

Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

Lecture 06 : Diffraction and Bragg's Law

Lecture 07 : Structure Factor and Diffraction Extinction Criteria

Lecture 08 : Structure factor and diffraction extinction criteria (Contd.)

Lecture 09 : Pole figures

Lecture 10 : Pole figures (Contd.)

Week 2 Lecture Material

Quiz: Week 2 : Assignment 2

Feedback From for Week 2

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Assignment Solution

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Week 2 : Assignment 2

The due date for submitting this assignment has passed.

Due on 2021-08-18, 23:59 IST.

As per our records you have not submitted this assignment.

- 1) The texture of a polycrystalline material could be represented using: 1 point
- (a) Pole figures
 - (b) inverse pole figures
 - (c) orientation matrix
 - (d) Euler space

No, the answer is incorrect.
Score: 0

Accepted Answers:
(a) Pole figures
(b) inverse pole figures
(c) orientation matrix
(d) Euler space

- 2) Which of the following statement/s is/are correct? 1 point
- (a) The intensities of the Debye-Scherrer rings from a texture polycrystal are non-uniform
 - (b) Elongated or flattened grains indicate very strong texture.
 - (c) The texture is an absolute quantity and requires no frame of reference for description
 - (d) Equiaxed grains does imply random texture.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(a) The intensities of the Debye-Scherer rings from a texture polycrystal are non-uniform

- 3) A FCC crystal is loaded in tensile along $[1\bar{1}0]$ to cause slip on $(1\bar{1}\bar{1})[0\bar{1}1]$. If the critical resolved shear stress is 90 MPa. The minimum tensile load required for plastic yielding is: 1 point

- (a) 0 MPa (b) 55 MPa (c) 110 MPa (d) 220 MPa

- a
- b
- c
- d

No, the answer is incorrect.
Score: 0

Accepted Answers:
d

- 4) If an ideal FCC aluminium single crystal is loaded for the tensile test along $\sim\langle 124 \rangle$, the final orientation of the tensile axis will be 1 point
- (a) $\langle 211 \rangle$ due to latent strain hardening
 - (b) $\langle 110 \rangle$ due to latent strain hardening
 - (c) $\langle 211 \rangle$ but not due to latent strain hardening
 - (d) $\langle 110 \rangle$ but not due to latent strain hardening

No, the answer is incorrect.
Score: 0

Accepted Answers:
(a) $\langle 211 \rangle$ due to latent strain hardening

- 5) Which of the following can be measured using X-ray diffraction? 1 point
- (a) Interplanar spacing and therefore the lattice parameter;
 - (b) Orientation of a single grain in a polycrystalline material;
 - (c) Crystallite size and dislocation density;
 - (d) Grain boundary character.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(a) Interplanar spacing and therefore the lattice parameter;
(c) Crystallite size and dislocation density;

- 6) Diffraction in polycrystals will occur if Bragg's law is satisfied for a certain set of atomic planes: 1 point
- (a) Yes
 - (b) No
 - (c) only if the structure factor is zero
 - (d) only if the structure factor is not zero

No, the answer is incorrect.
Score: 0

Accepted Answers:
(d) only if the structure factor is not zero

- 7) Which of the crystallite size given below can not be measured using XRD? 1 point
- (a) 1 nm,
 - (b) 10 nm,
 - (c) 100 nm,
 - (d) 1000 nm

No, the answer is incorrect.
Score: 0

Accepted Answers:
(d) 1000 nm

- 8) Determine the diffraction planes of a FCC unit cell ($a = 3.00\text{\AA}$) for Cu $K\alpha = 3.14\text{\AA}$ radiation. 1 point

- (a) only (111)
(b) (111) and (200)
(c) (111), (200), and (220)
(d) (110), (200), (211), and (220)

- a
- b
- c
- d

No, the answer is incorrect.
Score: 0

Accepted Answers:
a

- 9) Find out the values of θ corresponding to these crystallographic planes in Q.8. 1 point
- (a) only 65°
 - (b) 65° and 72°
 - (c) 65° , 72° , and 85°
 - (d) 48° , 72° , 79° , and 85°

No, the answer is incorrect.
Score: 0

Accepted Answers:
(a) only 65°

- 10) Calculate the crystallite size for FWHM = 10° , 40° , and 60° for the FCC unit cell ($a = 3.00\text{\AA}$) for Cu $K\alpha = 3.14\text{\AA}$ radiation. Assuming that there is no micro-strain and the constant $k = 1$. 1 point

- (a) 20\AA , 5\AA , and 3.3\AA
(b) 3.3\AA , 5\AA , and 20\AA
(c) 5\AA , 3.3\AA , and 20\AA
(d) None of the above

- a
- b
- c
- d

No, the answer is incorrect.
Score: 0

Accepted Answers:
a