# Cambridge IGCSE Chemistry

## Topic 7: Chemical reactions

### Redox

**Notes**

## *Define oxidation and reduction in terms of oxygen loss/gain (oxidation state limited to its use to name ions, e.g. iron(II), iron(III), copper(II), manganate(VII))*

- oxidation is gain of oxygen
- Reduction is loss of oxygen
- Roman numerals are used after an element in the name of a compound to refer to its oxidation state – normally used in reference to metals showing what + charge they have
    - E.g. iron(II) is $Fe^{2+}$, iron(III) is $Fe^{3+}$, copper(II) is $Cu^{2+}$, manganate(VII) is $Mn^{7+}$ etc...

## *(Extended only) Define redox in terms of electron transfer*

- Oxidation Is Loss (of electrons)
- Reduction Is Gain (of electrons)


## *(Extended only) Identify redox reactions by changes in oxidation state and by the colour changes involved when using acidified potassium manganate(VII), and potassium iodide (recall of equations involving $KMnO_4$ is **not** required)*

- A redox reaction is one where both oxidation and reduction take place
- If an element is gaining electrons and another is losing electrons, then the reaction is a redox reaction (or losing/gaining oxygen)
- Potassium manganate(VII):
    - Deep purple and when reduced, it becomes colourless
    - E.g. react with iron(II) chloride and colourless $Mn^{2+}$ ions are formed
    - E.g. react with sulphur dioxide and the same thing happens
    - This is because, potassium manganate(VII) is an oxidising agent and therefore is reduced itself (see below)
- Potassium iodide:
    - Colourless solution is oxidised by an oxidising agent to form brown iodine solution
    - React with hydrogen peroxide (which oxidises the iodide ions to iodine, which is brown in colour)

## *(Extended only) Define oxidising agent and reducing agent*

- Oxidising agent is a substance which oxidises another substance during a redox reaction
- Reducing agent is a substance which reduces another substance during a redox reaction

## *(Extended only) Identify oxidising agents and reducing agents from simple equations*

- Oxidising agents are reduced
- Reducing agents are oxidised
- they can be identified by recognising which elements have been oxidised/reduced in an equation