

Unit 4 - Week 2

Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

- Crystal Structure - 6 (Planar density, Close-Packed Structures, Stacking Faults)
- Crystal Structure - 7 (Single Crystal and Polycrystalline Materials)
- Crystal Structure - 8 (X-Ray Diffraction and Determination of Structure)
- Defects in Crystalline Materials - 1 (Types of Crystalline Defects)
- Defects in Crystalline Materials - 1 (Point Defects)
- Defects in Crystalline Materials - 1 (Equilibrium Concentration of Vacancies)
- Defects in Crystalline Materials - 1 (Theoretical Shear Strength)
- Defects in Crystalline Materials - 2 (Effect of Point Defects)
- Defects in Crystalline Materials - 2 (Point Defects and Solid Solutions)
- Quiz : Assignment 2
- Week 2 Lecture materials
- Week 2 Feedback Form : Basics of Materials Engineering
- Assignment 2 solutions

Week 3

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Week 12

Video Download

Live Session

Text Transcripts

Assignment 2

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

Due on 2020-09-30, 23:59 IST.

1) Which of the following crystal structure exhibits the stacking sequence $ABAB \dots$? 1 point

- Simple Cubic
 HCP
 FCC
 BCC

No, the answer is incorrect.
Score: 0

Accepted Answers:
HCP

2) Which of the following crystal structure exhibits the stacking sequence $ABCABC \dots$? 1 point

- Simple Cubic
 BCC
 HCP
 FCC

No, the answer is incorrect.
Score: 0

Accepted Answers:
FCC

3) The number of atoms centered on the $[110]$ direction for the FCC structure is _____

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 2

1 point

4) The planar density for BCC (110) plane in terms of $1/R^2$, where R is the atomic radius, is _____.

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.263,0.267

2 points

5) A monochromatic light beam of wavelength 0.1790 nm is incident on BCC iron crystal lattice, with lattice parameter 0.2866 nm. Assume that the order of reflection is 1. The diffraction angle θ , rounded to the nearest integer for the (220) set of planes is 124 degrees.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 122,126

2 points

6) The presence of vacant lattice sites in a crystal

- Decreases it's entropy
 Increases it's entropy
 Has no effect on the entropy

No, the answer is incorrect.
Score: 0

Accepted Answers:
Increases it's entropy

1 point

7) A Schottky defect

- Reduces the density of the crystal
 Does not affect the density of the crystal
 Increases the electrical charge of the crystal
 Does not affect the electrical charge of the crystal

No, the answer is incorrect.
Score: 0

Accepted Answers:
Reduces the density of the crystal
Does not affect the electrical charge of the crystal

1 point

8) A Frenkel defect

- Reduces the density of the crystal
 Does not affect the density of the crystal
 Increases the electrical charge of the crystal
 Does not affect the electrical charge of the crystal

No, the answer is incorrect.
Score: 0

Accepted Answers:
Does not affect the density of the crystal
Does not affect the electrical charge of the crystal

0 points

9) The atomic weight and density for aluminum are 26.98 g/mol and 2.62 g/cm³, respectively. The activation energy (in eV/atom) for vacancy formation in aluminum, given that the equilibrium number of vacancies at 500° C is $7.57 \times 10^{23} \text{ m}^{-3}$, is

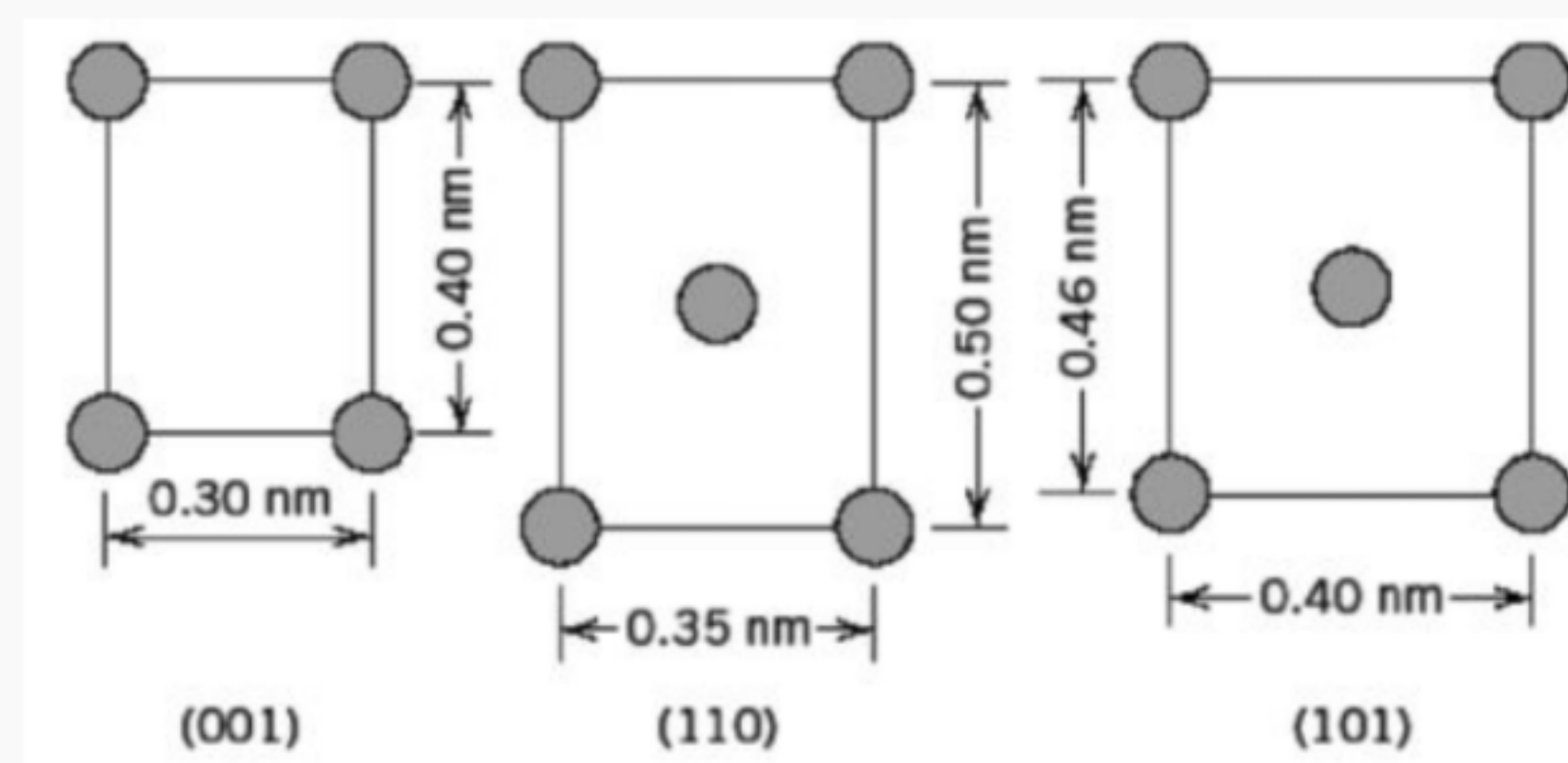
- 0.6
 0.75
 1
 0.33

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.75

3 points

10) Figure below shows the crystallographic planes with the indicated Miller indices. The circles represent the atoms in the unit cell. Identify the crystal structure of the unit cell. 2 points



- Face-centered orthorhombic
 Body-centered orthorhombic
 Face-centered tetragonal
 Body-centered tetragonal

No, the answer is incorrect.
Score: 0

Accepted Answers:
Body-centered orthorhombic

2 points