Week 2: Assignment 2

The due date for submitting this assignment has passed.

Due on 2021-09-08, 23:59 IST.

As per our records you have not submitted this assignment.

Packing fraction

Assuming atoms represented by the largest possible sphere, find the packing fraction for:

1) a crystal represented by a body centered cubic lattice and a one-atom basis ***2 points***

- 65%
- 68%
- 74%
- 34%

No, the answer is incorrect.
Score: 0

Accepted Answers:
68%

2) a crystal represented by a face centered cubic lattice and a one-atom basis ***2 points***

- 65%
- 68%
- 74%
- 34%

No, the answer is incorrect.
Score: 0

Accepted Answers:
74%

3) a crystal represented by a face centered cubic lattice and a two-atom basis, atoms located at (0, 0, 0) and (0.25, 0.25, 0.25). ***3 points***

- 65%
- 68%
- 74%
- 34%

No, the answer is incorrect.
Score: 0

Accepted Answers:
34%

X-ray Diffraction

4) Determine the maximum wavelength for which constructive interference can be observed in the Bragg model for a simple cubic crystal with a lattice constant of 3.6 Å. (use condition of maxima, $h = 6.626 \times 10^{-34}$, $m_n = 1.675 \times 10^{-27}$) ***2 points***

- 7.0Å
- 7.2Å
- 7.4Å
- 7.8Å

No, the answer is incorrect.
Score: 0

Accepted Answers:
7.2Å

5) What is the energy of the X-ray in eV? (use the value obtained above,) ***2 points***

- $1.7keV$
- $2.0keV$
- $3.4keV$
- $4.2keV$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$1.7keV$

6) If you were to perform neutron diffraction, what would the energy of the neutrons have to be in order to obtain the same de Broglie wavelength (as obtained in part a)? ***3 points***

- 8.18×10^{-2}
- 0.16×10^{-2}
- 2.34×10^{-2}
- 4.68×10^{-2}

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.16×10^{-2}