

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Solid State Chemistry

Subject Co-ordinator - Prof. Madhav Ranganathan

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Nature of solid state and the solid state materials  
Lecture 2 - Thermodynamics of solids  
Lecture 3 - Crystallisation Kinetics  
Lecture 4 - Synthetic Strategy  
Lecture 5 - Review of week 1 and Practice problems  
Lecture 6 - Unit Cells  
Lecture 7 - Conventional Unit Cell and Primitive Unit Cell  
Lecture 8 - Bravais Lattices  
Lecture 9 - Bravais Lattices, Basis and crystal  
Lecture 10 - Summary of week 2 and Practices Problems  
Lecture 11 - Symmetry In Crystals, Point Symmetries  
Lecture 12 - Reflections, Inversions and Rotoinversions  
Lecture 13 - Schonflies and Hermann-Mauguin Conventions  
Lecture 14 - Fractional Coordinates, Planer Visualization  
Lecture 15 - Review of week 3 And Practice Problems  
Lecture 16 - Combining symmetry operations, translational symmetries  
Lecture 17 - Screw Axis  
Lecture 18 - Glide Planes  
Lecture 19 - Symmetry and Symmetry Notations  
Lecture 20 - Summary of week 4 and Practice Problems  
Lecture 21 - Crystal Systems  
Lecture 22 - Crystal Systems and Unit Cells  
Lecture 23 - Point Groups  
Lecture 24 - Space Groups  
Lecture 25 - Week 5 Summary and Practice Problems  
Lecture 26 - 32 Crystal Classes Based on Symmetry  
Lecture 27 - Notation for 32 Crystal Classes  
Lecture 28 - Short Form of Hermann-Mauguin Notations  
Lecture 29 - Hermann - Mauguin notation for Space Groups

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- Lecture 30 - Summary and Practice Problems
- Lecture 31 - Coordination number, Voids
- Lecture 32 - Lattice Imperfections and Crystals
- Lecture 33 - Line Planner and Bulk defects and crystals
- Lecture 34 - Thermodynamics of defects in crystals
- Lecture 35 - Review of Week 7, Practice Problems
- Lecture 36 - Miller Planes, Miller Indices
- Lecture 37 - Miller Indices for Hexagonal Systems, Distance between Planes
- Lecture 38 - X-ray diffraction, Bragg's Law, Reciprocal Lattice
- Lecture 39 - Reciprocal Lattice, XRD instrumentation
- Lecture 40 - Review of week 8, Practice Problems
- Lecture 41 - XRD - Analysis of Pattern
- Lecture 42 - Geometric Structure Factor - Missing Peaks
- Lecture 43 - X-Ray Crystallography
- Lecture 44 - Electron Microscopy
- Lecture 45 - Review of Week 9. Practice Problems
- Lecture 46 - Closed - Packed Structures and Voids
- Lecture 47 - Crystal Structures of Binary Compounds
- Lecture 48 - Perovskites and Spinals
- Lecture 49 - Space filling Polyhedra, Alloys
- Lecture 50 - Summary of Week 10 and Practice Problems
- Lecture 51 - Free electron Models
- Lecture 52 - Bloch Theorem
- Lecture 53 - Band Theory of Solids
- Lecture 54 - Bands in Higher Dimensions
- Lecture 55 - Summary of Week 11 and Practice Problems
- Lecture 56 - More about Band Theory, Crystal Momentum
- Lecture 57 - Density of States
- Lecture 58 - Metals, Insulators and Semiconductors
- Lecture 59 - Band Gap and Optical Properties
- Lecture 60 - Summary of Week 12 and Practice Problems