

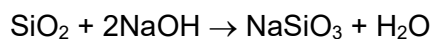
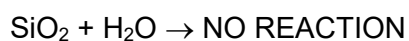
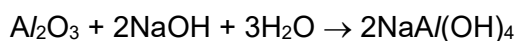
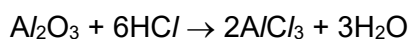
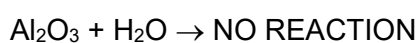
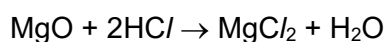
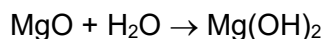
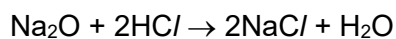
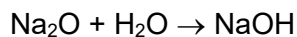
## INORGANIC:



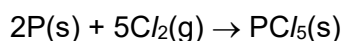
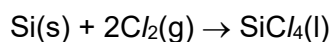
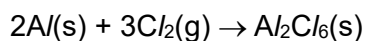
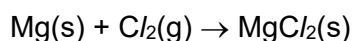
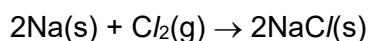
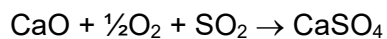
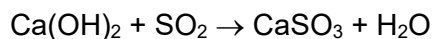
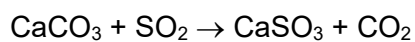
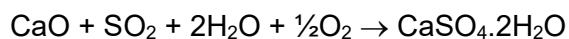
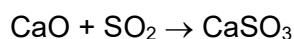
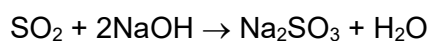
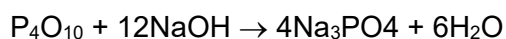
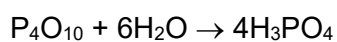
← for **COLD DILUTE NaOH**

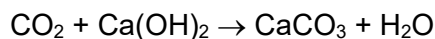
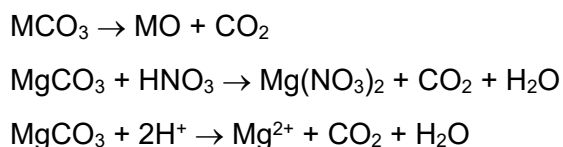
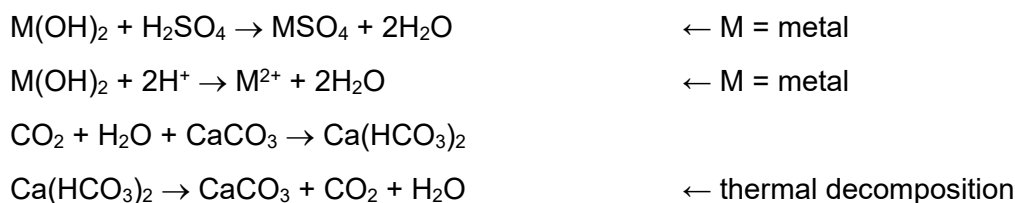
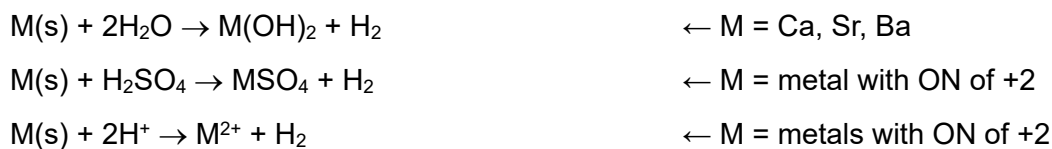
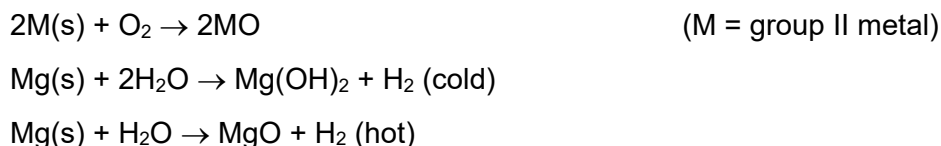
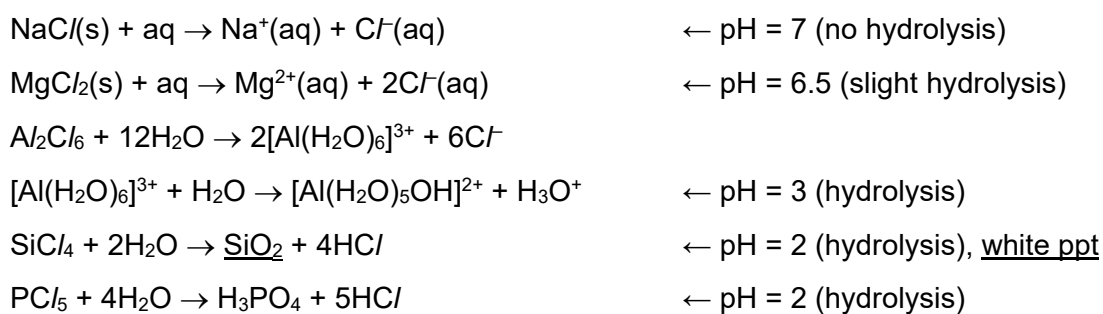


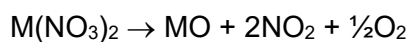
← for **HOT concentrated NaOH**



← **HOT NaOH**

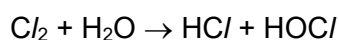




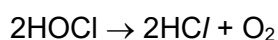


← thermal decomposition

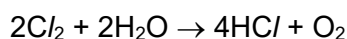
← M = Mg/Ca/Sr/Ba ← brown gas, solid melts



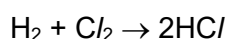
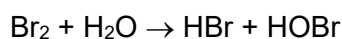
← strong oxidising agent, kills bacteria



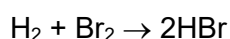
← UV light



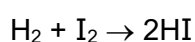
← overall reaction



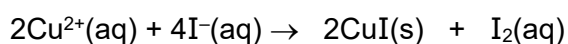
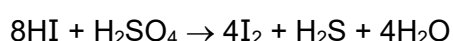
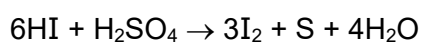
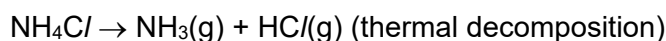
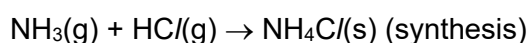
← in UV light



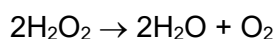
← heat gently



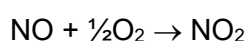
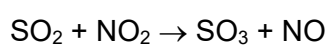
← heat



blue sol.                      off-white ppt    brown sol.



Catalysis of  $\text{SO}_3$  production by  $\text{NO}_2$



←  $\text{NO}_2$  is regenerated

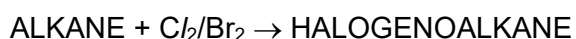
## ORGANIC:



Type: Complete combustion

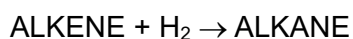


Type: incomplete combustion



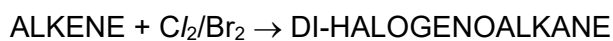
Type: homolytic free radical substitution

Condition: UV light



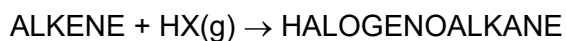
Type: electrophilic addition

Conditions: 150°C + Ni catalyst



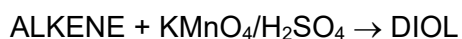
Type: electrophilic addition

Conditions: room temp



Type: electrophilic addition

Conditions: room temp



Type: oxidation/redox/addition

Conditions: dilute, cold (ie. room temp)



Type: oxidation/redox/addition

Conditions: conc., hot



Type: electrophilic addition

Conditions: 300°C, 60 ATM, H<sub>3</sub>PO<sub>4</sub>

LOTS OF ALKENE → ADDITION POLYMER

Type: Addition polymerisation

Conditions: Very high pressure

HALOGENOALKANE + NaOH(aq) → ALCOHOL + Na<sup>+</sup>X<sup>-</sup>

Type: nucleophilic substitution

Conditions: NaOH(aq) + heat under reflux

HALOGENOALKANE + NaOH(ethanolic) → Alkene

Type: elimination

Conditions: NaOH(ethanolic) + heat under reflux

HALOGENOALKANE + conc. NH<sub>3</sub> → AMINE

Type: nucleophilic substitution

Condition: Ethanolic solution of ammonia + heat in sealed tube/under high pressure

HALOGENOALKANE + HCN → NITRILE

Type: nucleophilic substitution

Condition: KCN dissolved in ethanol + heat under reflux

PRIMARY ALCOHOL → ALDEHYDE

Type: oxidation/redox

Conditions: K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>/H<sub>2</sub>SO<sub>4</sub>, distill

PRIMARY ALCOHOL → CARBOXYLIC ACID

Type: oxidation/redox

Conditions: K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>/H<sub>2</sub>SO<sub>4</sub> + heat under reflux

SECONDARY ALCOHOL → KETONE

Type: oxidation/redox

Conditions: K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>/H<sub>2</sub>SO<sub>4</sub> + heat under reflux

ALCOHOL → ALKENE

Type: dehydration

Conc. H<sub>3</sub>PO<sub>4</sub> or Al<sub>2</sub>O<sub>3</sub> or conc. H<sub>2</sub>SO<sub>4</sub>

ALDEHYDE → CARBOXYLIC ACID

Type: oxidation/redox

Conditions:  $K_2Cr_2O_7/H_2SO_4$  + heat under reflux

ALDEHYDE → PRIMARY ALCOHOL

Type: reduction

Conditions:  $LiAlH_4$  (dry ether) or  $NaBH_4(aq)$

CARBOXYLIC ACID → PRIMARY ALCOHOL

Type: reduction

Conditions:  $LiAlH_4$  (dry ether)

KETONE → SECONDARY ALCOHOL

Type: reduction

Conditions:  $LiAlH_4$  (dry ether) or  $NaBH_4(aq)$

ALDEHYDE/KETONE → HYDROXYNITRILE

Type: nucleophilic addition

Conditions:  $KCN + H_2SO_4$  + heat under reflux OR  $HCN$  with traces of  $KCN$  + heat

ALDEHYDE → CARBOXYLATE ION with Tollens' reagent

Type: redox

Conditions:  $AgNO_3(aq) + NaOH(aq)$  then add  $NH_3(aq)$

ALDEHYDE → CARBOXYLIC ACID with Fehling's solution

Type: redox

Conditions: Fehling's solution

ALDEHYDE/KETONE → HYDRAZONE

Type: nucleophilic addition-elimination

Conditions: 2,4-DNPH

METHYL KETONE/SECONDARY ALCOHOL, ETHANAL, ETHANOL, PROPAN-2-OL →  
iodoform/triiodomethane + sodium carboxylate

Type: N/A

Conditions:  $I_2(aq) + NaOH(aq)$

NITRILE + Na + ETHANOL → AMINE

Type: reduction

NITRILE + dilute HCl(aq) → CARBOXYLIC ACID + NH<sub>4</sub><sup>+</sup>

Type: acid hydrolysis

NITRILE + dilute NaOH(aq) → CARBOXYLATE SALT + NH<sub>3</sub>

Type: alkaline hydrolysis

CARBOXYLIC ACID + Na(s) → CARBOXYLATE SALT + H<sub>2</sub>(g)

Type: redox

Conditions: dry conditions

CARBOXYLIC ACID + BASE → CARBOXYLATE SALT + H<sub>2</sub>O(l)

Type: neutralization

CARBOXYLIC ACID + METAL CARBONATE → CARBOXYLATE SALT + CO<sub>2</sub> + H<sub>2</sub>O

Type: neutralization

Effervescence

CARBOXYLIC ACID + LiAlH<sub>4</sub> → PRIMARY ALCOHOL + H<sub>2</sub>O

Type: reduction

Conditions: LiAlH<sub>4</sub> should be in dry ether

CARBOXYLIC ACID + ALCOHOL → ESTER + H<sub>2</sub>O

Type: condensation/esterification

Conditions: Conc. H<sub>2</sub>SO<sub>4</sub> catalyst

ACYL CHLORIDE + ALCOHOL → ESTER + HCl

Type: condensation/esterification

No catalyst needed