

MATS7AE PHASE DIAGRAMS and MICROSTRUCTURES

MATS7AE		ECTS Credits : 2		Semester : S7
Phase Diagrams and Microstructures		Duration : 21 hours		
Person(s) in charge:				
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Keywords:				
Phase diagrams, microstructures				
Prerequisites:				
Macroscopic thermodynamics applied to the study of closed systems, physico-chemical properties of pure bodies and binary mixtures in the three states, evolution criteria, conditions of equilibrium and stability of matter.				
Objective:				
Matter transformation in the structural materials domain.				
Contents:				
<ul style="list-style-type: none">• Description of materials: phases, homogeneity, polyphased materials• The different microstructures in the three major types of materials• «Gibbs energy-composition" binary diagrams and phase stability• Equilibrium diagrams of binary condensed phases• Relations between molar diagrams and phase equilibrium diagrams• Chemical diffusion as a phenomenon closely linked to the emergence and persistence of microstructures• GT(x) molar diagrams, phase equilibrium diagrams and microstructures				
Abilities:				
Level	Description and operational verbs			
Know	Discover and describe the principal microstructures in the three types of material, Describe properties of the Gibbs energy for the different phases present in the microstructures of materials.			
Understand	acquire basic knowledge, methods of analysis and knowhow, in short, making students autonomous in their thoughts, analysis and proposals when confronted with problems related to the transformation of material in the field of structural materials.			
Apply	Know how to use binary phase diagrams, know how to link phase diagrams and «Gibbs energy-composition" molar charts.			
Analyse	Know how to determine the driving force behind the evolution of an out-of-equilibrium system that is the seat of phase transformation, know how to describe the relative movement of constituents in relation to each other under the effect of diverse forces: gradients of chemical composition, gradients of chemical potential, gradients of electrical potential, etc.			
Summarise				
Assess				
Assessment:				
<input checked="" type="checkbox"/> Written Test	<input checked="" type="checkbox"/> Continuous Control	<input type="checkbox"/> Oral Report	<input checked="" type="checkbox"/> Project	<input checked="" type="checkbox"/> Written Report