

Unit 8 - Structure Determination

Course outline

How to access the portal?

Introduction to Materials

Introduction to Crystallography

Structures of Materials

Solid Solutions & Structures

Classification of Ionic Solids

Non-Crystalline Solids

Structure Determination

● Lecture 31: Structure of Polymers (Contd...)

● Lecture 32: Structure Determination (X-ray Diffraction)

● Lecture 33: X-ray Diffraction

○ Lecture 34: X-ray Diffraction (Contd.)

● Lecture 35: X-ray Diffraction (Contd...)

○ Quiz : Assignment-7

○ Assignment-7: Solution

Imperfections in Solids

Week-0

Assignment-7

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-10-16, 23:59 IST.

1) Which of the following polymers has regular alternating arrangement of side groups? 1 point

- Atactic polymer
- Isotactic polymer
- Syndiotactic polymer
- Cotactic polymer

No, the answer is incorrect.
Score: 0

Accepted Answers:
Syndiotactic polymer

2) Entanglement of chains in a polymer leads to increase in its 1 point

- tensile strength
- modulus of elasticity
- conductivity
- ductility

No, the answer is incorrect.
Score: 0

Accepted Answers:
tensile strength

modulus of elasticity

3) Vulcanisation of natural rubber for prolonged periods results in formation of 1 point

- Elastomer
- Ebonite
- Nylon
- Cellulose

No, the answer is incorrect.
Score: 0

Accepted Answers:
Ebonite

4) For diffraction from a crystal lattice, what is true? 1 point

- Diffraction can occur at all incident angles.
- Path difference is a integral multiples of the wavelength.
- Wavelength is of the same order of magnitude as lattice spacing.
- The angle of diffraction can be up to 180°.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Path difference is a integral multiples of the wavelength.

Wavelength is of the same order of magnitude as lattice spacing.

5) What is the energy of K_{α} X-rays emitted from a target material (E_K : Energy of K- shell, E_L : Energy of L-shell)? 1 point

- E_K
- E_L
- $E_L + E_K$
- $E_L - E_K$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $E_L - E_K$

6) In a X-ray spectra, characteristics radiation peak are K_{α} and K_{β} . What is true for the relation between the two? 1 point

- $\lambda(K_{\alpha}) > \lambda(K_{\beta})$
- $\lambda(K_{\alpha}) < \lambda(K_{\beta})$
- $\lambda(K_{\alpha}) = \lambda(K_{\beta})$
- $\lambda(K_{\alpha}) = 0.5 \lambda(K_{\beta})$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\lambda(K_{\alpha}) > \lambda(K_{\beta})$

7) What is the value of shortest wavelength (λ_{swL}) for the spectrum of continuous radiation at 25kV? 1 point

- 0.35Å
- 0.49Å
- 0.56Å
- 0.82Å

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.49Å

8) The condition for Nickel to be used as a filter material for letting K_{α} radiation pass through and for blocking K_{β} radiation from a copper target is: 1 point

- $E(\text{Cu}(K_{\beta})) < E(\text{Ni}(K\text{-edge})) < E(\text{Cu}(K_{\alpha}))$
- $E(\text{Cu}(K_{\beta})) > E(\text{Ni}(K\text{-edge})) > E(\text{Cu}(K_{\alpha}))$
- $E(\text{Cu}(K_{\beta})) = E(\text{Cu}(K_{\alpha})) = E(\text{Ni}(K\text{-edge}))$
- $E(\text{Cu}(K_{\beta})) > E(\text{Cu}(K_{\alpha})) > E(\text{Ni}(K\text{-edge}))$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $E(\text{Cu}(K_{\beta})) > E(\text{Ni}(K\text{-edge})) > E(\text{Cu}(K_{\alpha}))$

9) Which of the following target material(s) are better for characterization of iron (Fe) containing materials? 1 point

- Cobalt (Co)
- Copper (Cu)
- Chromium (Cr)
- Molybdenum (Mo)

No, the answer is incorrect.
Score: 0

Accepted Answers:
Cobalt (Co)

Chromium (Cr)

10) X-rays can penetrate the metals because of which of the following characteristics? 1 point

- They have high flux
- They have longer wavelength
- They have shorter wavelength
- They have high amplitude

No, the answer is incorrect.
Score: 0

Accepted Answers:
They have shorter wavelength

11) An X-ray beam of wavelength 0.71Å is incident on a body centered cubic crystal of lattice parameter 3.6 Å. What will the value of Bragg's angle (in degrees) of fourth order (111) reflection? 1 point

- 23
- 33
- 43
- 53

No, the answer is incorrect.
Score: 0

Accepted Answers:
43

12) What is the angle between the incident beam and diffracted beam in Bragg's geometry (θ : Bragg angle)? 1 point

- 90-2 θ
- 2 θ
- 180-2 θ
- θ

No, the answer is incorrect.
Score: 0

Accepted Answers:
2 θ

13) In a cubic crystal the diffraction from (100) plane is expressed as $2d_{100}\sin\theta = 2\lambda$, which is equivalent to: 1 point

- first order diffraction from (100) plane
- first order diffraction from (200) plane
- second order diffraction from (100) plane
- second order diffraction from (200) plane

No, the answer is incorrect.
Score: 0

Accepted Answers:
first order diffraction from (200) plane

second order diffraction from (100) plane

14) Which of the following methods can be used for determination of crystal structure of a single crystal using X-ray diffraction with continuous radiation? 1 point

- Laue Method
- Rotating Crystal Method
- Debye Scherrer Method
- Two Circle Diffractometer

No, the answer is incorrect.
Score: 0

Accepted Answers:
Laue Method

15) Debye Scherrer method is used to characterize: 1 point

- Polycrystalline materials
- Powders
- Single crystals
- Epitaxial Thin Films

No, the answer is incorrect.
Score: 0

Accepted Answers:
Polycrystalline materials

Powders