

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

NPTEL Video Course - Metallurgy and Material Science - NOC:Crystal Symmetry, X-Ray Diffraction and Physical Properties

Subject Co-ordinator - Prof. Sandeep Sangal

Co-ordinating Institute - IIT - Kanpur

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

- Lecture 1 - Lattice and Translation Symmetry
- Lecture 2 - Lattice, Motif, Crystals and Unit Cells
- Lecture 3 - Crystallographic Patterns
- Lecture 4 - Crystal Systems in 3D
- Lecture 5 - Crystals Based on 3D
- Lecture 6 - Miller Indices for Directions in Lattice Space
- Lecture 7 - Miller Indices for Planes in Lattice Space
- Lecture 8 - Interplanar Spacing
- Lecture 9 - Properties of Planes and Directions in a Cubic Unit Cell
- Lecture 10 - Weiss Zone Law
- Lecture 11 - Translation and Point Symmetries
- Lecture 12 - Restrictions on Rotational Symmetries
- Lecture 13 - 2D Crystal Systems and Lattices - I
- Lecture 14 - 2D Crystal Systems and Lattices - II
- Lecture 15 - What is a Group ?
- Lecture 16 - Point Groups - I
- Lecture 17 - Point Groups - II
- Lecture 18 - Matrix Representations of Rotation Operation
- Lecture 19 - Matrix Operation of Reflection Operation
- Lecture 20 - Combination of two mirrors
- Lecture 21 - The 10 2D Point Groups and their notations
- Lecture 22 - Combining Translation with Point Symmetries - I
- Lecture 23 - Combining Translation with Point Symmetries - II
- Lecture 24 - Combining Rotation and Translation Symmetries
- Lecture 25 - Plane Groups - I
- Lecture 26 - Plane Groups - II : Glide Planes
- Lecture 27 - Plane Groups - III : Glide Planes
- Lecture 28 - Hexagonal Plane Groups based on the Point Symmetry 3m
- Lecture 29 - Derivation of the Remaining Plane Groups

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- Lecture 30 - Decoding the International Tables - I
- Lecture 31 - Combination of Three Rotation Axes in 3D
- Lecture 32 - Combination of Three Rotation Axes in 3D - I
- Lecture 33 - Combination of Three Rotation Axes in 3D - II
- Lecture 34 - Stereographic Projection: Stereograms of Point Groups
- Lecture 35 - The 32 Point Groups in 3D
- Lecture 36 - Derivation of 3D - Bravais Lattices
- Lecture 37 - Introduction to Space Groups
- Lecture 38 - Space Groups: Screw Axes
- Lecture 39 - Space Groups: Glide Planes
- Lecture 40 - Decoding the International Tables - II
- Lecture 41 - DVD as a Diffraction Grating
- Lecture 42 - X-Ray Diffraction: Bragg's Law
- Lecture 43 - Scattering of X-Rays: The Laue Equations - I
- Lecture 44 - Scattering of X-Rays: The Laue Equations - II
- Lecture 45 - The Structure Factor
- Lecture 46 - Structure Factor Calculations
- Lecture 47 - Structure Factor Calculations
- Lecture 48 - The Reciprocal Lattice
- Lecture 49 - Application of Reciprocal Lattice in Crystal Geometry
- Lecture 50 - Reciprocal Lattice Examples
- Lecture 51 - Reciprocal Lattice and Diffraction
- Lecture 52 - X-Ray Diffraction Techniques
- Lecture 53 - Analysis of Diffraction Pattern for a Cubic Crystal - I
- Lecture 54 - Analysis of Diffraction Pattern for a Cubic Crystal - II
- Lecture 55 - Decoding the International Tables - III
- Lecture 56 - Tensor Representation of Physical Properties
- Lecture 57 - Tensor Properties, Symmetry and Neumann's Principle
- Lecture 58 - Transformation of Second Rank Tensor
- Lecture 59 - Effect of Crystal Symmetry on Second Rank Property Tensor - I
- Lecture 60 - Effect of Crystal Symmetry on Second Rank Property Tensor - II
- Lecture 61 - Effect of Crystal Symmetry on Second Rank Property Tensor - III
- Lecture 62 - Third Rank Piezoelectric Property Tensor - I
- Lecture 63 - Third Rank Piezoelectric Property Tensor - II
- Lecture 64 - Fourth Rank Elasticity Tensor