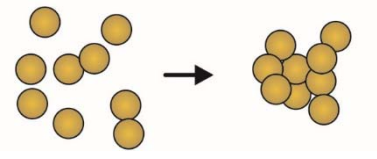
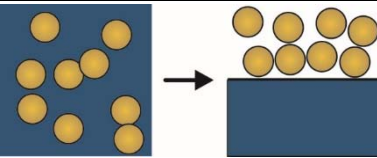
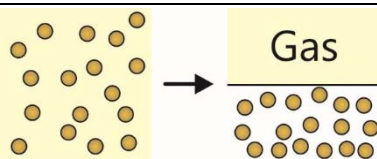
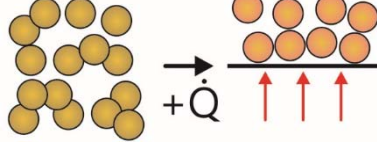


Survey about Unit Operations in Particle Processing

Scheme of operation principle	Process	Related processes	Physical operation principle
	Size reduction	Comminution	→ of solids (irreversible)
		Disintegration	→ of weakly bonded agglomerates (reversible)
	Classifying	Separation acc. particle size	
		Sieving or screening	→ acc. geometrical dimensions
	Sorting and grading	Separation acc. physical material properties	
		Density sorting	→ acc. density
		Hand sorting	→ acc. optical properties
		Mechanical sorting	→ acc. mechanical properties (elasticity)
		Magnetic grading	→ acc. magnetic properties
		Electrical grading	→ acc. conductivity
	Leaching	Dissolution	→ of soluble phase
		Extraction	Liquid-liquid phase transition
	Crystallization	Crystallization	Evaporation of liquid
		Precipitation	Generation of a new insoluble solid phase
	Mixing and blending	Homogenization of various particle phases	
		Solid mixing	Solid-solid mixing
		Homogenization	Temporary constant properties
		Suspension	Solid in liquid
	Agglomeration	Adhesion of primary particles to few coarser agglomerates	
		Pelletizing	Moist agglomeration
		Press agglomeration	→ under pressure (tableting)
		Sintering	Contact fusion
		Coagulation	Liquid-liquid
	Solid-liquid separation	Thickening of the particles, clarifying of the liquid	
		Sedimentation	Particle settling
		Filtration	Retention of particles by semipermeable membrane
		Drying	Evaporation of liquid
	Dust collection	Precipitation of particles from gas	
		Absorption	→ from emission sources
		Gas cleaning	Separation of particles from gas
	Thermal treatment	Roasting	Degassing of volatile phases
		Calcination	Chemical reactions within solids (e.g. lime)
		Combustion	Gasification of organic phases

In extension of the lecture: "Mechanical Process Engineering", Prof. J. Tomas, held at OvGU Magdeburg
acc. – according to