

NPTEL Video Lecture Topic List - Created by Linuxpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC:Phase Transformation in Materials

Subject Co-ordinator - Dr. Krishanu Biswas

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Brief Introduction

Lecture 2 - Define Phase, Equilibrium

Lecture 3 - Free Energy, Stability of Phases

Lecture 4 - Gibbs Free Energy of Binary Solution

Lecture 5 - Ideal Solution and Chemical Potential

Lecture 6 - Thermodynamics of solid solutions

Lecture 7 - G vs X curves

Lecture 8 - Solid solutions

Lecture 9 - Heterogeneous phase equilibria

Lecture 10 - G vs X curves for eutectic system

Lecture 11 - G-X plot for peritectic system

Lecture 12 - Effect of temperature of solid solubility, Influence of interfaces on Equilibrium

Lecture 13 - Introduction of Diffusion

Lecture 14 - Mechanism of Diffusion, Fick's I law

Lecture 15 - Fick's II law

Lecture 16 - Fick's II law (Continued...), Diffusion and Temperature

Lecture 17 - Interfacial Free Energy, Solid/Vapor Interface

Lecture 18 - Boundaries in single phase solids

Lecture 19 - High angle grain boundaries, Equilibrium in poly-crystalline materials, Interphase interfaces in

Lecture 20 - Interphase interfaces in solids (Continued...)

Lecture 21 - CSL Boundaries

Lecture 22 - Types of Nucleations

Lecture 23 - Homogeneous Nucleation

Lecture 24 - Homogeneous Nucleation (Continued...)

Lecture 25 - Heterogeneous Nucleation

Lecture 26 - Heterogeneous nucleation (Continued...)

Lecture 27 - Growth

Lecture 28 - Atomic mechanism of growth

Lecture 29 - Dendritic Solidification

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- Lecture 30 - Growth rate for dendrite formation
- Lecture 31 - Alloy solidification
- Lecture 32 - Alloy solidification (Continued...)
- Lecture 33 - Eutectic
- Lecture 34 - Eutectic
- Lecture 35 - Solidification of casting / ingot
- Lecture 36 - Precipitation hardenable alloy
- Lecture 37 - Precipitation age- hardening alloy (Continued...)
- Lecture 38 - Age hardening alloy
- Lecture 39 - Eutectoid transformation
- Lecture 40 - Eutectoid transformation (Continued....)
- Lecture 41 - Eutectoid transformation in steel (Continued...)
- Lecture 42 - Martensite
- Lecture 43 - Martensite (Continued...)
- Lecture 44 - Martensite (Continued...) and TTT curves
- Lecture 45 - TTT diagram
- Lecture 46 - Recovery, Recrystallization and Grain growth
- Lecture 47 - Recovery
- Lecture 48 - Recrystallization
- Lecture 49 - Recrystallization (Continued...)
- Lecture 50 - Introduction to spinodal decomposition