Identifying ions

Reaction with water

Disproportionate reaction- when the oxidation sates of one increase and others decrease**.**

$Cl_2(g) + H_2O(l) \rightleftharpoons HCl(aq) + HClO(aq)$

HClO is used in bleach and swimming pools:

- oxidising agent and kills bacteria by oxidation.
- Health benefit out ways the risk

In sunlight

$2Cl_2(g) + 2H_2O(l) \rightarrow 4HCl(aq) + O_2(g)$

Reaction with alkali

$Cl_2(g) + 2NaOH(aq) \rightarrow NaCl(aq) + NaClO(aq) + H_2O(l)$

$CuO(s) + C(g) \rightarrow Cu(l) + CO(g)$

3. Advantages and disadvantages of the process

Advantages	Disadvantages
raw materials are very cheap	carbon dioxide is released
reaction is exothermic, so less energy is needed to keep the furnace hot	metals which are higher than carbon in the reactivity series (eg aluminium) cannot be extracted in this way
continuous process which means iron can be made more efficiently	metals which react with carbon to form carbides (eg titanium and tungsten) cannot be extracted in this way
	Some need contains significant quantities of carbon

Elimination

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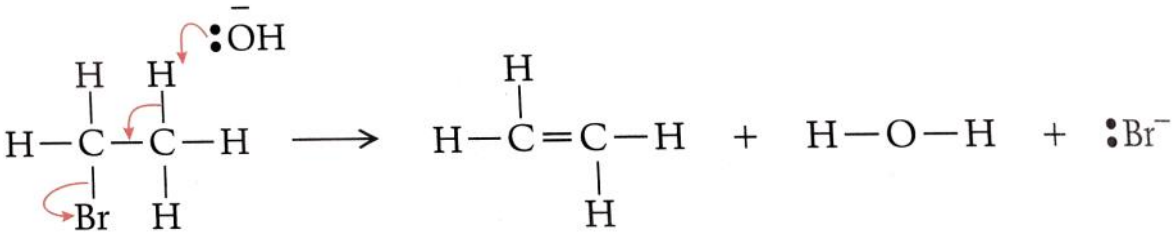
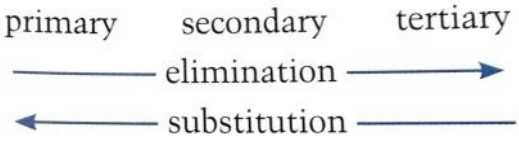
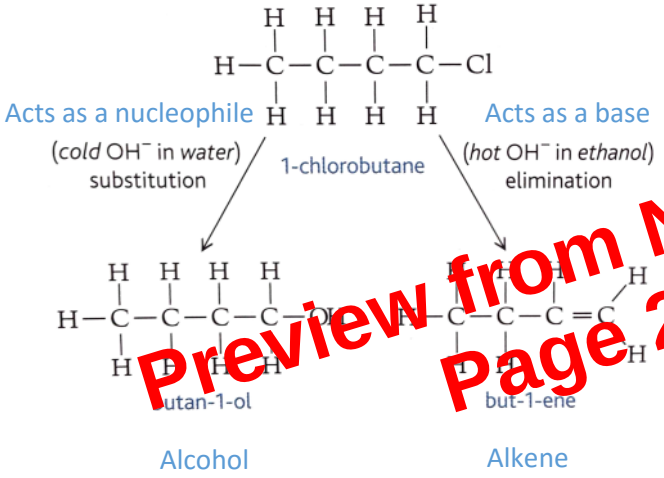
Under different conditions the OH^- acts as a base:

- Removing a H^+ ion from a halo alkane



Substitution or elimination





Isomerism

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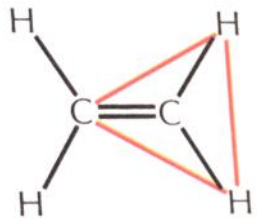
Shape of alkenes

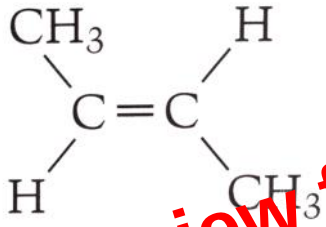
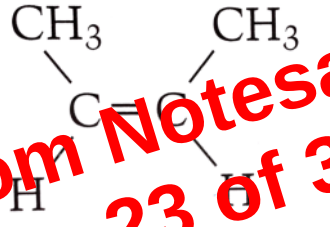


The bond angles in the planar unit are all 120°.

Positional isomerism

- The double bond is in different positions

Geometric isomerism

E - opposite (across the double bond)	Z- together (both above or below)
	
E-but-2-ene	Z-but-2-ene

Glossary

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Enthalpy change: change in heat energy under constant pressure

Standard conditions: 100 kPa and a stated temperature

Exothermic: a change during which heat is given out by the particles

Endothermic: a change during which heat is absorbed by the particles

Standard enthalpy of formation: heat energy change when one mole of a compound is formed from its elements in their standard states under standard conditions

Standard enthalpy of combustion: heat energy change when one mole of a substance is completely burned in excess oxygen under standard conditions

Activation energy: minimum energy required for a collision to be successful

Collision frequency: number of collisions between particles per second

Collision energy: combined kinetic energy of the colliding particles

Rate of reaction: change in concentration of a species per unit time

Catalyst: substance which increases the rate of a chemical reaction without itself being chemically unchanged at the end of the reaction

Dynamic equilibrium: a reaction in which the forward and reverse reactions are proceeding at the same rate, so the concentrations of reactants and products are constant

Le Chatelier's principle: if a change in conditions is imposed on a system at equilibrium, the system will react in such a way as to oppose the effect of that change

Oxidation: loss of electrons

Reduction: gain of electrons

Oxidising agent: electron acceptor

Reducing agent: electron donor

Oxidation number: charge that would be on an atom if the bonding were completely ionic

Redox reaction: reaction in which electrons are transferred from one species to another

Geometrical Isomerism: the same molecular formula, but a different spatial arrangement of atoms around a double bond

Addition: Combination of two or more molecules to form a single molecule

Substitution: Replacement of one atom or group of atoms by another

Elimination: Loss of a small molecule from a larger molecule to form an unsaturated compound

Electrophile: Species which can accept an electron pair from another species