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Courses » Heat Treatment and Surface Hardening-I



Announcements

Course

Ask a Question

Progress

Unit 6 - Week-5



Course outline

How to access the portal?

Week-1

Week-2

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Week-5

- Introduction to Kinetics of Phase Transformation
- Variation of ∆G* and r* with Undercooling
- Nucleation rate - I
- Nucleation Rate -II
- Critical Undercooling
- Quiz : Assignment-5
- Week 5 Feedback
- Assignment-5 solution

Week-6

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Assignment-5

The due date for submitting this assignment has passed. Due on 2018-03-18, 23:59 IS As per our records you have not submitted this assignment.

- 1) Q1 During homogeneous solidification of a pure metal from its molten state, very low nucleation rate and very high growth rate will result into the microstructure consisting of
 - (a) Very coarse grains
 - (b) Very fine grains
 - (c) Mixture of fine and coarse grains
 - (d) Different for different metal

No, the answer is incorrect.

Score: 0

Accepted Answers:

(a) Very coarse grains

- 2) Q2 During the homogeneous nucleation of a pure metal, if the nucleation rate is 1 point below the critical nucleation rate
 - (a) Solidification takes place rapidly
 - (b) Solidification depends on the crystal structure of the metal
 - (c) Liquid remain as supercooled liquid
 - (d) None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

- (c) Liquid remain as supercooled liquid
- 3) Q3 For same critical size of nucleus (r*), which of the following statement is 1 point correct for free energy barrier to nucleation and nucleation rate for homogeneous and heterogeneous nucleation? [Assume contact angle $\theta < 180^{\circ}$]
 - (a) $(\Delta G^*)_{homo} = (\Delta G^*)_{hetero}$ and $I_{homo} = I_{hetero}$ always
 - (b) $(\Delta G^*)_{homo} < (\Delta G^*)_{hetero}$ and $I_{homo} > I_{hetero}$
 - \bigcirc (c) ($\triangle G^*$) homo > ($\triangle G^*$) hetero and Ihomo < Ihetero
 - \bigcirc (d) ($\triangle G^*$) homo and I_{homo} can be greater than or less than ($\triangle G^*$) hetero and I_{hetero}

No, the answer is incorrect.

Score: 0

Accepted Answers:

(c) $(\Delta G^*)_{homo} > (\Delta G^*)_{hetero}$ and $I_{homo} < I_{hetero}$

4) Q4 10 g of gold and 25 g of silver are mixed to form a single- phase ideal solid 1 point solution. The mole fraction of gold and silver are: (given that the atomic weight of gold and silver are 196.97 and 107.87 g/mole, respectively).

- (a) 0.18 and 0.82, respectively.
- (b) 0.12 and 0.88, respectively.
- (c) 0.10 and 0.90, respectively.
- (d) 0.13 and 0.87, respectively.

No, the answer is incorrect.

Score: 0

Accepted Answers:

(a) 0.18 and 0.82, respectively.











Score: 0

Accepted Answers:



- 6) Q6 The chemical potential of elements A and B in an ideal solution is given by: 1 point
 - \circ (a) mA=-m⁰A+ RT ln X_A and mB= m⁰B+ RT ln X_B
 - \odot (b) mA= m⁰A- RT ln X_A and mB= m⁰B- RT ln X_B
 - \odot (c) mA= m⁰A+ RT ln X_A and mB= m⁰B+ RT ln X_B
 - \odot (d) m_A= m⁰_A-RT ln X_A and m_B= m⁰_B- RT ln X_B

No, the answer is incorrect.

Score: 0

7)

Accepted Answers:

(c)
$$m_A = m^0_A + RT \ln X_A$$
 and $m_B = m^0_B + RT \ln X_B$

(a) No change in the concentration of a and b.

- (b) Accumulation of A atoms at a/b interface.
- (c) Migration of A atom from a to b phase.
- (d) Migration of A atom from b to a phase.

No, the answer is incorrect.

Score: 0

Accepted Answers:

- (c) Migration of A atom from a to b phase.
- 8) Q8 In the plot shown below, the phases stable in the region of cd will be:

1 point

1 point

f

1 pc

in











- (a) g
- (b) b
- (c) g+b+L
- (d) a+b

No, the answer is incorrect.

Score: 0

Accepted Answers:

(*c*) g+b+L













No, the answer is incorrect.

Score: 0

Accepted Answers:





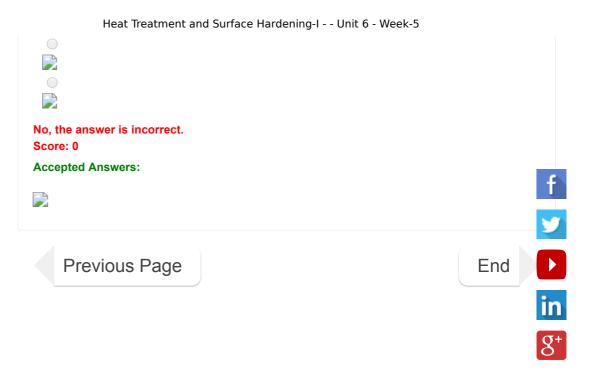
1 point

1 point









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