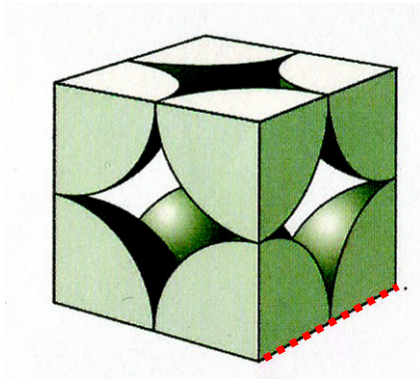


CUBIC CRYSTAL SYSTEMS

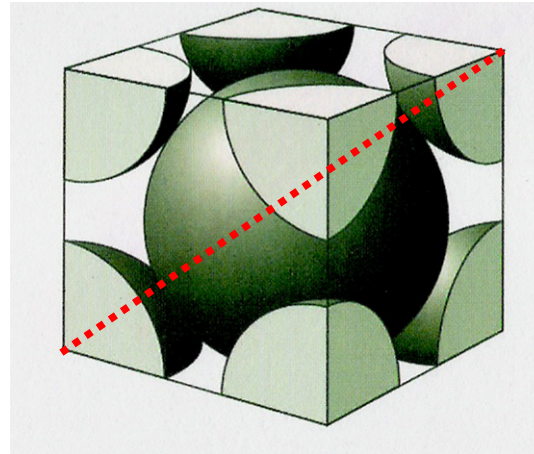
Simple Cubic



$$a = 2r$$

1 atom/UC

Body-Centered Cubic

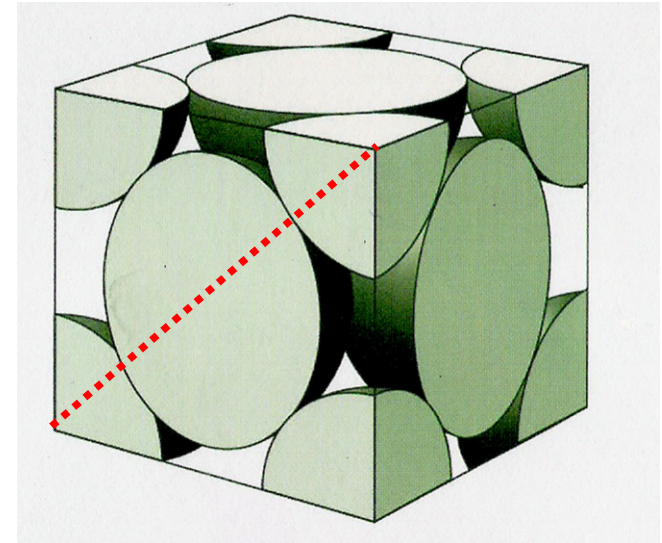


$$b = 4r$$

$$a = \frac{b}{\sqrt{3}} = \frac{4r}{\sqrt{3}}$$

2 atoms /UC

Face-Centered Cubic (cubic closest packing)



$$f = 4r$$

$$a = \frac{f}{\sqrt{2}} = \frac{4r}{\sqrt{2}}$$

4 atoms/UC

Volume of atom (sphere) = $\frac{4}{3} \pi r^3$ or $\frac{1}{6} \pi d^3$

1 nm = 10^{-9} m

1 Å = 10^{-10} m

1 pm = 10^{-12} m

Volume of UC (cube) = a^3

Occupied Volume = (# atoms/UC)(volume/atom)

% Occupied Volume (packing efficiency) = $\frac{\text{occupied volume}}{\text{volume of UC}} \times 100$