



Satuan Acara Pengajaran

MMS8110802 - Kinetik & Transformasi Fasa

Pengajar

Nofrijon Bin Imam Sofyan Ph.D

Prof. Dr. Ir. Bondan Tiara M.Si.

Tujuan Perkuliahan

Mata kuliah ini ditujukan agar mahasiswa mampu memahami mekanisme terjadinya proses transformasi fasa baik melalui proses difusi atau melalui proses non-difusi dan penerapannya dalam proses pemilihan dan desain bahan sesuai dengan sifat yang diinginkan.

Minggu 1

Materi	Introduction (Rules, Grading, Marking) 1. Review on Thermodynamics and Phase Equilibrium: a. Single Component System b. Binary Component System c. The Phase Rule d. Binary Phase Diagrams: - Two phase equilibrium - Three phase equilibrium - Exercise on two phase and three phase equilibrium - Reactions in the solid state
---------------	---

Media	LCD Projector
--------------	---------------

- Referensi**
1. Porter, D. A and Easterling, K.E, Phase Transformation in Metals and Alloys, 2nd. ed., CRC Press, 2003.
 2. Prince, A, Multicomponent Alloy Constitutional Bibliography, The Metals Society, London, 1978
 3. West, DRF, Ternary Equilibrium Diagrams, Chapman and Hall, 1982

Support materials:

1. Chapter 5, 9 and 10 of: Callister, W.D, Materials Science and Engineering: An Introduction, 6th ed., Wiley., 2004
2. Lennart Backerud, Guocai Chai, and Jarmo Tamminen, Solidification Characteristics of Aluminum Alloys-Volume 2: Foundry Alloy
3. Lars Arnberg, Lennart Backerud, and Guocai Cahi, Solidification Characteristics of Aluminum Alloys-Volume 3: Dendrite Coherency

Aktivitas

Minggu 2

- Materi**
- e. Fe-Fe₃C Phase Diagram
 - f. Ternary System Representation
 - g. Ternary System containing 2 phase
 - h. Exercise

Media LCD Projector

Referensi

Aktivitas

Minggu 3

- Materi**
- Diffusion in Materials:
- a. Atomic mechanism of diffusion
 - b. Fick's first law for steady state diffusion
 - c. Interstitial diffusion
 - d. Substitutional diffusion

Media LCD Projector

Referensi

Aktivitas

Minggu 4

Materi Diffusion in Materials (cont.):
d. Tracer diffusion in binary alloys
e. Diffusion in multiphase binary system
f. Journal review

Media LCD Projector

Referensi

Aktivitas

Minggu 5

Materi Solution for Fick's 2nd law:
- Homogenization
- Thin film solution
- Carburization and decarburization
- Diffusion from a Finite Source into Semi Infinite Media
- Case studies

Media LCD Projector

Referensi

Aktivitas

Minggu 6

Materi Crystal Interface and Microstructure (2)
a. Interfacial free energy
b. Grain boundary
c. Case study in Crystal Interface

Media LCD Projector

Referensi

Aktivitas

Minggu 7

Materi Crystal Interface and Microstructure (2)
d. Interphase interfaces in solids
e. Interface migration

Media LCD Projector

Referensi

Aktivitas

Minggu 8

Materi Midterm

Media

Referensi

Aktivitas

Minggu 9

Materi Solidification (1)
a. Nucleation in pure metals
b. Growth of pure solid
c. Solidification of alloy

Media LCD Projector

Referensi

Aktivitas

Minggu 10

Materi Solidification (2)
d. Application of solidification theory in casting and welding
e. Solidification during quenching from the melts
f. Case study

Media LCD Projector

Referensi

Aktivitas

Minggu 11

Materi Diffusional Transformation in Solids (1)
a. Homogeneous and heterogeneous nucleation in solids
b. Precipitate growth
c. Transformation kinetics

Media LCD Projector

Referensi

Aktivitas

Minggu 12

Materi Diffusional Transformation in Solids (2)
d. Eutectoid transformation
e. Ordering transformation
f. Case study

Media LCD Projector

Referensi

Aktivitas

Minggu 13

Materi Diffusionless Transformation in Solids:
a. Theories of martensite nucleation
b. Martensite growth
c. Tempering of ferrous martensite
d. Martensite transformation in nonferrous metals

Media LCD Projector

Referensi

Aktivitas

Minggu 14

Materi Diffusionless Transformation in Solids (2)
e. Exercise
f. Case study in Diffusionless transformation

Media LCD Projector

Referensi

Aktivitas

Minggu 15

Materi - Class review
- Question and answer session

Media LCD Projector

Referensi

Aktivitas

Minggu 16

Materi Final examination

Media

Referensi

Aktivitas
