



Satuan Acara Pengajaran

ENMT800020 - Teknologi Nano

Pengajar

Dr. Ir. Donanta Dhaneswara M.Si

Prof. Dr. Ir. Akhmad Herman Yuwono M.Phil.Eng.

Tujuan Perkuliahan

Setelah mengambil kuliah ini mahasiswa diharapkan mendapatkan pemahaman tentang aspek teknologi nano yang multidisiplin sehingga bisa menjelaskan konsep tentang teknologi nano termasuk fenomena material nano, sintesis, karakterisasi, dan aplikasinya

Minggu 1

Materi Class introduction:
- About the class
- Rules
- Grading
- Course content
- Group discussion

Media LCD Projector

Referensi 1. Diamond & Related Materials 19 (2010) 1457-1460
2. Superlattices and Microstructures 45 (2009) 529-534

Aktivitas Lecture
Group discussion

Minggu 2

Materi General Introduction to Nanotechnology
- Definitions
- Challenge
- Root of nanotechnology
- Approaches
- Tools

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Referensi G. Cao: Nanostructures and Nanomaterials, Imperial College Press, London, 2004.
C.P. Poole, Jr., and F.J. Owens: Introduction to Nanotechnology, John Wiley & Sons, Inc., 2003.
E.L. Wolf, Nanophysics and Nanotechnology, an Introduction to Modern Concepts in Nanoscience, WILEY-VCH Verlag GmbH & Co. KGaA, 2004.

Aktivitas Lecture

Minggu 3

Materi Physics of Solids: Crystal Structure
- Size dependence of nanostructure
- Basic crystallography
- Basic nanostructure in SC, BCC, FCC
- Ferroelectrics and dielectrics properties
- Magnetic properties

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Referensi B.D. Cullity: Elements of X-ray Diffraction, 2nd ed., Addison-Wesley Publishing Company Inc., Reading, Massachusetts, 1978
C. Hammond: The Basics of Crystallography and Diffraction, 3rd ed., Oxford University Press Inc., New York, 2009.
R.J.D. Tilley: Crystals and Crystal Structures, John Wiley & Sons Ltd., Chichester, West Sussex, England, 2006
W.D. Callister, Jr.. Fundamentals of Materials Science and Engineering, John Wiley & Sons, Inc., New York, 2001

Aktivitas Lecture

Minggu 4

Materi Physical Chemistry of Solid Surfaces:
- Origin of surface energy
- Surface energy in FCC
- Wulff plot
- Exercise

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Referensi G. Cao: Nanostructures and Nanomaterials, Imperial College Press, London, 2004.
C.P. Poole, Jr., and F.J. Owens: Introduction to Nanotechnology, John Wiley & Sons, Inc., 2003.
E.L. Wolf, Nanophysics and Nanotechnology, an Introduction to Modern Concepts in Nanoscience, WILEY-VCH Verlag GmbH & Co. KGaA, 2004.

Aktivitas Lecture
Exercise

Minggu 5

Materi Nanomaterials and Fundamental of Electron Theory:
- Approaches in continuum, classical, and quantum theories
- The wave-particle duality
- The Schrödinger equation
- Solution for the Schrödinger equation

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Referensi C.P. Poole, Jr., and F.J. Owens: Introduction to Nanotechnology, John Wiley & Sons, Inc., 2003.
R.E. Hummel: Electronic Properties of Materials, Springer-Verlag New York, Inc., 2001

Aktivitas Lecture

Minggu 6

Materi Energy Bands in Solids:
- Insulators
- Conductors
- Semiconductors

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Referensi C.P. Poole, Jr., and F.J. Owens: Introduction to Nanotechnology, John Wiley & Sons, Inc., 2003.
R.E. Hummel: Electronic Properties of Materials, Springer-Verlag New York, Inc., 2001

Aktivitas Lecture

Minggu 7

Materi Physical Properties of Nanomaterials
- Melting point and lattice constant
- Mechanical properties
- Optical Properties
- Electrical properties
- Ferroelectrics and dielectrics properties
- Magnetic properties

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Referensi G. Cao: Nanostructures and Nanomaterials, Imperial College Press, London, 2004.
C.P. Poole, Jr., and F.J. Owens: Introduction to Nanotechnology, John Wiley & Sons, Inc., 2003.
E.L. Wolf, Nanophysics and Nanotechnology, an Introduction to Modern Concepts in Nanoscience, WILEY-VCH Verlag GmbH &Co. KGaA, 2004.

Aktivitas Lecture

Minggu 8

Materi Midterm

Media

Referensi

Aktivitas
