Quiz Question Prompts

Fundamentals of Crystallography with Ansys Granta EduPack Software

Kaitlin Tyler

Ansys Academic Program

education@ansys.com

Ansys Software Used

This resource uses Ansys Granta EduPack™ teaching software for materials education.

Instructions

Below is a bank of multiple choice, True/False, and fill in the blank questions related to Crystallography for use in courses. Solution keys and different formats are available to instructors- see ReadMe file for details.

Topic: Crystal Structures

1. The crystal structure of alpha brass is:
    a. Face-centered cubic
    b. Body-Centered cubic
    c. Hexagonal close packed
    d. Tetragonal

2. The crystal structure of beta brass is:
    a. Body-centered cubic
    b. Face-centered cubic
    c. Hexagonal close packed
    d. Body-centered tetragonal

3. The crystal structure of alpha ferrite is:
    a. Face-centered cubic
    b. Hexagonal close packed
    c. Body-centered tetragonal
    d. Body-centered cubic

4. The crystal structure of pure alpha tin is:
    a. Body-centered cubic
    b. Face-centered cubic
    c. Diamond cubic
    d. Hexagonal close packed

5. Which of the common 13 unit cells has the highest degree of symmetry?
    a. Cubic
    b. Hexagonal close packed
    c. Rhombohedral
    d. Monoclinic

6. Which of the common 13 unit cells has the lowest degree of symmetry?
    a. Monoclinic
    b. Cubic
    c. Triclinic
    d. Tetragonal

Topic: Point Defects

1. A _____ occurs when an atom from the crystalline lattice rests in an interstitial site
    a. Vacancy
    b. Self-interstitial
    c. Interstitial
    d. Substitutional

2. A _____ occurs when an atom is missing from the crystalline lattice
    a. Self-interstitial
    b. Interstitial
    c. Vacancy
    d. Substitutional

3. A _____ occurs when a solute or impurity atom takes the spot of the host atom within the crystal lattice
    a. Self-interstitial
    b. Substitutional
    c. Vacancy
    d. Interstitial

4. A _____ occurs when a solute or impurity atom rests in the interstitial space within a crystal lattice
    a. Vacancy
    b. Substitutional
    c. Self-Interstitial
    d. Interstitial

5. T/F: A substitutional atom that is smaller than the host atoms puts the lattice under tension locally

6. T/F: A substitutional atom that is larger than the host atoms puts the lattice under tension locally

7. T/F Substitutional defects are always unwanted within a material

Topic: Line/Planar Defects

1. T/F: Only edge dislocations can climb or have non-conservative motion

2. A _____ boundary exists between small crystals within a material that have different crystallographic orientations
   a. Twin
   b. Grain
   c. Surface
   d. Stacking Fault

3. Glide dislocation motion occurs when the _____ and _____ are in the plane of motion

4. T/F A twin boundary is a type of grain boundary

5. The burgers vector provides two pieces of information about the associated dislocation. What are those two things?

6. T/F Intrinsic stacking faults have a partial plane missing

7. T/F Extrinsic stacking faults have a partial plane missing

Topic: Crystallographic Planes and Directions

1. The closest packed family of planes in FCC is _____

2. The closest packed family of directions in BCC is _____

3. T/F BCC crystals have a closest packed plane

4. The closest packed family of directions in FCC is _____

5. The closer packed family of planes in BCC is _____

6. The Atomic Packing Factor of FCC is _____
   a. 0.74
   b. 0.65
   c. 0.87
   d. 0.63

Use and Reproduction

The content used in this resource may only be used or reproduced for teaching purposes; and any commercial use is strictly prohibited. The full Academic Terms & Conditions can be found using this link.

Document Information

This case study is part of a set of teaching resources to help introduce students to topics related to fluids.

Ansys Education Resources

To access more undergraduate education resources, including lecture presentations with notes, exercises with worked solutions, microprojects, real life examples and more, visit www.ansys.com/education-resources.

Feedback

Here at Ansys, we rely on your feedback to ensure the educational content we create is up-to-date and fits your teaching needs.

Please click the link here out a short survey (~7 minutes) to help us continue to support academics around the world utilizing Ansys tools in the classroom.

ANSYS, Inc.
Southepointe
2600 Ansys Drive
Canonsburg, PA 15317
U.S.A.
724.746.3304
ansysinfo@ansys.com