Question

Which of the following has the highest packing efficiency.
i) Simple cubic ii) body-centred cubic iii) hexagonal close-packed lattice?

Answer:

Unit cell	scc	bcc	hcp
Packing efficiency	52.4%	68%	74%

Question

Gold (atomic radius = 0.144 nm) crystallises in a face-centred unit cell. What is the length of a side of the cell?

Answer:

For fcc unit cell atoms at corners and face centre touch each other so $\sqrt{2}a = 4R$ where a is edge length of unit cell and 'R' radius of atom.

$\sqrt{2}R = 4R$

$a = 2\sqrt{2}R = 2\sqrt{2} \times 0.144\,nm = 0.407\,nm$