

# Redox Reaction

① Oxidation → loss of electron

→ gain of oxygen

→ loss of hydrogen

→ ↑ O.S.

substance oxidised

↓  
reducing agent

② Reduction → gain of electrons

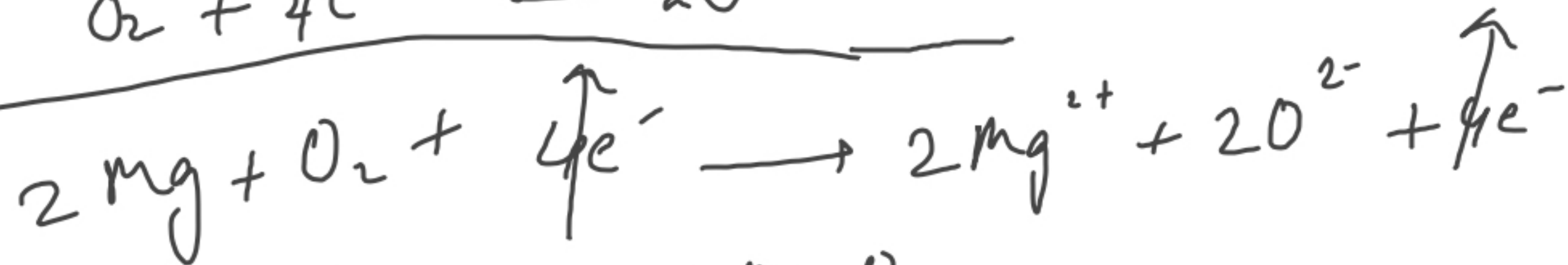
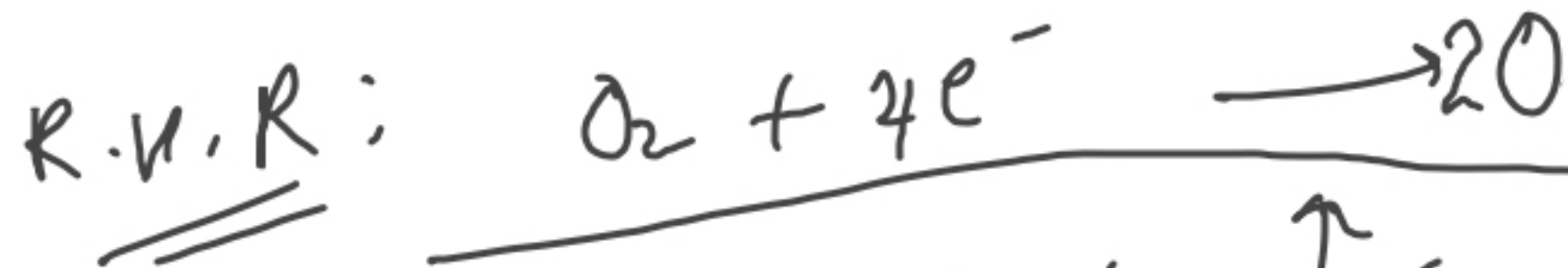
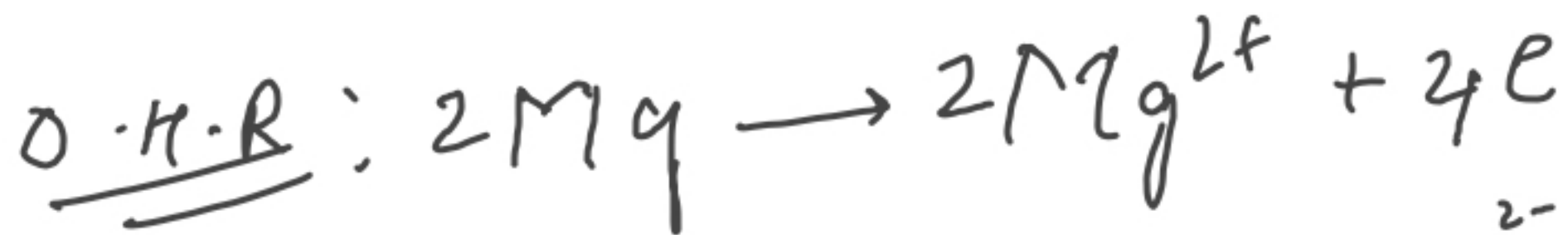
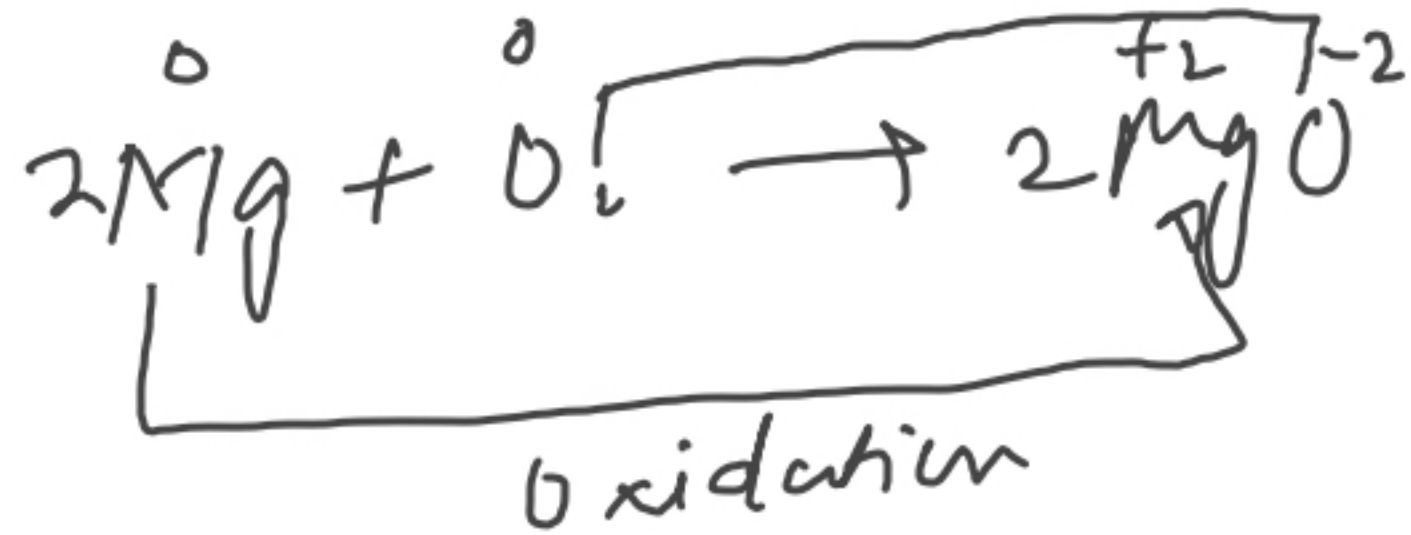
→ addit. of hydrogen

→ removal of oxygen

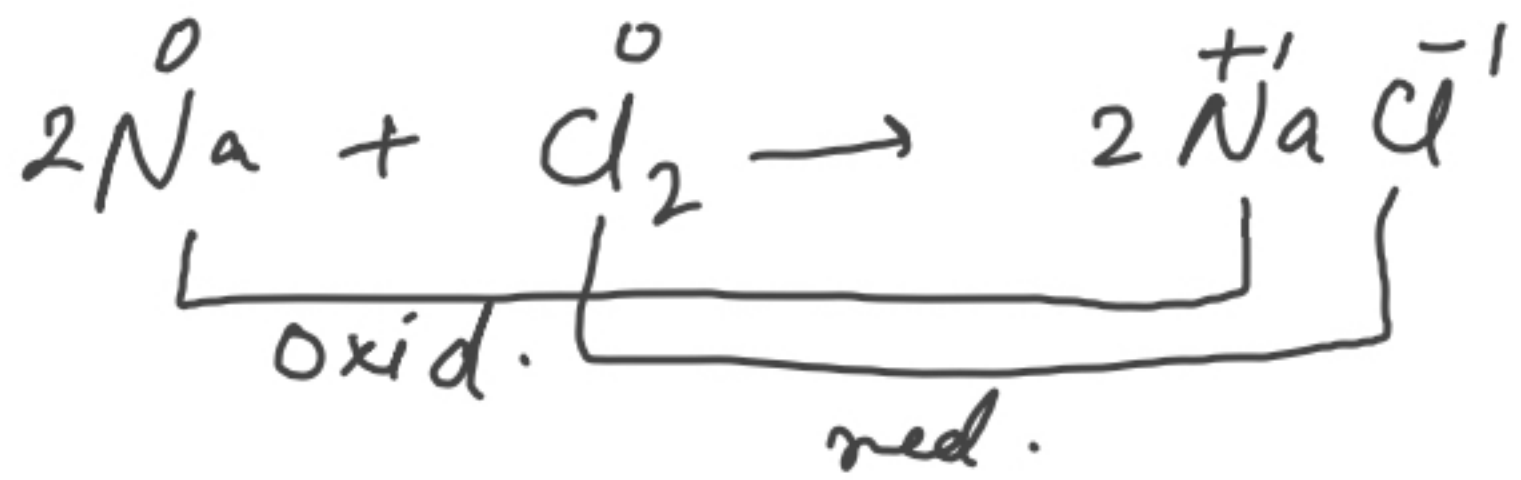
→ decrease in O.S. ↓

substance reduced

↓  
oxidising agent

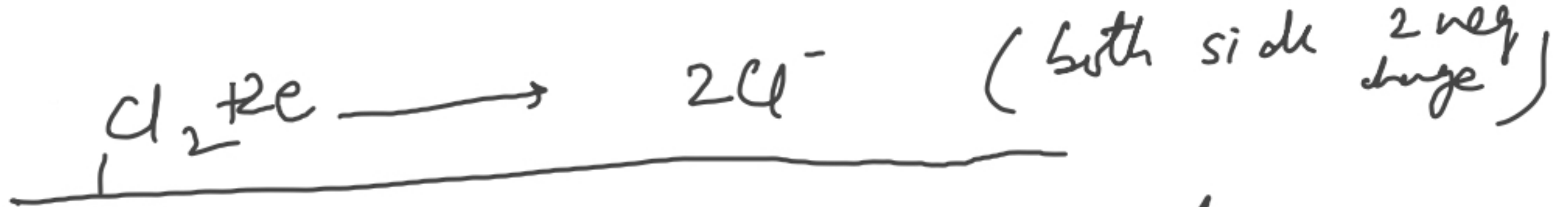
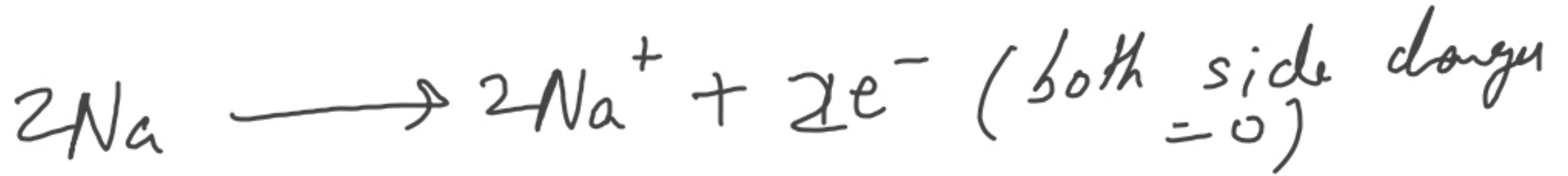


overall  
reacn.



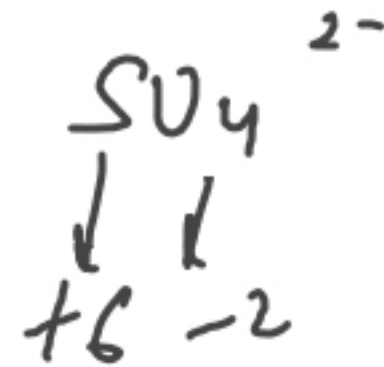
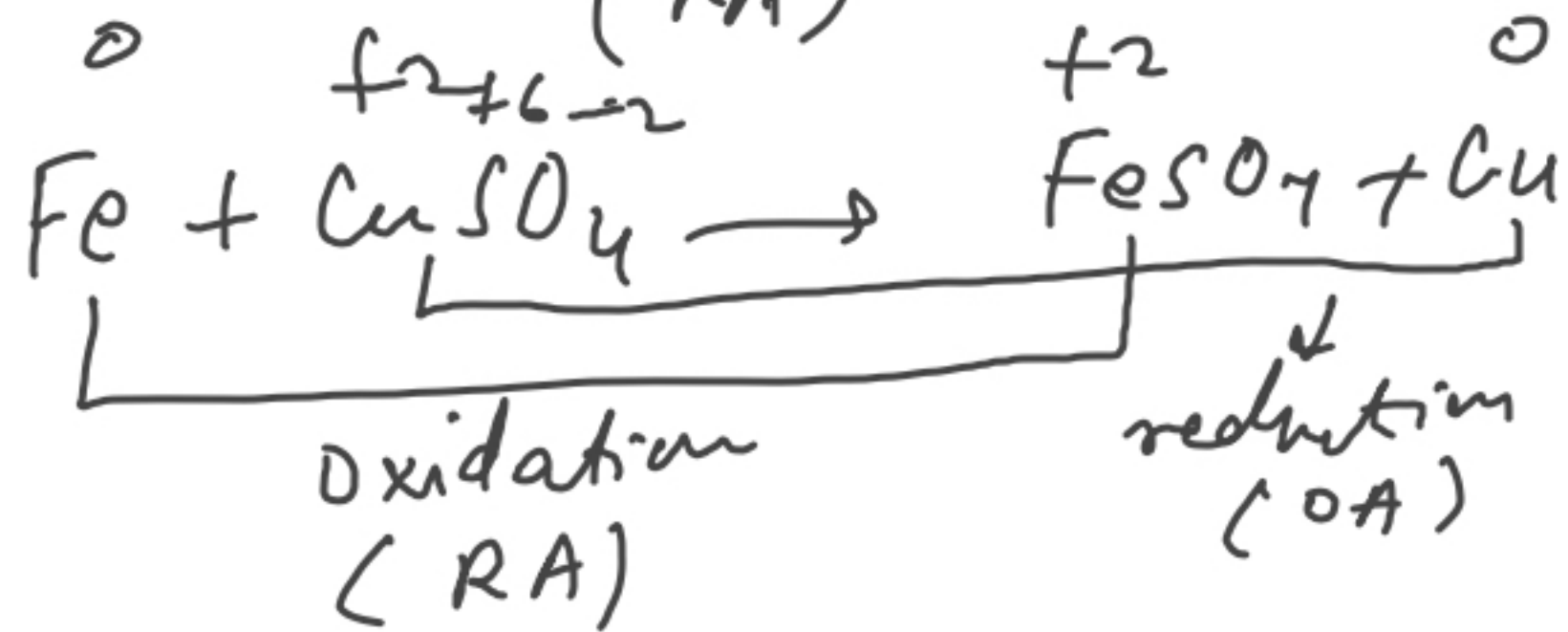
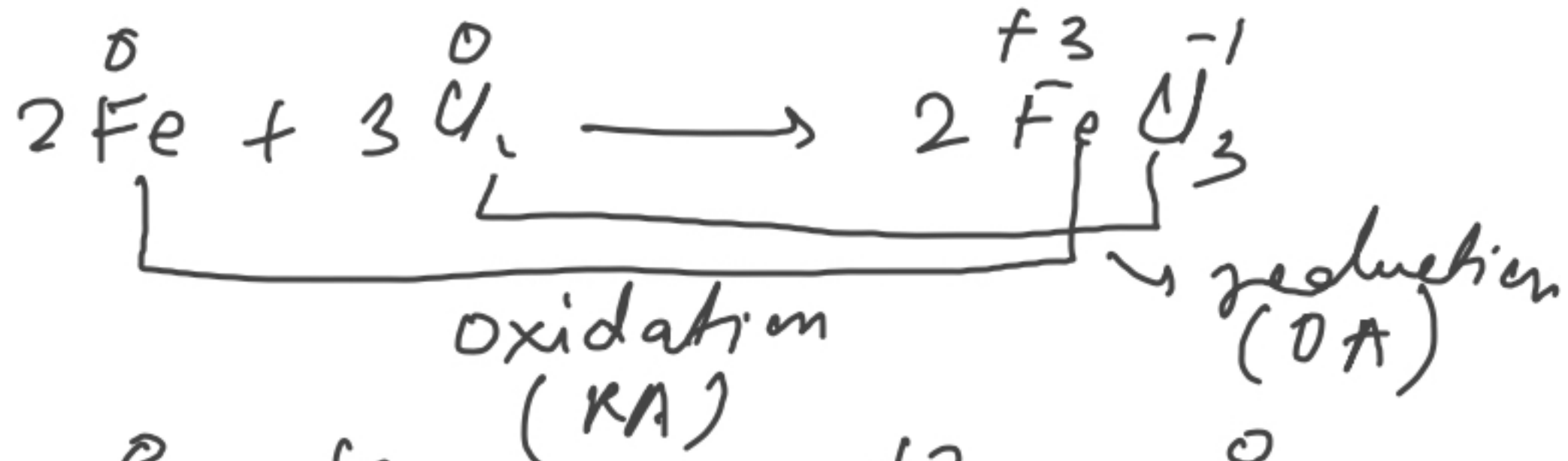
O.N.R.

R.N.F.



overall  
reaction:





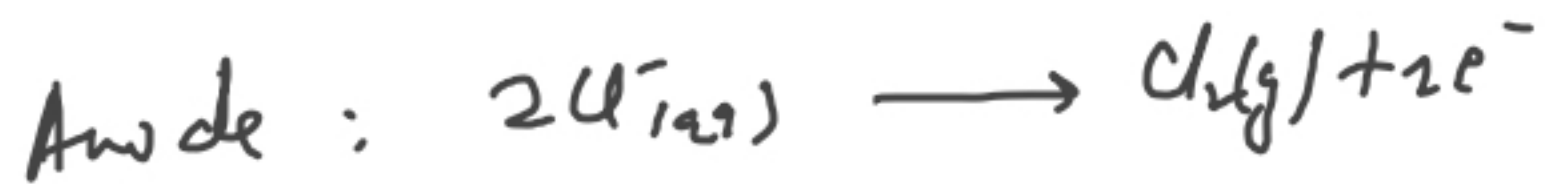
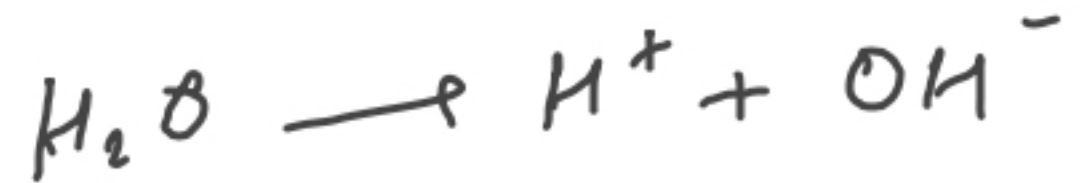
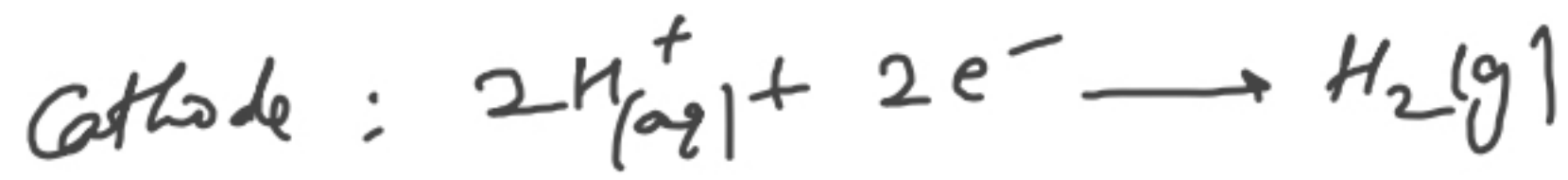
$\overset{+1}{\text{H}_2} \overset{-1}{\text{O}_2}$   
 in hydrogen peroxide  
 of  $\text{H}_2\text{O}_2$  -1 0.5.  
 Rest in all other compounds  
 ;  $\text{H}_2\text{O}$  -2 0.5.



Anode: titanium

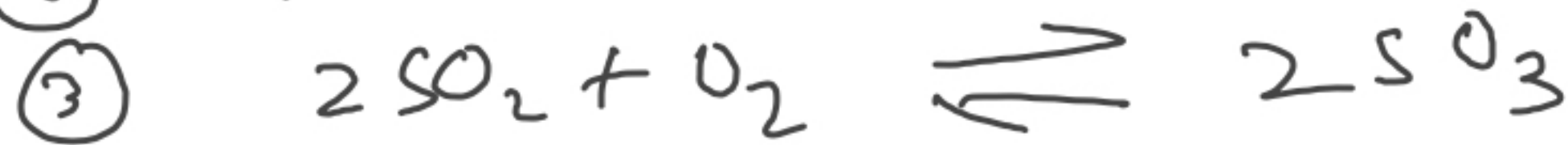
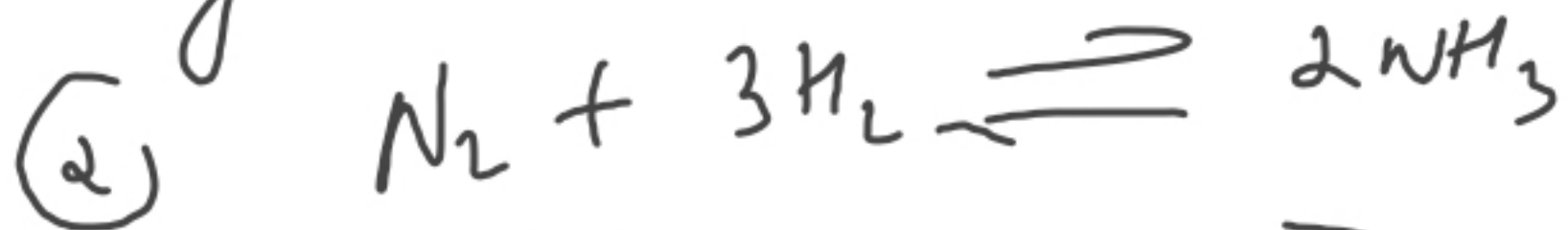
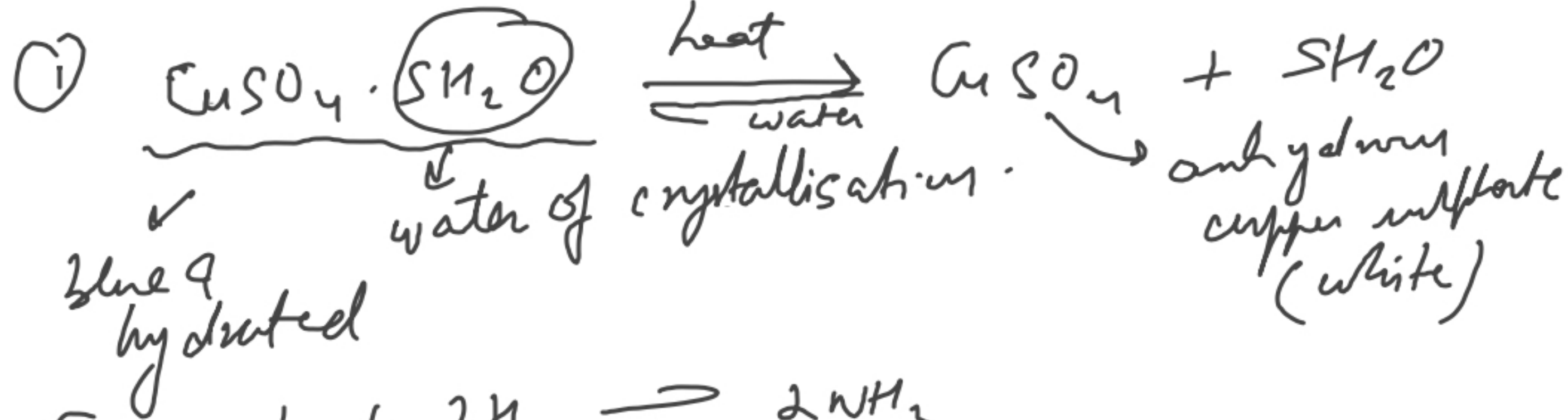
Cathode: Nickel

semi-permeable membrane in between so as to allow the ions to pass but keep gases on two sides of it apart.



$\text{NaOH}$  in soln  $\xrightarrow{\text{dry it / evaporation}}$  solid  $\text{NaOH}$

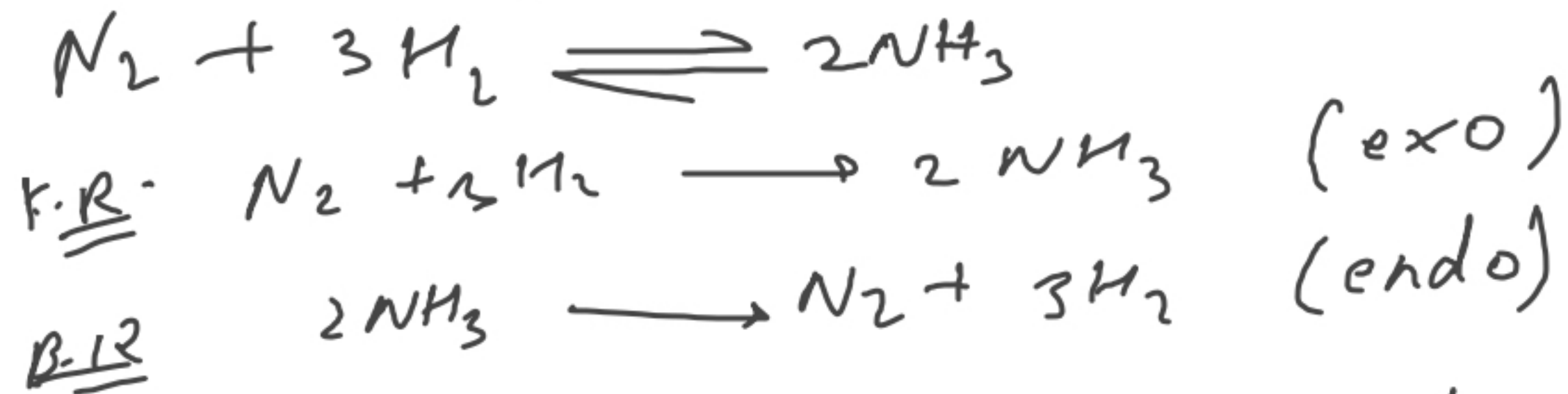
Reversible Reactions





# Shifting the equilibrium :

Rate of forward react<sup>n</sup>  
 = Rate of backward react<sup>n</sup>  
 net overall change = 0



for F.R.: if  $T \uparrow$  it favours backward react<sup>n</sup>  
 if  $T \downarrow$  it favours forward react<sup>n</sup> ✓

for B.R.: if  $T \uparrow$  it favours forward react<sup>n</sup> ✓  
 if  $T \downarrow$  it favours backward react<sup>n</sup>

effect of temperature on equilibrium  
 favourable cond. for  $NH_3$  formation.

Pressure: if  $P \uparrow$  for exo. react<sup>n</sup>, equilibrium shift forward i.e. more ammonia will be formed ✓  
 for endo react<sup>n</sup>, equilibrium shift backward i.e. more ammonia gets decomposed

Pressure: if  $P \downarrow$ , for F.R (P <math>X</math> V)  $\rightarrow$  backwards  
 for B.R (end  $\downarrow$ )  $\rightarrow$  forward  $\checkmark$

So fav. conditions for  $NH_3$  formation are:

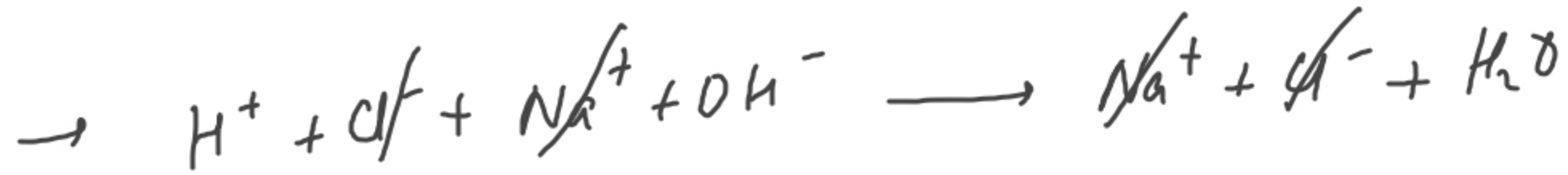
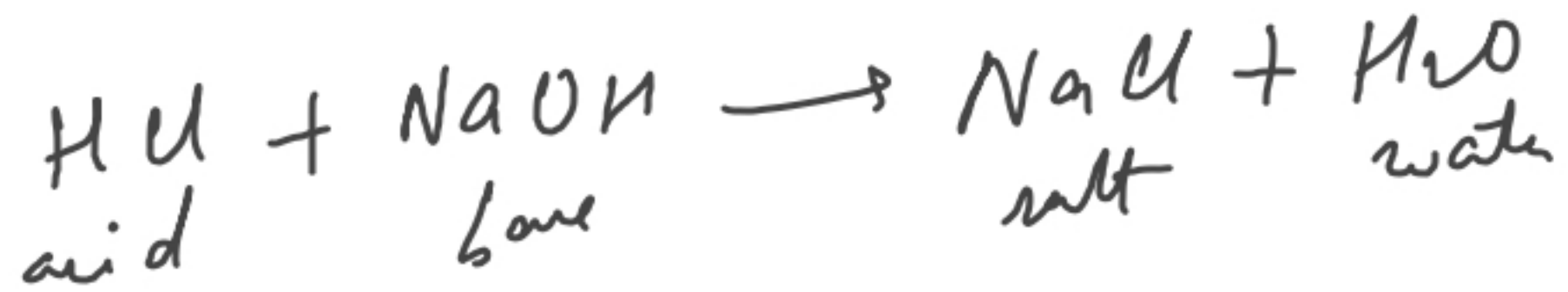
a) All the ticks  $\checkmark$

i.e we use high pressure & remove  $NH_3$  to improve the yield  
 we use moderate temperature & a catalyst (Fe)

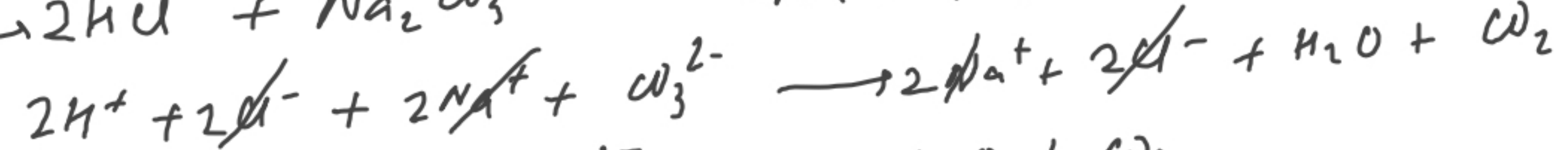
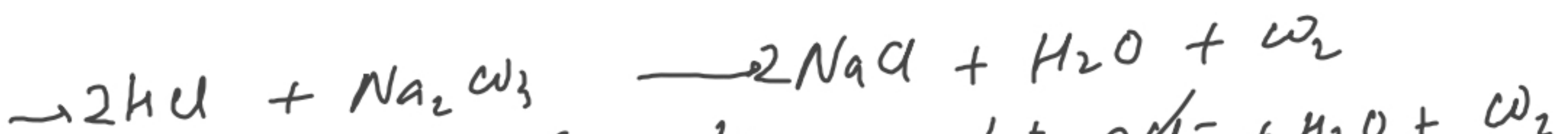
- ① When  $NH_3$  is removed, equilibrium shift forward way to form more  $NH_3$  (Le Chatelier's principle)   
 (removing decreases  $NH_3$  quantity)
- ② if  $\uparrow N_2$  or  $H_2$  is added, equilibrium favours forward reaction to consume it.



A closer look at neutralization



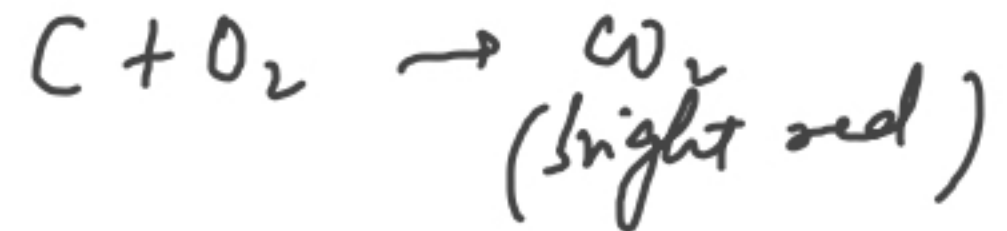
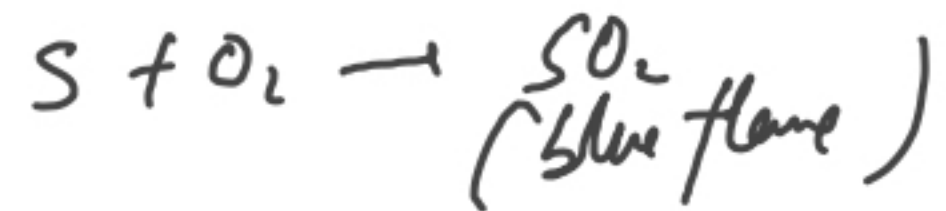
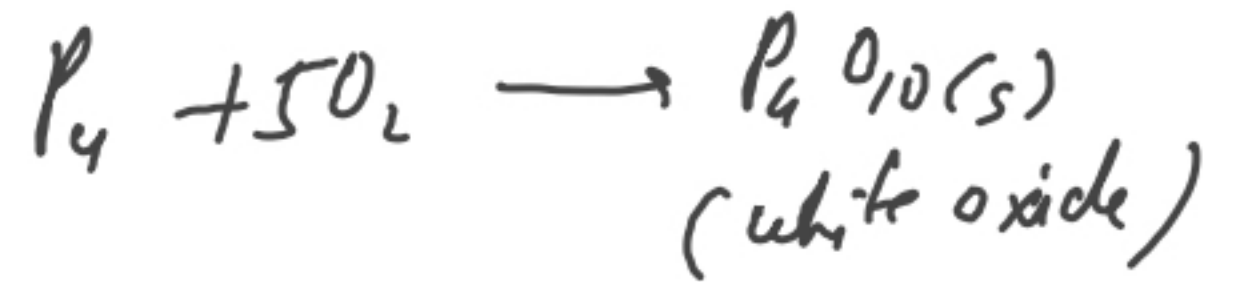
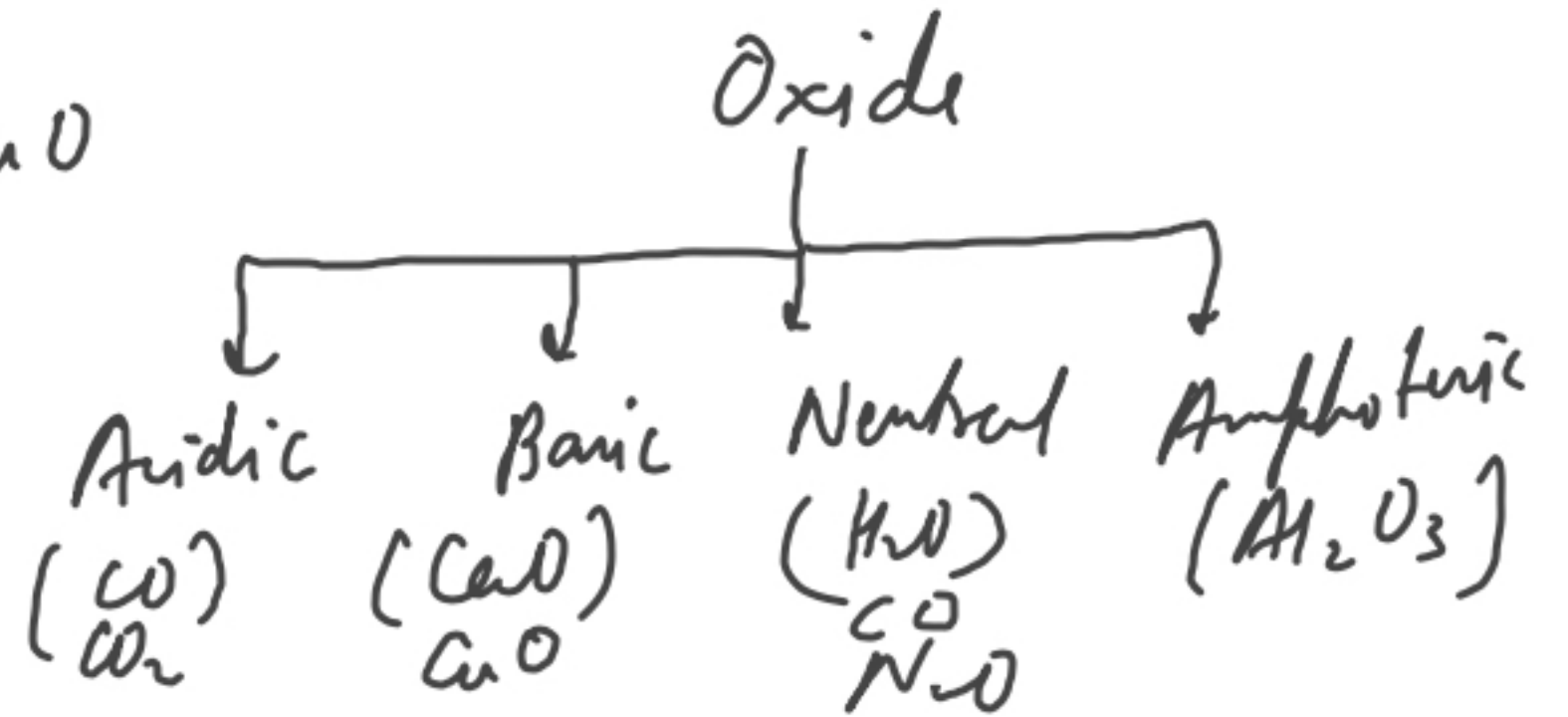
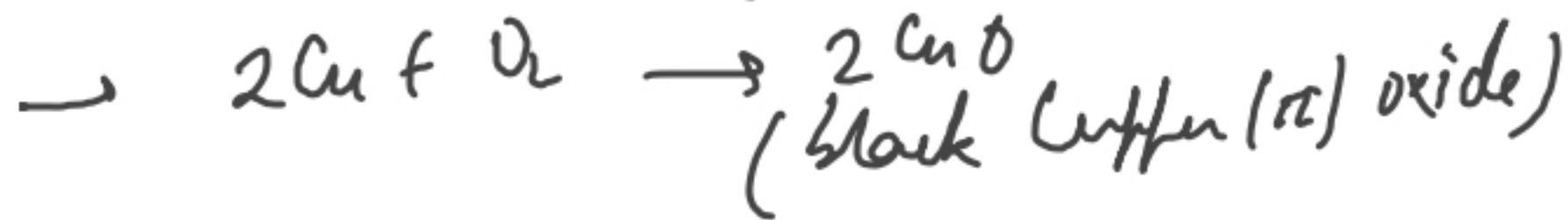
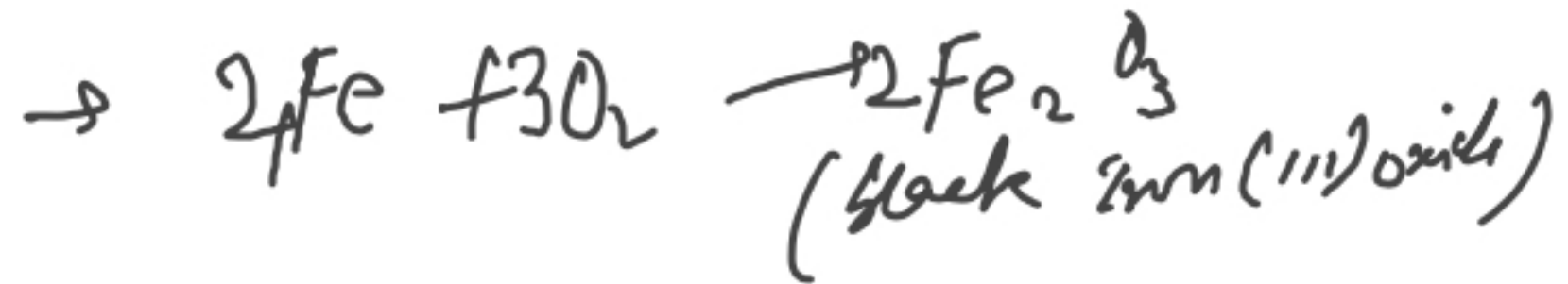
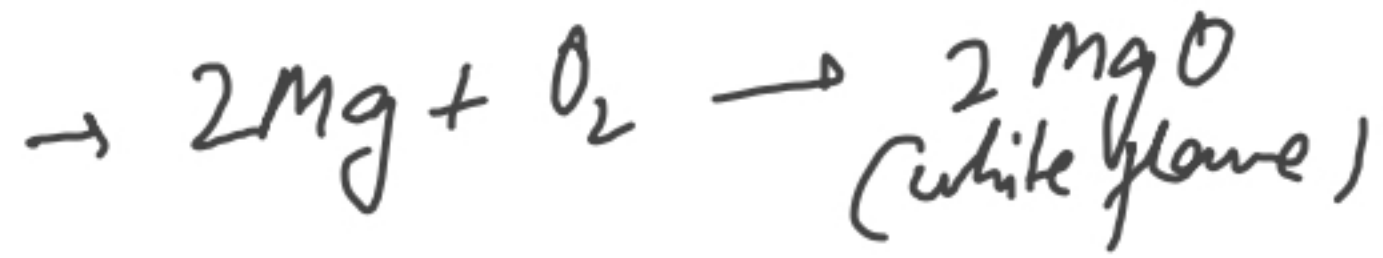
Acids  $\rightarrow$  proton donors  
Base  $\rightarrow$  proton acceptors



# Oxides

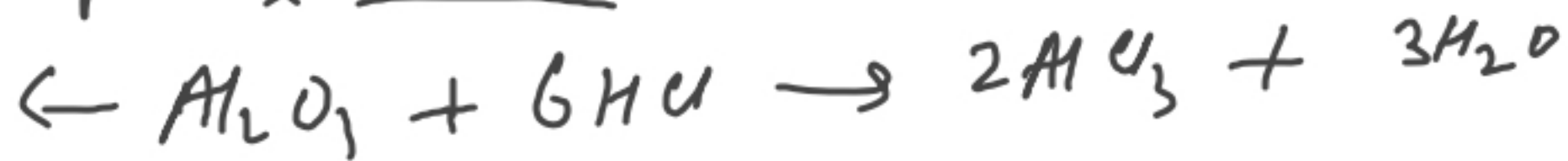
→ metallic Oxide → Basic  
Ex:  $\text{CaO}$ ,  $\text{MgO}$ ,  $\text{Na}_2\text{O}$ , etc;  $\text{CuO}$

→ Non-metallic Oxide → Acidic  
Ex:  $\text{SO}_2$ ,  $\text{SO}_3$ , etc;  $\text{CO}_2$

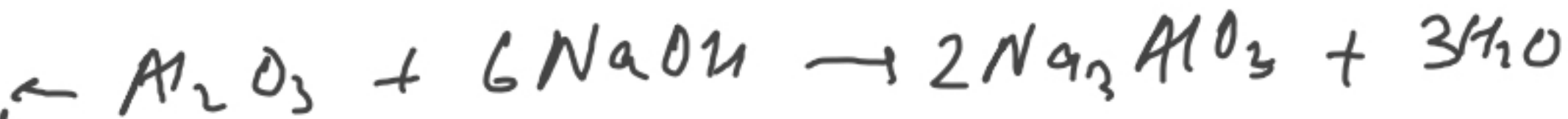


## Amphoteric Oxide :

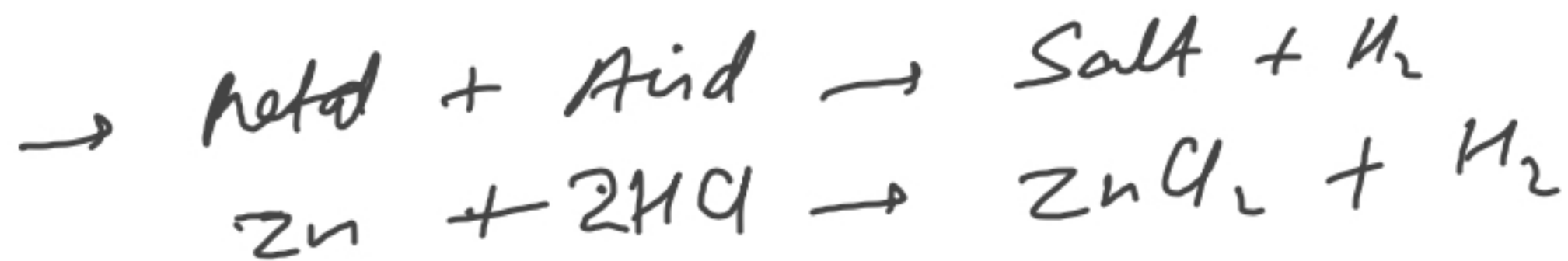
behaves here as an base



behaves here as an acid



reacts with both an acid and a base.



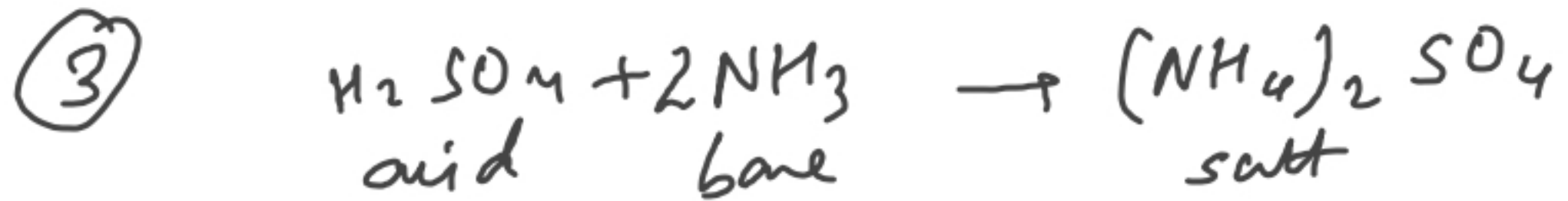
②  $0.025 \times 2 = 0.05$  moles  $\text{Na}_2\text{CO}_3$



2 moles	1 mole
$2 \times 0.05$	0.05 mole
= 0.1 mole.	

$$\therefore \text{N.A.} = \frac{0.1}{2} \text{ litre} = \frac{\text{mole}}{\text{Volume}}$$

$$= \frac{0.05 \times 2}{50 \text{ cm}^3} = \frac{0.1}{\text{Volume}}$$



from calc<sup>n</sup> molar of  $\text{H}_2\text{SO}_4$  used =  $\frac{24}{1000} \times 1 = 0.02$  molar

from react<sup>n</sup> 1 molar of acid neutralises 2 molar of  $\text{NH}_3$

0.02	"	"	"	$2 \times 0.02$	"	"	"
				0.04			

$$\therefore \text{concentration of } \text{NH}_3 = \frac{0.04}{0.025} = 1.6 \text{ M}$$























