

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

NPTEL Video Course - Mechanical Engineering - NOC:Heat Treatment and Surface Hardening - II

Subject Co-ordinator - Dr. Kallol Mondal

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Recap - I

Lecture 2 - Recap - II

Lecture 3 - Recap - III

Lecture 4 - Determination of Phase Diagram (Experimentally) - I

Lecture 5 - Determination of Phase Diagram (Experimentally) - II

Lecture 6 - Determination of Phase Diagram (Thermodynamically)

Lecture 7 - Effect of pressure on phase transformation temperature and concept of equilibrium between condens

Lecture 8 - Effect of different parameters on heat treatment and concept of saturation vapor pressure with ex

Lecture 9 - Title

Lecture 10 - G-X diagrams (Part- II) and concept of chemical potential (Micro Sign) from G-X diagrams.

Lecture 11 - Concept of common tangent for equilibrium between two phases

Lecture 12 - Expressions for equilibrium of two phases - I

Lecture 13 - Expressions for equilibrium of two phases - II

Lecture 14 - Expressions for equilibrium of two phases - III

Lecture 15 - Determining nucleation of phases using G-X plot

Lecture 16 - $\hat{I} G$ for nucleation and overall transformation, concepts of solid state transformation including

Lecture 17 - Introduction to real solutions and expression of $\hat{I} H_{mix}$ based on the Quasi-Chemical Model (QCM)

Lecture 18 - Expression for $\hat{I} H_{mix}$ as a function of interaction energy and mole fraction, based on the QCM -

Lecture 19 - Expression for $\hat{I} H_{mix}$ as a function of interaction energy and mole fraction, based on the QCM -

Lecture 20 - Graphical representation of $\hat{I} G_{mix}$, $\hat{I} H_{mix}$, and $-T\hat{I} S_{mix}$ for real solutions and evolution of eut

Lecture 21 - Effect of $\hat{I} H_{mix}$ on determination of phase diagrams (same crystal structure)

Lecture 22 - Effect of $\hat{I} H_{mix}$ on determination of phase diagrams (Continued...)

Lecture 23 - Importance of phase diagrams

Lecture 24 - Effect of heat treatment on microstructure evolution in steel - I

Lecture 25 - Effect of heat treatment on microstructure evolution in steel - II

Lecture 26 - Recap of homogeneous and heterogeneous nucleation for solid to solid transformation

Lecture 27 - Nucleation rate and its dependence on T (temp. of interest), $\hat{I} T$, $\hat{I} G_v$ and $\hat{I} G^*$ and, introducti

Lecture 28 - Growth kinetics (Continued...)

Lecture 29 - Growth rate variation with undercooling and kinetics of overall phase transformation

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- Lecture 30 - Implication of Avrami's equation with example on excel spreadsheet
- Lecture 31 - Experimental verification of Avrami Equation
- Lecture 32 - Linear regression (least squares) method to find the value of n and k in Avrami equation
- Lecture 33 - In this lecture, method to determine the goodness of fit has been explained. Procedure to estimate
- Lecture 34 - Stereology and quantitative metallography - I
- Lecture 35 - Stereology and quantitative metallography - II
- Lecture 36 - Grain size measurements methods
- Lecture 37 - Statistical tools for analysis and reporting of obtained data with examples
- Lecture 38 - Evolution of TTT and CCT diagram from f vs. t plots
- Lecture 39 - TTT, CCT continue and hardenability of steel
- Lecture 40 - Importance of heat treatment practices in real life (with examples)