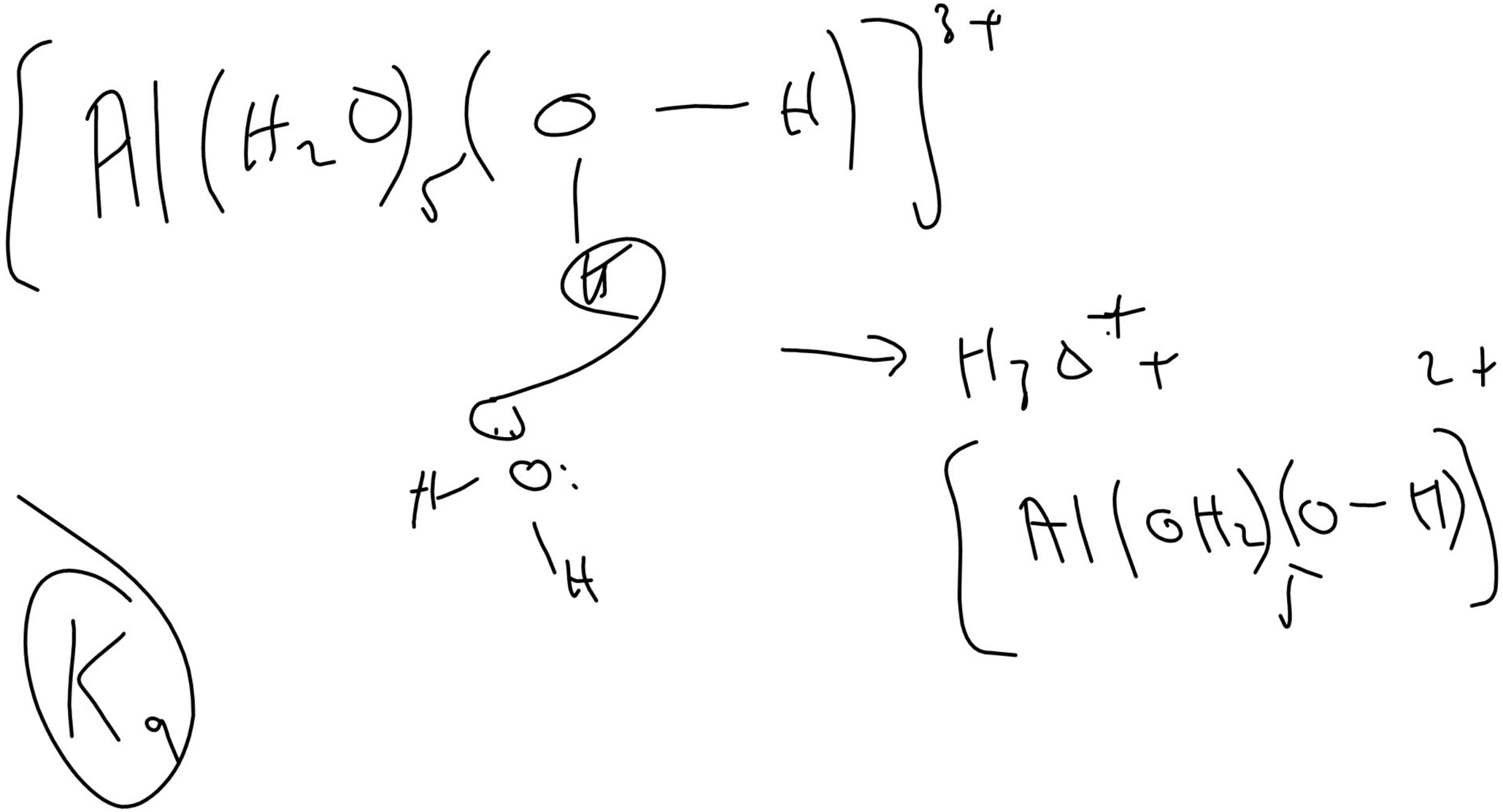
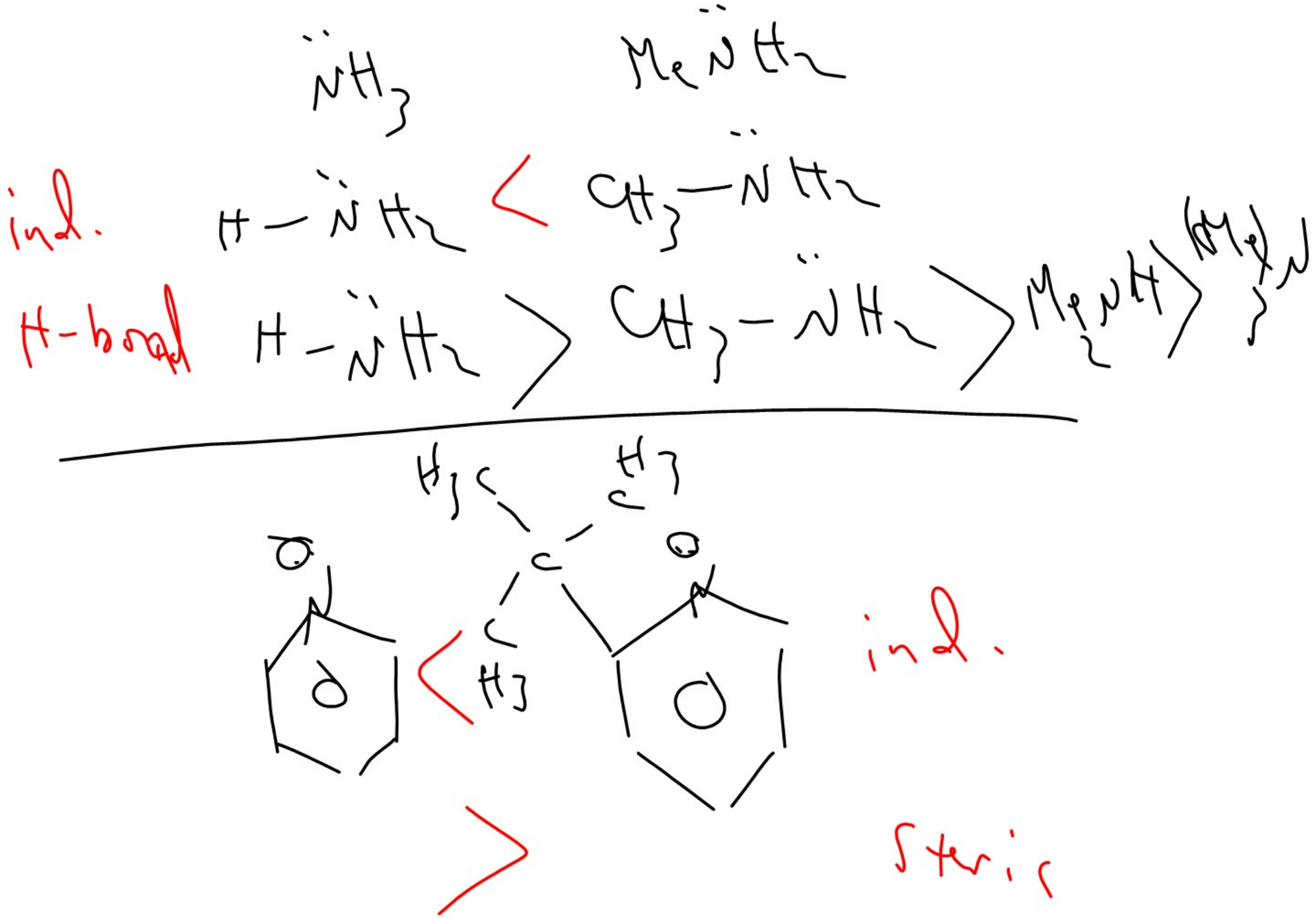
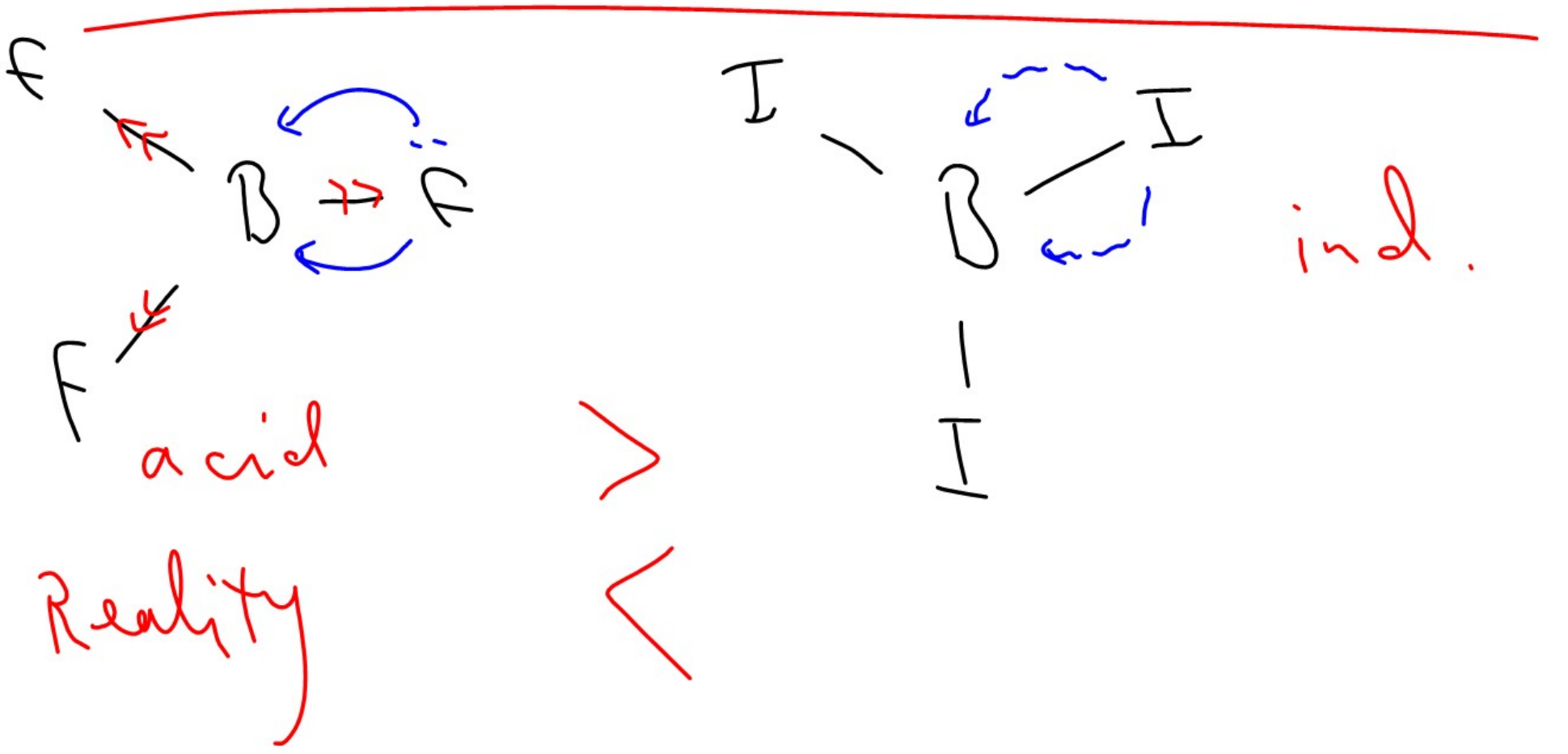


Ind. Effect

H-bonds

Steric Effect





Me_3N Me_2NH $MeNH_2$ NH_3

ind. > > > >

in water: $Me_2NH > MeNH_2 > Me_3N > NH_3$

Super acid

H_2SO_4 HBr, HI

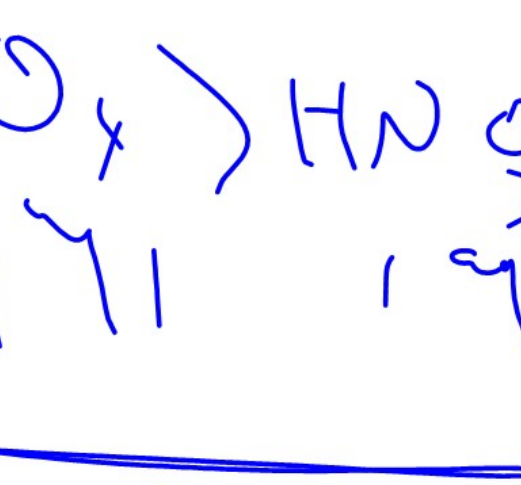
Strong $HClO_4$, HCl, HNO_3

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

$HClO_4$ > HCl > H_2SO_4 > HNO_3

+ H^+

Superacid



H_2SO_4

Magic Acid HSO_3F/SbF_5

$$HF + SbF_5 \rightleftharpoons \boxed{H_2F^+} + SbF_6^-$$

$$2HF + 2SbF_5 \rightleftharpoons \boxed{H_2F^+} + Sb_2F_{11}^-$$

K_w

0 — 14 at 25°C

0 — 14

$NH_3(l)$ | Pure Solvent

Chapt. 7

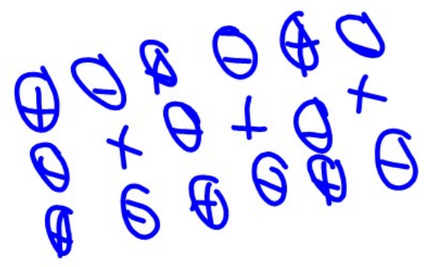
Solid State

- Crystalline
  - Component have long range regular ordering (repetitive)
- amorphous

Crystal

Represented as

lattice point representation of crystal



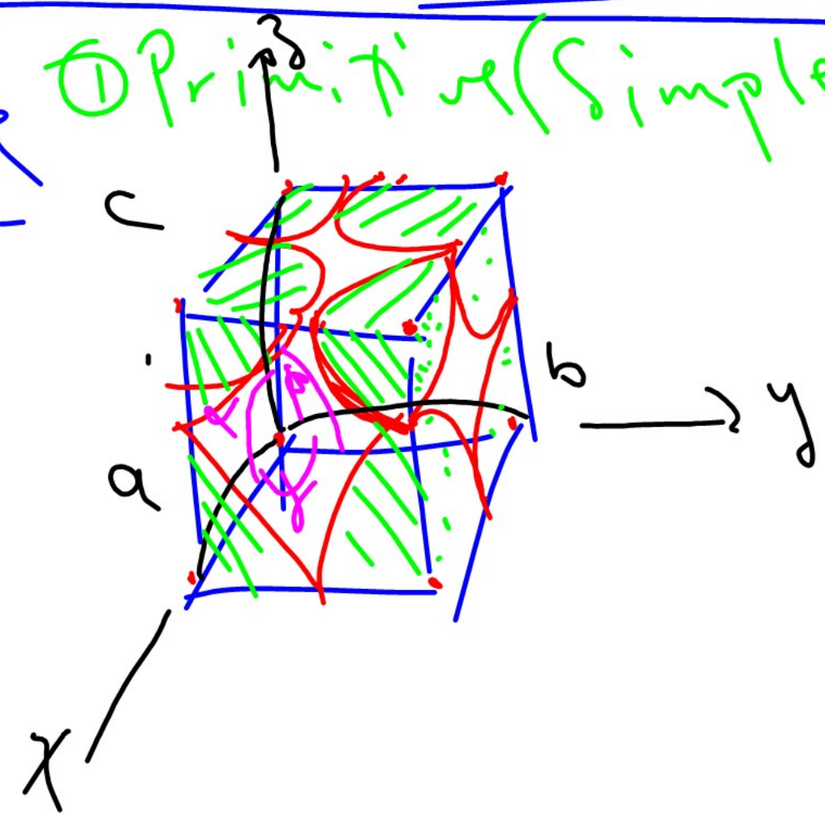
Type of Lattices

Lattice ⇒ unit cells ⇒ (14)

→ Cubic type

① Primitive (Simple) Cube

8 × 1/8 = 1



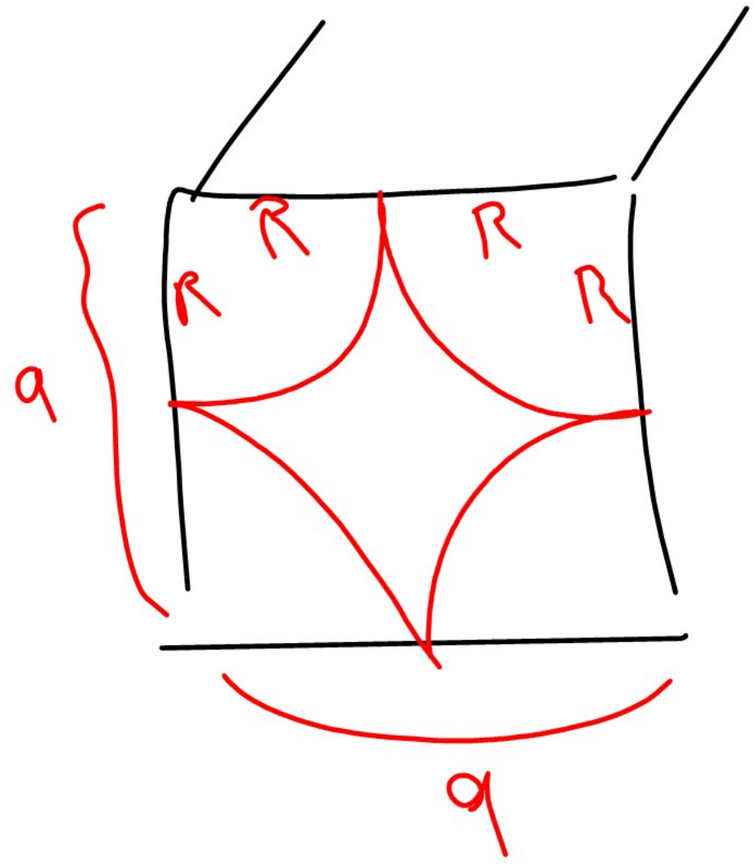
$a = b = c$

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

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

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

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

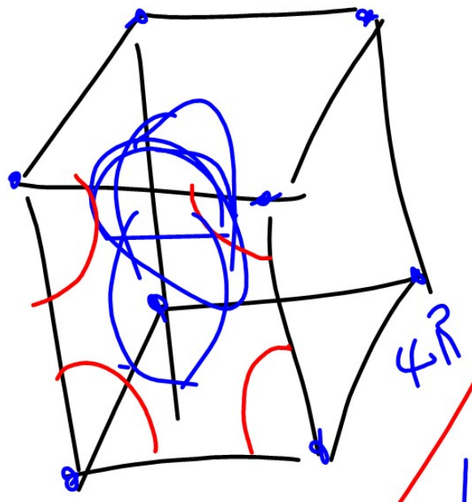


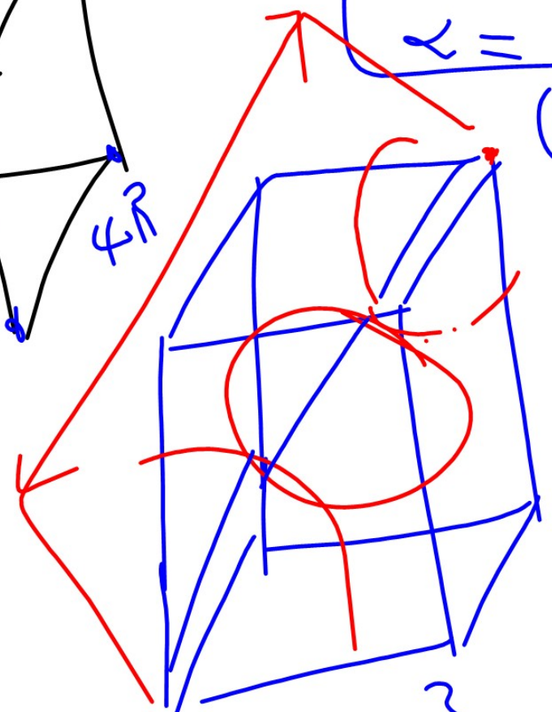
→ bcc

body centered cubic / 2 spheres

$a = b = c$

$\alpha = \beta = \gamma = 90°$





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

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

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

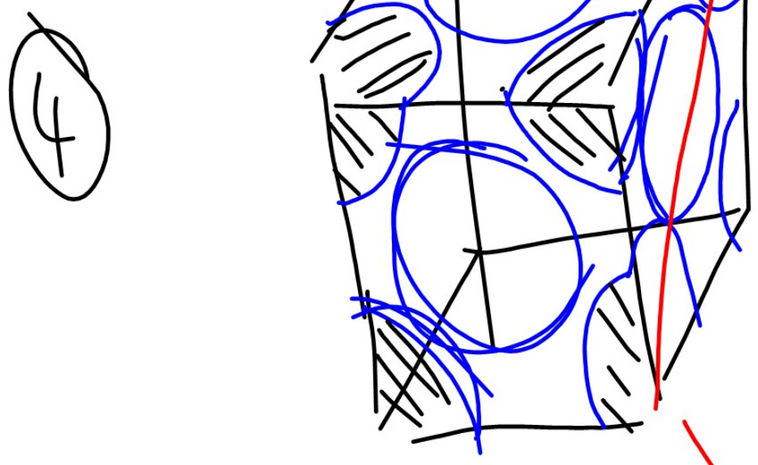
$APF \simeq 68\%$

fcc

face Centred cubic

$a = b = c$

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



(4)

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

$APF \simeq 74\%$

$4R = \sqrt{2}a$

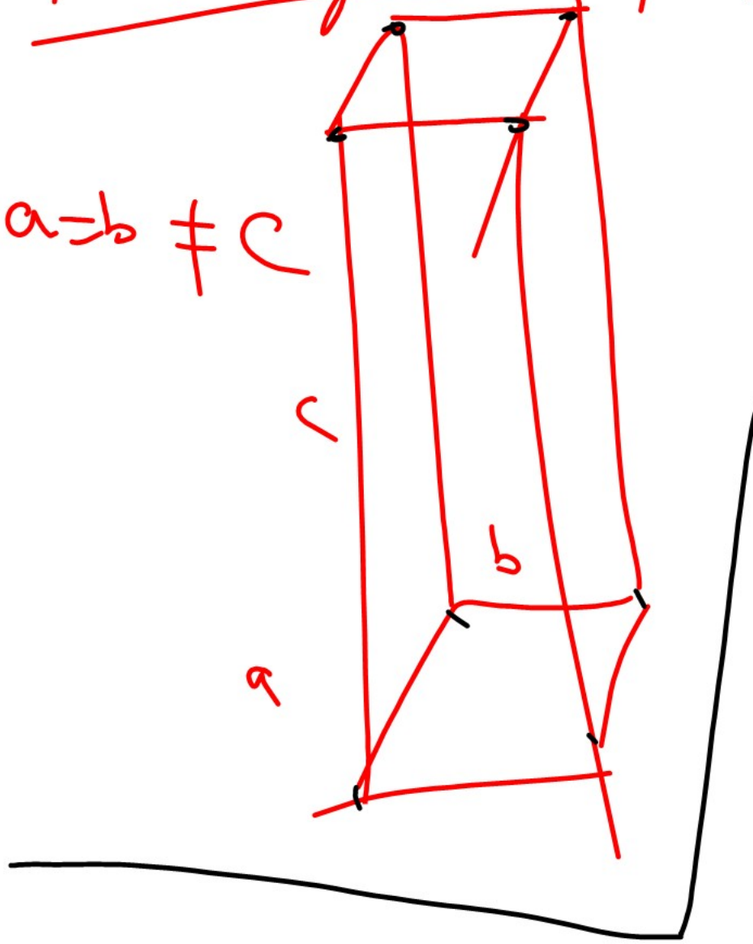
$(4R)^2 = 2a^2$

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

$8R^2 = a^2$

$a = R\sqrt{8}$

Tetragonal / Primitive or body Center tetragonal



Hexagonal

a=b≠c

α=β=90

γ=120