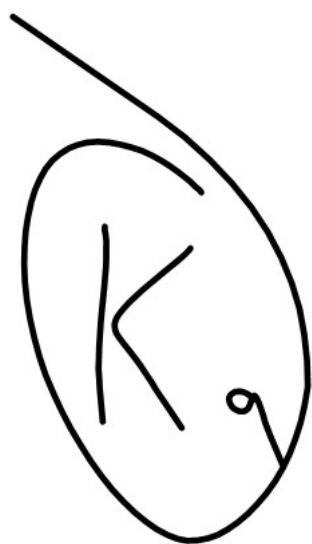
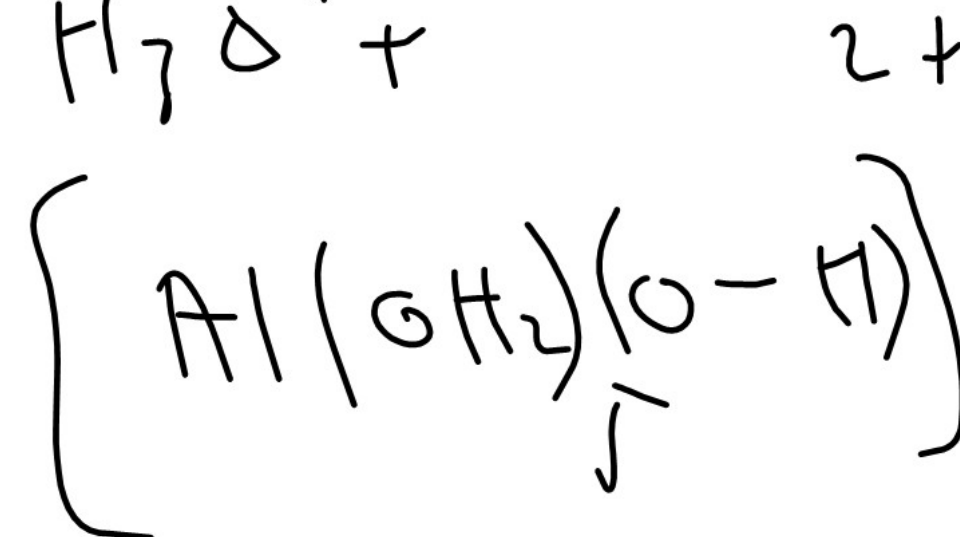




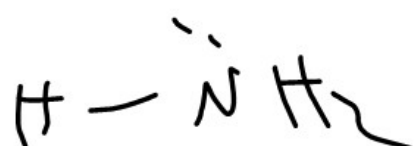
Ind. Effect

H-bonds

Steric Effect



ind.



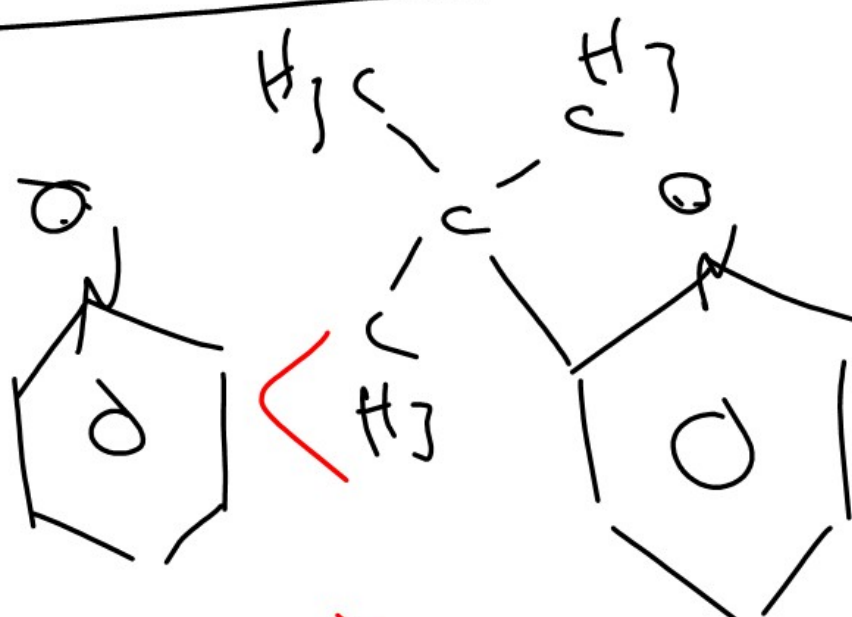
<



H-bond



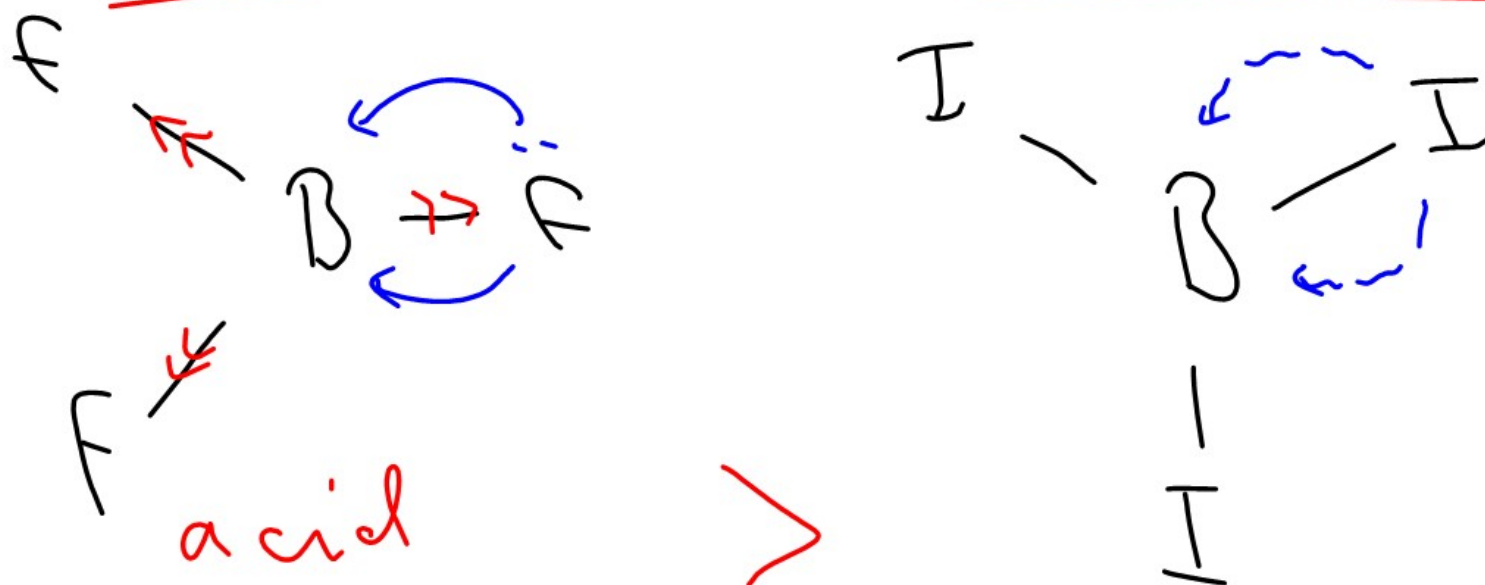
>



ind.

>

Steric



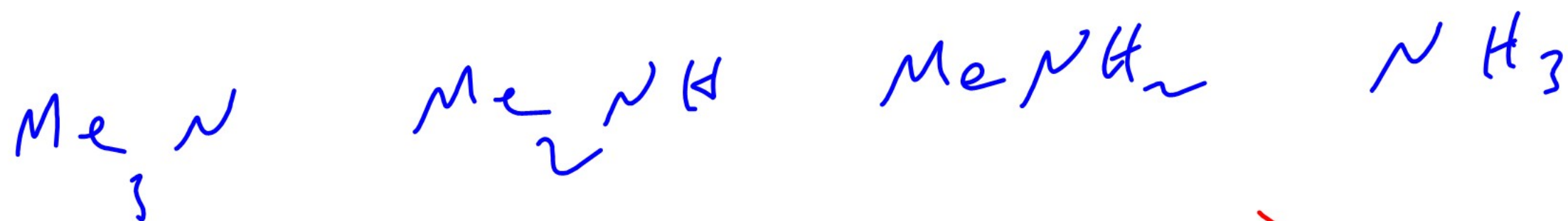
ind.

acid

Reality

>

<



ind.



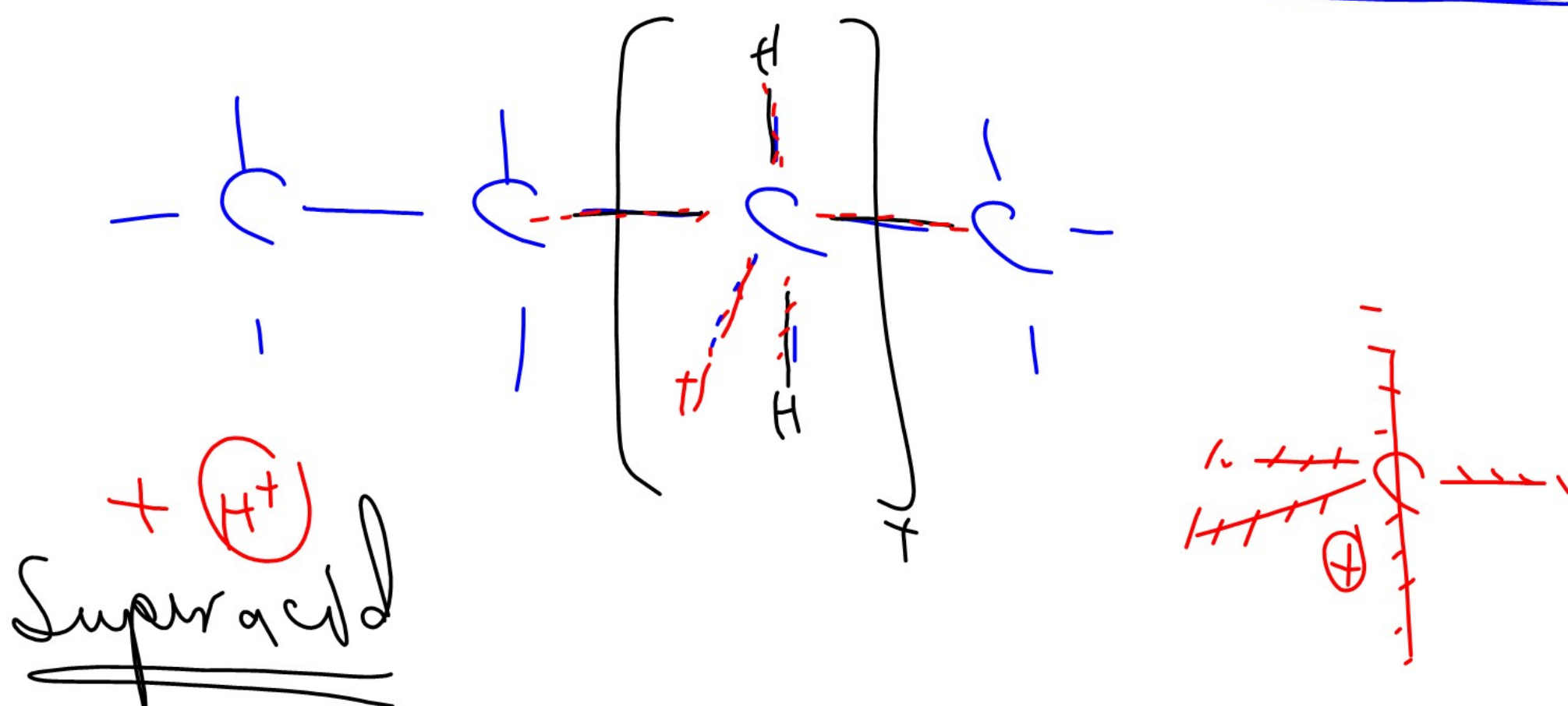
Super Acid

H_2SO_4 , HBr , HF

Strong $HClO_4$, HCl , HNO_3

weak: HCN , HF , acetic acid,
 HNO_2 , H_2SO_3

$HC(OH)HCl$ > H_2SO_4 > HNO_3
 (4) (9) (4) (9)





Magic Acid



H_2O

$\boxed{0 - 14}$ at $25^\circ C$

$\boxed{0 - 14}$

$NH_3(l)$ | pure solvent

Chapt. 7

Solid State

Crystalline

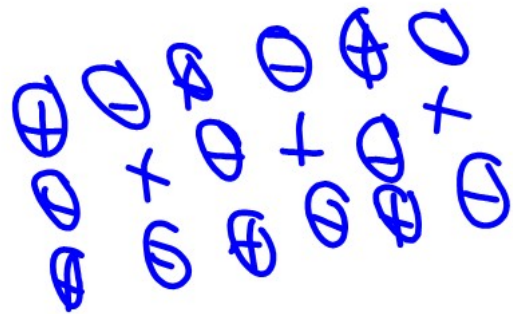
amorphous

Components have
long range regular ordering
(repetitive)

Crystal

Represented
as

(lattice) point representation of crystal



Type of Lattices

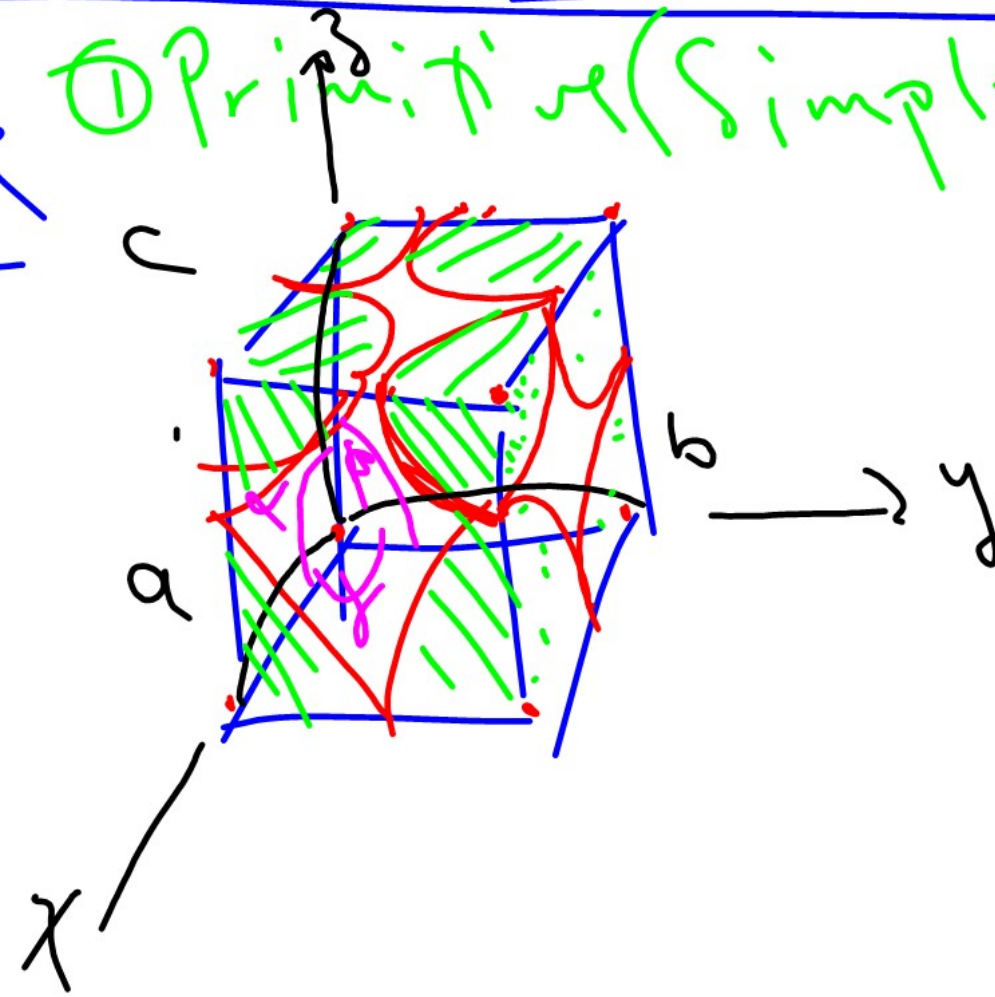
Lattice $\Rightarrow$ unit cells $\Rightarrow$ (14)

$\rightarrow$ Cubic type $\Rightarrow$ ① Primitive (Simple) cube

$$8 \times \frac{1}{8} = 1$$

$$a = b = c$$

$$\alpha = \beta = \gamma = 90^\circ$$

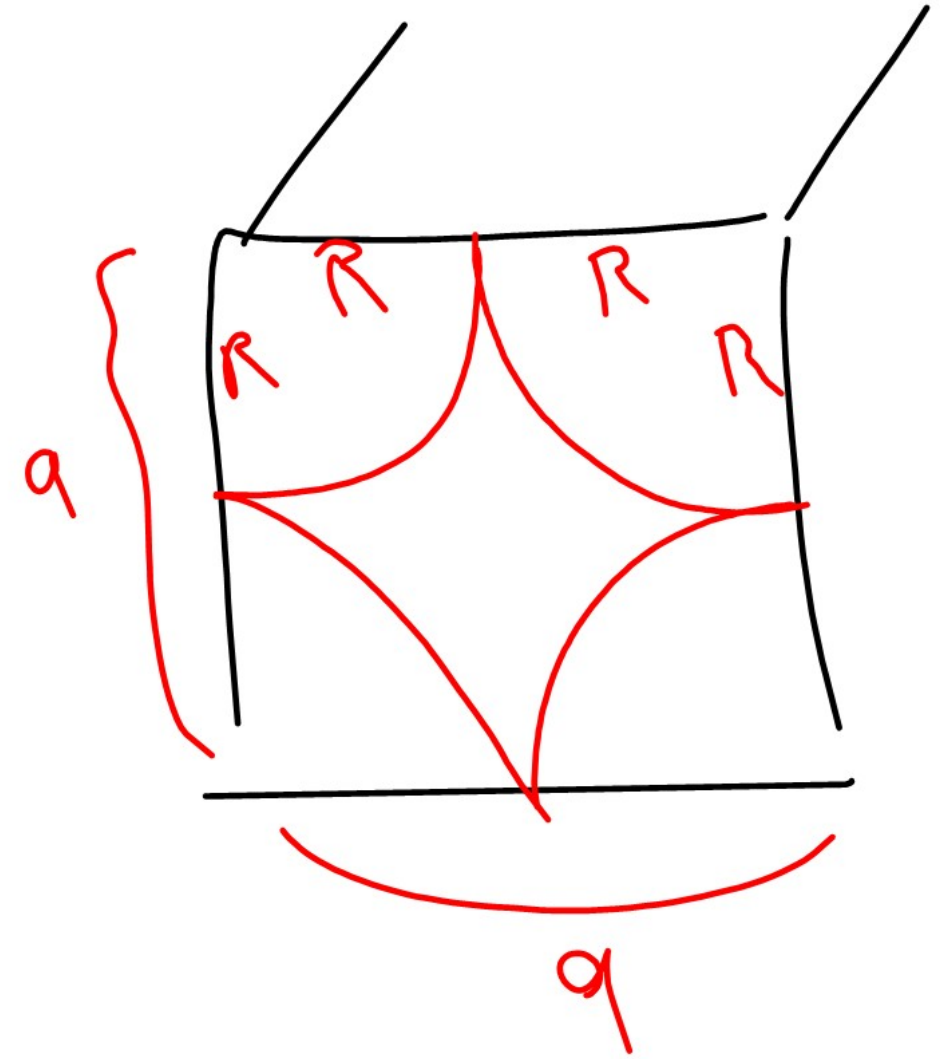


$$\text{APF} = \frac{\text{total size of spheres}}{\text{total size of unit cell}}$$

↓ ↓ ↓

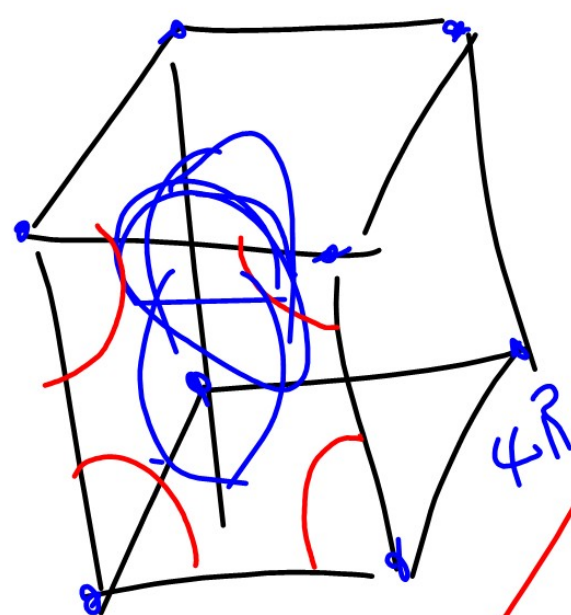
$$= \frac{(1) \times \frac{4\pi}{3} R^3}{a^3}$$

$$= \frac{\frac{4}{3}\pi R^3}{(2R)^3} = ??$$



→ bcc

body centered cubic / 2 spheres



$$a = b = c$$

$$\alpha = \beta = \gamma = 90^\circ$$

$$(4R)^2 = 3a^2$$

$$a = \sqrt{\frac{4R^2}{3}} = \frac{4R}{\sqrt{3}}$$

$$APF = \frac{(2) \times \frac{4}{3} \pi R^3}{a^3}$$

$$APF = \frac{8\pi}{3\sqrt{3}}$$

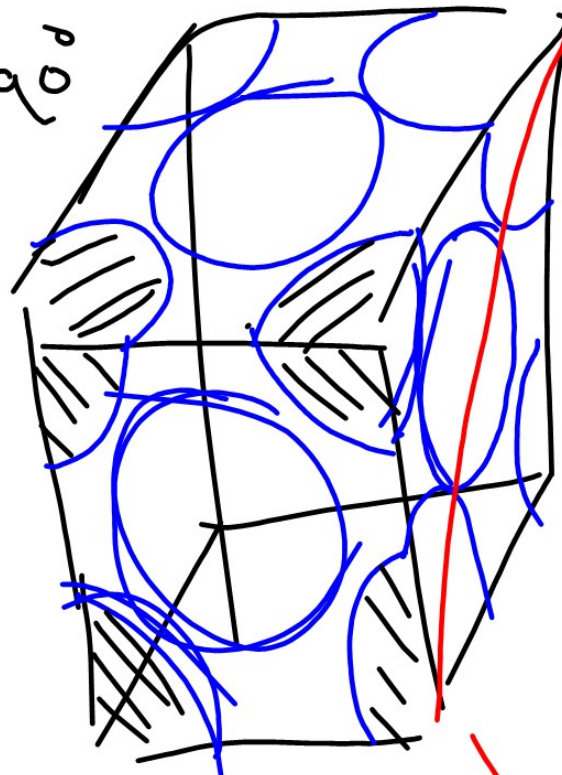
fcc

Face Centred
cubic

$$a = b = c$$

$$\alpha = \beta = \gamma = 90^\circ$$

(4)



$$APF = \frac{(4) \times \frac{4}{3} \pi R^3}{a^3}$$

$$APF \approx 74\%$$

$$4R = \sqrt{2}a$$

$$\frac{(4R)^2}{2} = a^2$$

$$8R^2 = a^2$$

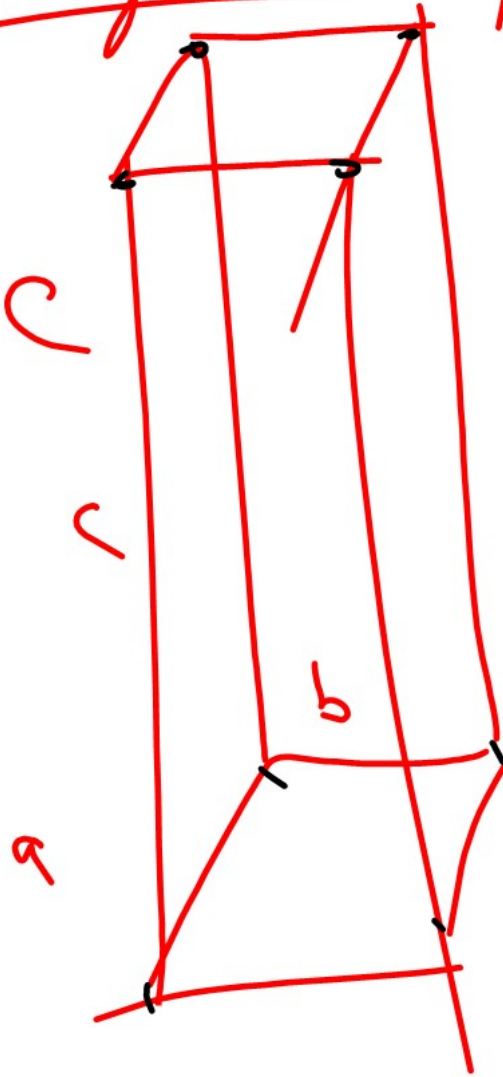
$$a = 2\sqrt{2}R$$

Tetragonal

Primitive

body
center
tetragonal

$$a=b \neq c$$



Hexagonal

$$a=b \neq c$$

$$\alpha = \beta = 90$$

$$\gamma = 120$$

