

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

NPTEL Video Course - Metallurgy and Material Science - NOC:Carbon Materials and Manufacturing

Subject Co-ordinator - Prof. Swati Sharma

Co-ordinating Institute - IIT - Madras

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

- Lecture 1 - Introduction to Materials and Manufacturing
- Lecture 2 - Mathematical Representation of Material Properties
- Lecture 3 - Story of Carbon: Carbon on Earth and in Outer Space
- Lecture 4 - Story of Carbon: Carbon in Technology
- Lecture 5 - Isotopes of carbon
- Lecture 6 - Hybridization in Carbon Atoms
- Lecture 7 -  $sp^3$ ,  $sp^2$  and  $sp$  Hybridization: Diamond, Graphite and Carbyne
- Lecture 8 -  $sp(2+n)$  Hybridization: Curved Carbon
- Lecture 9 - Allotropes of Carbon and Their Classification
- Lecture 10 - Carbon Allotrope Conversion
- Lecture 11 - Phase Diagram of Carbon
- Lecture 12 - Introduction to Engineering Carbons
- Lecture 13 - Graphite Crystal Structure
- Lecture 14 - Rhombohedral Graphite and Stacking Faults
- Lecture 15 - Graphite Ore Processing
- Lecture 16 - Synthetic Graphite Production from Needle Coke
- Lecture 17 - Kish Graphite and PVC-Derived Graphite
- Lecture 18 - Highly Oriented Pyrolytic Graphite
- Lecture 19 - Pyrolysis of Gaseous Hydrocarbons
- Lecture 20 - Polymer-derived Carbon: Coking and Charring Mechanism
- Lecture 21 - Kinetics of Graphitization
- Lecture 22 - Microstructure of Non-Graphitizing Carbon
- Lecture 23 - Glass-Like Carbon: Introduction and Properties
- Lecture 24 - Glass-Like Carbon: Industrial Manufacturing
- Lecture 25 - Microfabrication with Glass-Like Carbon
- Lecture 26 - Carbon Materials and Manufacturing
- Lecture 27 - X-Ray and Nano-Imprint Lithography
- Lecture 28 - Activated Carbon: Introduction and Properties
- Lecture 29 - Activated Carbon: Industrial Manufacturing

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- Lecture 30 - Carbon Black: Introduction and Properties
- Lecture 31 - Carbon Black: Industrial Manufacturing
- Lecture 32 - Carbon Fiber: Introduction and Properties
- Lecture 33 - Melt Spinning of Petroleum Pitches
- Lecture 34 - Electrospinning and Viscoelasticity
- Lecture 35 - Carbonization of Polyacrylonitrile (PAN) Fibers
- Lecture 36 - Mechanical Property Testing Methods for Carbon Fibers
- Lecture 37 - Defects in Carbon Fibers
- Lecture 38 - Introduction to Carbon Fiber Reinforced Plastic (CFRP)
- Lecture 39 - Machining of Carbon Fiber Reinforced Plastic
- Lecture 40 - Carbon/Carbon Composite
- Lecture 41 - Carbon/Metal and Carbon/Concrete Composites: Manufacture and Properties
- Lecture 42 - Graphene: Introduction and Crystal Structure
- Lecture 43 - Graphene: History and Nomenclature
- Lecture 44 - Chemical Vapor Deposition of Graphene - I
- Lecture 45 - Chemical Vapor Deposition of Graphene - II
- Lecture 46 - Defects in Graphene and the (n,m) Notations
- Lecture 47 - Carbon Nanotube: Introduction and Properties
- Lecture 48 - Vapor Phase Growth of Carbon Nanotube
- Lecture 49 - Vapor Deposited Diamond
- Lecture 50 - Diamond Like Carbon
- Lecture 51 - X-Ray Diffraction Analysis of Carbon Materials
- Lecture 52 - Raman Spectroscopy of Carbon Materials
- Lecture 53 - Transmission Electron Microscopy of Carbon Materials
- Lecture 54 - Surface Area Analysis of Carbon Materials
- Lecture 55 - Numerical Problems: Carbon Manufacturing and Characterization
- Lecture 56 - Large Scale Industrial Applications of Carbon Materials
- Lecture 57 - Micro and Nano Scale Applications of Carbon Materials: Rigid and flexible carbon devices
- Lecture 58 - Supply Chain of Industrial Carbons
- Lecture 59 - Summary of NPTEL Course on Carbon Materials and Manufacturing