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Unit 3 - Week 1 : Solid State And Solid State Materials

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Course outline

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Practice

Week 1 : Solid State And Solid State Materials

- Lecture 1 : Nature of solid state and the solid state materials
- Lecture 2 : Thermodynamics of solids
- Lecture 3 : Crystallisation Kinetics
- Lecture 4 : Synthetic Strategy
- Lecture 5 : Review of week 1 and Practice problems
- Quiz : Assignment 1
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- Assignment 1 Solution

Week 2 Unit

Assignment 1

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment. **Due on 2019-02-13, 23:59 IST.**

1) The correct statement regarding enthalpies and inter particle potentials of solids and liquids is *1 point*

- Liquids have higher enthalpy than solids and different interparticle potentials for solids.
- Liquids have higher enthalpy than solids but the same interparticle potentials as solids.
- Liquids have lower enthalpy than solids and different interparticle potentials from solids.
- Liquids have lower enthalpy than solids but the same interparticle potentials as solids.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Liquids have higher enthalpy than solids but the same interparticle potentials as solids.

2) An amorphous solid has *1 point*

- short range order but not long range order
- long range order but not short range order
- short range order and long range order
- neither short range order nor long range order

No, the answer is incorrect.
Score: 0

Accepted Answers:
short range order but not long range order

3) A crystalline solid *1 point*

- always has less molar entropy than the corresponding liquid but not always less molar volume.
- always has less molar volume than the corresponding liquid but not always less molar entropy.
- always has less molar entropy and less molar volume than the corresponding liquid
- satisfies none of the above statements.

- is never equal to zero
- is equal to zero beyond a critical distance but becomes large for small distances
- is equal to zero for all distances
- satisfies none of the above statements

No, the answer is incorrect.
Score: 0

Accepted Answers:
is equal to zero for all distances

5) ***1 point***

A certain material has almost same molar volume in the solid and liquid state. Given that the molar entropies of the solid and liquid are quite different, the slope of the solid-liquid coexistence curve in the *P-T* phase diagram (i.e. d*P*/d*T*) is

- very small
- very large
- equal to zero
- not necessarily very large or very small

No, the answer is incorrect.
Score: 0

Accepted Answers:
very large

6) The reason for a nucleation barrier for crystal growth from a supersaturated solution is **1 point**

- solids are much more stable than the supersaturated solution
- solids prefer to be part of the solution as opposed to the crystal
- solution has lower free energy than solids
- none of the above statements

No, the answer is incorrect.
Score: 0

Accepted Answers:
none of the above statements

7) When the liquid is cooled to its freezing point and the temperature is held at the freezing point, the rate of crystallisation is : **1 point**

- proportional to the enthalpy difference between the liquids and the solids
- proportional to the chemical potential difference between the liquids and solids which is greater than zero.
- equal to zero.
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
equal to zero.

8) On doubling the supersaturation of a solution, the rate of crystallization **1 point**

- doubles
- gets multiplies by a factor e^2
- gets multiplied by a factor of ln(2)
- does not change

No, the answer is incorrect.
Score: 0

Accepted Answers:
doubles

9) One advantages of soft chemical methods over solid state synthesis: **1 point**

- The quality of crystals grown using soft chemical methods are better.
- Larger crystals can be grown by soft chemical methods.
- Crystal growth is faster using soft chemical methods.
- Crystals can be grown at lower temperatures in soft chemical methods.

No, the answer is incorrect.
Score: 0

Accepted Answers:

Crystals can be grown at lower temperatures in soft chemical methods.

10) Iron at room temperatures shows a bcc structure. However, on heating above 1180 K, it transforms to an fcc structure with a 9% increase in density. From this we conclude that : ***1 point***

- At room temperature, bcc iron has higher density than fcc iron.
- At room temperature, bcc iron is metastable.
- At room temperature, bcc iron has greater entropy than fcc iron.
- none of the above.

No, the answer is incorrect.
Score: 0

Accepted Answers:

At room temperature, bcc iron has greater entropy than fcc iron.

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